

Article

The Design and Implementation of an Innovative Course on the Creation of Cultural Landscape Images: A Case Study of Dalin Township in Taiwan

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Abstract: Innovative design-based education is a student-centered approach that aims to nurture students' proactivity, creativity, and interdisciplinary integrated skills. The curriculum planning of a course in this study incorporated design-based learning with the 4D design process. Three units were planned: field exploration and concept development, 3D wearable creations, and cultural landscape shaping. Each unit was co-taught by an interdisciplinary teacher. By means of teamwork, the students explored agricultural spaces and cultural stories, then used paper materials and mixed media to create wearable creations. Afterward, they visually recorded their unique views of traditional spaces and created cultural landscape images. To elucidate their learning outcomes and creative expression, this study adopted a mixed-methods approach. The results are as follows: (1) The students experienced positive growth in their five core competencies. Their "field-based knowledge" and "skills and technological value" were significantly improved. (2) The five major perspectives of the students pointed out that creativity stems from multicultural symbols, the learning outside-the-classroom approach reinvigorated motivation, more confidence is gained through learning by doing, teamwork can create more possibilities, and discovering one's other interests is possible through diverse exploratory approaches. (3) The teacher summarized the feasibility of designing and implementing innovative courses under three themes: conversing with methods, conversing with cultures, and conversing with teams.



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Keywords: innovative design; design-based learning; 4D design process; creation of cultural landscape images; 3D wearable creations

1. Introduction

In light of global issues such as low birth rates, population aging, digitalization, and climate change, the best way to surmount the challenges and impacts of these issues is, from an educator's perspective, to change one's instructional mindset and approaches, as this allows for the educator and their students to deepen their interdisciplinary skills, creativity, social compassion, and enthusiasm. Liberal education is the mainstay of education in Taiwan; students achieve the goal of sustainable learning by broadening their interdisciplinary perspectives and understanding, thinking, and constructing values [1]. However, Wu (2019) noted that in practical Taiwanese educational settings characterized by intellectualism, students are likely to achieve excellent personal grades at the expense of teamwork and social compassion [2]. Even though Taiwan's higher education system has fostered highly professional talents in students, they find it difficult, due to a lack of widened perspectives, to strike a balance in the workplace between humanities and technology, and have trouble engaging in teamwork [3]. In addition, classroom learning in Taiwan is mostly centered on conveying knowledge and ideas using content-oriented instructional materials. In this sense, students learn according to the logic of their discipline and acquire decontextualized fragments of knowledge [4]. Students merely acquire "packaged knowledge" at school [5]. Even though this approach allows them to view the knowledge framework rapidly and

is conducive to nurturing their professional skills, it omits the essence of “experience and knowledge-based” learning [6]. When students graduate and encounter complex social problems in real life, they are often unable to overcome these adversities and become easily frustrated.

The goal of education is to safeguard the creativity of every student and enable them to connect their acquired knowledge with the real world based on their experiences [7]. Dewey (1910) stated that the interaction between a person and the environment creates a problematic situation that is conducive to activating students’ learning motivation. The best approach to learning is through learning by doing [8], as practice-oriented teaching triggers students’ active reflection and thought, facilitating their understanding of the association between matters [9]. The complexity of real-world problems can only be surmounted through interdisciplinary thinking. Design-based learning (DBL) is a novel, interdisciplinary, exploratory, and learner-centered teaching approach that combines design thinking and design practice to create new products, systems, and solutions. This approach also enables students to explore and solve real-life design problems and engage in reflective learning through hands-on experiences [10]. The DBL process emphasizes uncovering new possibilities through interactive methods. Students increase their general and innovative skills while teachers provide guidance and instrumental support to assist them in solving problems or completing a task [11]. IDEO, a design and consulting firm, takes a human-centered design thinking approach to find innovative solutions for various issues. By successfully consolidating commercial value with technology, the firm has created numerous well-known design solutions and triggered innovation in other firms and organizations [12]. The d. school at Stanford University has also introduced design thinking courses that underscore attitudes of humanism, embracing creativity and practical thinking [13]. Liu and Kang (2017) agreed that the curriculum design in DBL should focus on solving complex problems through design thinking. Student teams study special topics with the help of interdisciplinary teacher groups [3]. DBL is a paradigm for interdisciplinary co-teaching and has attracted resource investments from various enterprises.

The university where the researcher teaches is situated on the Chianan Plain in Chiayi County, which is the county with the highest rate of aging population (18.61%) in Taiwan. The Chianan Plain is characterized by severe population aging amidst a rural backdrop. Although the government approved the Rural Rejuvenation Act in 2010 with the hope of promoting rural development and rejuvenation, the greatest barrier is that the future of rural areas remains underemphasized. As a result, younger people are unwilling to venture into rural industries, and even if they were willing, they would still lack the means to do so [14]. Thus, the researcher suggests that knowledge should not only exist in textbooks and lecture notes, and that the learning process should not be confined to classrooms or campuses. An innovative course design gives students the opportunity to be connected with local rural resources.

The aim of this study is the curriculum planning of a course in incorporated design-based learning (DBL) with the Double Diamond (4D) design process. The question of this study are will students complete a design practice through teamwork and hands-on thinking? Additionally, research is used to explore students’ learning effects and creative performance, as well as the course participation perspective of teams with excellent overall performance in the course. Finally, the teacher reflected on the feasibility of innovative curriculum design and implementation.

2. Materials and Methods

2.1. Study Design

This study applied the learner-centered learning approach to a practical course. During the learning process, several practical questions were proposed to help the students develop their active learning, critical thinking, and problem-solving skills by engaging in group discussions [15]. The learning process was also aided by multidisciplinary teachers who elicited the students’ innovative design skills through teamwork, cooperative learning, and

practical communication and design. The curriculum design comprised three instructional units: field exploration and concept development, 3D wearable creations, and cultural landscape shaping. Each unit had a multidisciplinary teacher who assisted the students to practice identifying the problem and activate their teamwork spirit. The learning process covered observation and exploration, brainstorming, inductive analysis, creative thinking, 3D wearable creations, and outcomes display. For the purpose of elucidating the students' learning outcomes and the changes in their mentality during the creation process, this study employed a mixed6methods research approach. The students' learning outcomes were quantified by means of a core competencies evaluation questionnaire, which was administered to the students as a pre-test at the beginning (week 1) and as a post-test at the end of the course (week 18). The students also completed a teaching feedback survey. The qualitative aspect centered on creation and outcome evaluations and focus group interviews to extract the students' perspectives and after-course reflection on the innovative course design. The study framework is presented in Figure 1.

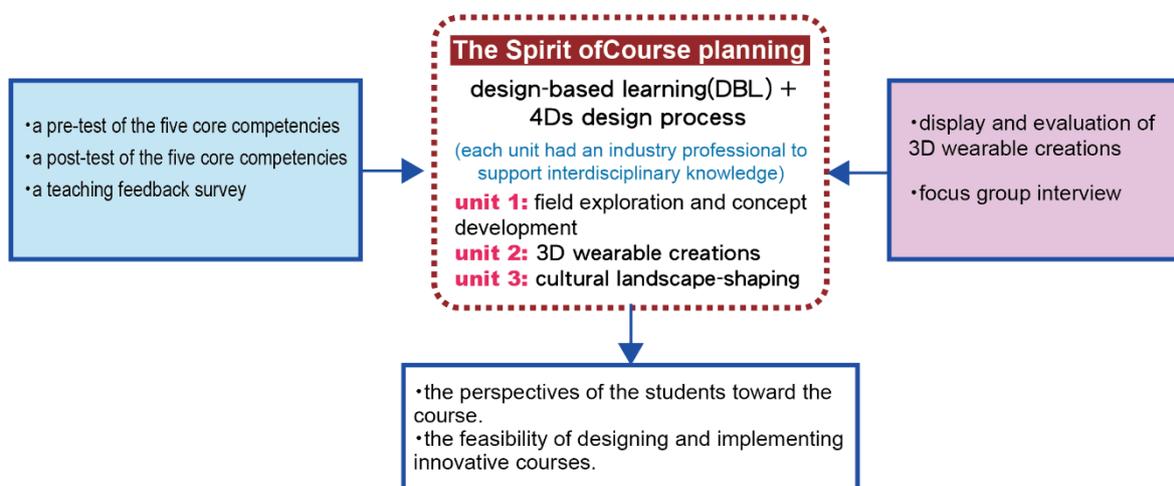


Figure 1. The framework of this study (source: this study).

2.2. Course Planning and Design Procedure

The course is designed to “take students out of the classroom” and view the world from a new perspective, collect insights with an open mind, discover something new, seek inspiration, and develop their opinions about various matters they see. The objective of this course is to enable students to interpret self-created local cultural landscape images by folding paper-based creations crafted according to their own inspirations and imagination. The source of inspiration and imagination is the pictograms of rural spaces around Dalin Township. Lynch (1960) wrote that the city image is the long-term affective connection that every urban dweller has with some parts of the city that they live in, and their image of the city is immersed in memories and full of meaning [16]. An image is a reenactment of a person’s previous sensory experiences in their memory [17]; it is a person’s subjective perception and experience of information transfer, and a mental representation that shapes perception and feelings. The importance of sensory experience lies within the sensory shaping of perception and the acquisition of cognition. Meaning is formed through the continuous interactions between memory and culture. The dynamic elements in a city, particularly human activities, are as important as the static elements. This is because we are not spectators of urban grandeur, but are rather a part of it, as we share the same stage with others. Lynch suggested that “our perceptions of a city are not sustained, but are fragmentary, partial, and mixed with other matters”. In the city, virtually all our senses operate simultaneously and the aggregation of these senses shapes the image of a city. Lynch divided the city image into five overlapping elements: paths, edges, districts, nodes, and landmarks. Districts are organized into nodes, defined by edges, penetrated by paths, and peppered with landmarks [16]. The crisscrossing of these elements

constitutes the spatial state of a city and serves as an important reference for the sensory environments of urban dwellers. The question is, how does the observer interact with the things that they observe? How does the observer interpret and organize the things they see and how much attention do they pay? How does the observer leverage the interactions between the five aforementioned elements to extract and convert the images of old cultural spaces? This study defined the design concept for the creation of imagined cultural landscapes as shown in Figure 2. This concept is rooted in the projection and extension of spaces (including culture, folklore, and objects), followed by the formation of the observed meanings through the randomness of character landscapes, followed by symbol conversion and interpretation based on the integration of composite materials (wearing the paper structures) and digital elements, and subsequently the creation of various storylines about the creators' meanderings through old and new cultural landscapes based on the spatial and routine interactions between the body, vector, and media.

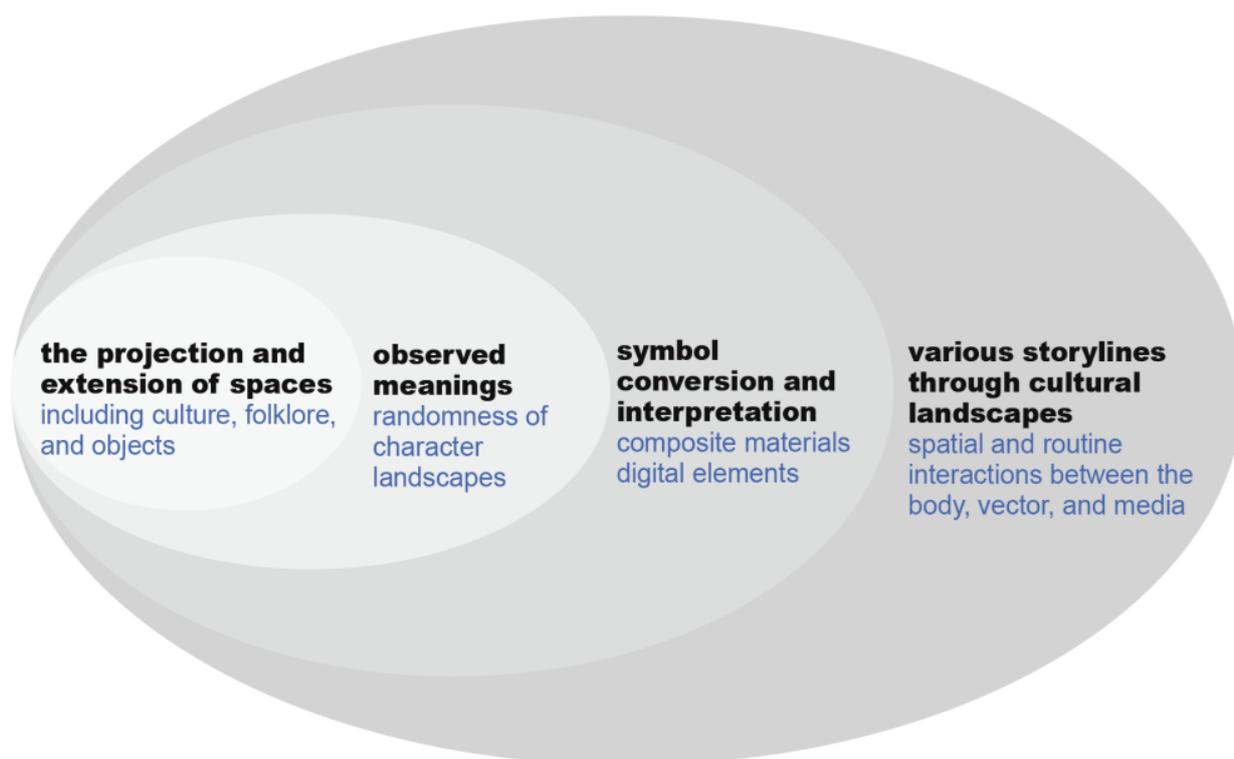


Figure 2. The design concept for the creation of self-created cultural landscape images (source: this study).

To accomplish the aforementioned objectives, the curriculum comprised three instructional units: field exploration and concept development, 3D wearable creations, and cultural landscape shaping. The complex design process in this study covered divergent thinking and convergent thinking, and the study adopted the Double Diamond (4D: discover, define, develop, and deliver) design process model developed by the Design Council (2005) [18] to plan the 18-week course (see Figure 3).

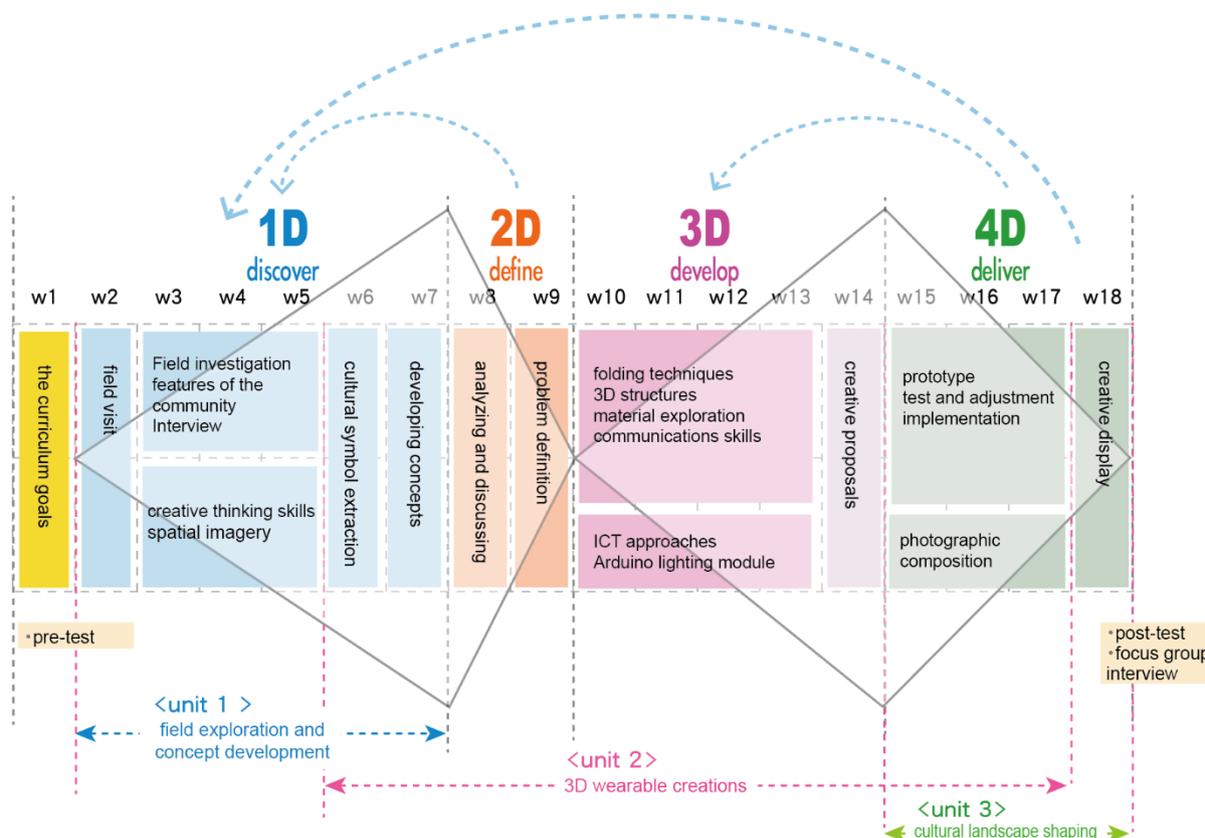


Figure 3. Applying the 4D design process in the curriculum planning of the 18-week course (source: this study).

1. 1D, discover. This stage consists of: describing the curriculum goals, activity contents, problem awareness, and various other topics; organizing on-site surveys to help students understand more about the abundant features of the community (humanistic, cultural, and geographical features, landscapes, and industries) and immerse themselves in the warmth of the spaces, images, and residents of the community; organizing icebreaker activities to train the students' teamwork and creative thinking skills, thus facilitating them in exploring the spatial imagery, extracting cultural symbols, and developing concepts;
2. 2D, design. This stage centers on the meaning of observations by using empathy maps, as well as analyzing, discussing, and defining the meanings of each team's observations;
3. 3D, develop. This stage is about symbol conversion and interpretation. The students participated in multi-perspective creative thinking activities, tested local artistic media, and developed diverse concepts including beginner folding techniques, three-dimensional structures, material exploration, design discussions, communication skills learning, and creative proposals;
4. 4D, deliver. This stage focuses on the students' storylines about their meanderings around Dalin Township. Actual practical outcomes in prototype design, design practice, audiovisual composition, and photographic and creative exhibitions were generated by leveraging the cooperation between the students and the guidance of interdisciplinary teachers (who specialize in field knowledge, ICT approaches, and photographic composition and expression).

2.3. Curriculum Design and Educational Settings

The curriculum design comprised three instructional units, each supported by an industry professional to boost the students' interdisciplinary knowledge.

1. Unit one was supported by Mr. Chiang Ming-he (who gave an 8 h course), who gave guided tours to students of the community's cultural spaces and explained the stories behind the featured attractions and friendly community spaces;
2. Unit two was supported by Mr. Lee Wang-pao (who gave a 4 h course), who specializes in ICT integration and Arduino lighting module creations. The students learned how to connect LED light strips to an Arduino board and make them flash by writing code;
3. Unit three covered photographic composition and photography techniques and was supported by Mr. Wu Ming-shu (who gave a 4 h course). He teaches students the principles of image composition and offers a visual guide to the techniques of photography.

The detailed designs and educational settings of the three instructional units are described as follows.

2.3.1. Field Exploration and Concept Development

The first task in the design process is to understand the essence of the problem [19], which can be discovered through images, forms, textures, colors, sounds, and smells. In this course, the students visited communities to have a practical experience of their rich humanistic, environmental, industrial, and landscape features. Mini getaways were also arranged to help the students discover Dalin's local features and cultural stories. Mr. Chiang himself took the students on a guided tour around Dalin, during which he explained the stories behind the featured attractions and friendly community spaces. The classroom activities consisted of a series of exercises combining creative thinking and cultural elements. The training sessions included topics such as figurative and audio associations, observation and imagination, complexity and simplicity, biomimicry, etc. Through these activities, the students activated their boundless thinking and interacted and discussed with one another to create interesting concept maps. The students were further guided to participate in knowledge construction and exploration experiences during which they fostered their independent thinking skills through visual observation, hands-on experiments, and brainstorming. Their independent thinking skills were a major driving force behind the efforts they invested in the process. The educational settings for this unit are presented in Figure 4.



Figure 4. Cont.

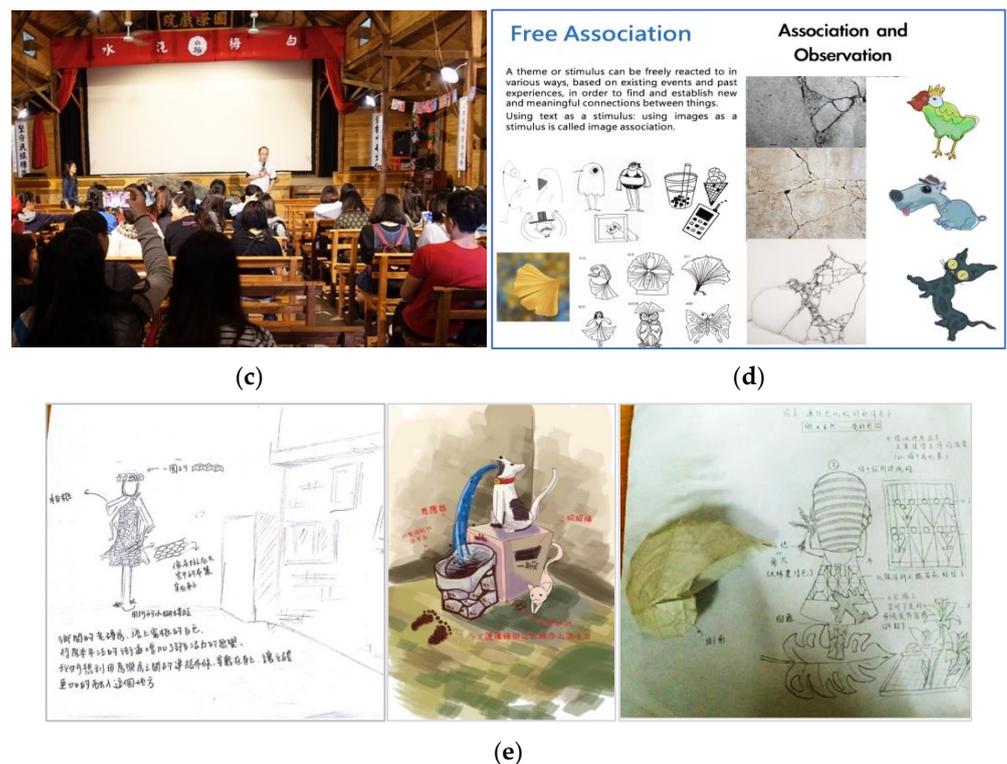


Figure 4. (a) Teamwork: ice breaker game; (b) Field visit: the miracle of Wusheng Temple; (c) Field visit: a traditional old theater brought back to life; (d) Training in creative thinking and design methods; (e) Extracting cultural symbols and discussing draft conceptualizations (source: this study).

2.3.2. D Wearable Creations

This unit covered the practical creation of three-dimensional structures from their two-dimensional forms through digital handiwork. Jackson (2011) suggested that during the process of folding, designers convert and construct 3D structures from 2D materials and provide unexpected inspiration and food for thought [20]. This course introduced geometric space-folding techniques, whereby a single piece of paper can be transformed into infinite creations and opportunities. Through techniques such as parabolas, kites, duplicating misalignments of symmetrical shapes, and expansion, a piece of paper can be folded using the same patterns into fascinating 3D structures. Then, under the guidance of ICT expert Mr. Lee Wang-pao, the students learned how to connect LED light strips to an Arduino board and make them flash by writing code. In this way, the students broadened their experience of using interactive art applications in their creations. After several weeks of conceptualization, design, discussion, and revision, all the teams gradually created 3D prototypes of their wearable creations based on the spatial conversions of specific cultures. The educational settings for this unit are presented in Figure 5.

2.3.3. Cultural Landscape Shaping

Every soundless image contains a plethora of stories and aesthetics. Zaltman and Coulter (1995) noted that we humans are often unable to fully express our deepest thoughts through speech and text, and instead we convey them through visual representations [21]. Catchings-Castello (2000) found that over 80% of communications do not rely on speech and text, but rather on image-based thoughts [22]. An environment filled with life not only creates distinctive images, but also plays certain social roles, and provides the source material for memories and symbols of collective exchanges [16]. In this curriculum unit, we invited photographer Mr. Wu Ming-shu to teach students the principles of image composition and offer a visual guide to the techniques of photography. The students brought their finished creations to the community and recorded their reinterpretations of

the cultural spatial landscapes around them through modeling language (light, colors, etc., to determine the desired image) and technical language (shutter speed, focal length, etc., to create different photographic effects). The educational settings for this unit are presented in Figure 6.



Figure 5. (a) Classroom learning in designing wearable creations; (b) Paper-folding techniques: duplicating misalignments of symmetrical shapes; (c) ICT co-teaching in interaction design technology; (d) Making a LED lighting module; (e) Integration of folding techniques for designers with lighting control; (f) Various conversational forms of the wearable creations (source: this study).



Figure 6. (a) Teaching how to display wearable creations and image demonstrations; (b) Teaching photography skills and photographic compositions.

2.4. Study Participants and Settings

The participants of this study were 21 sophomore visual art majors (5 males, 16 females, 19–22 years old, in-person classes 2 h a week for 18 weeks) who took an elective course titled “Introduction to Design”. During the course, the students visited Dalin Township in person. Dalin means “the land of verdant forests”, but the forests have now been replaced by vast paddy fields. As a typical agricultural township, Dalin enjoys abundant harvests all year round. Even though it is just a small town on the Chianan Plain, the establishment of the Dalin Sugar Factory during the Japanese occupation period was the embodiment of the town’s booming industry. Additionally, during the 1950s–1960s, there were two major military camps in Dalin (Zhongkeng and Qiding), which remain in the memories of many men who were stationed there. At that time, Dalin was a thriving entertainment hub, with establishments such as the Xue Xiang Ting Restaurant and the Wang Guo Cinema, bearing witness to the bygone days of prosperity and jubilation. Nowadays, Dalin’s heydays are over, and the town is impacted by population migration and aging. However, its hospitality remains unwavering, and the residents’ enthusiasm toward other people, and all sorts of objects, as well as to their hometown, is still strong. The students developed storylines about their meanderings around Dalin Township based on the aforementioned traditional elements and through deeper cultural exploration and imagination.

2.5. Study Instruments

2.5.1. Quantitative Instruments

1. Student core competencies scale

The student core competencies scale developed in this study was adapted from the interdisciplinary integration-based core competencies scale [23]. The scale comprised 35 items across five core competency indicators that were revised in accordance with the study objectives (see Appendix A). The five core competencies were: “team communication” (seven items), “implementation” (six items), “field-based knowledge and skills” (six items), “technological value” (six items), and “reflection” (ten items). All items were measured on a five-point Likert scale (ranging from strongly disagree to strongly agree). The scale was administered as a pre-test in the first week of the course and as a post-test in the 18th week. In addition, because the number of students taking the course is less than 30, a small sample of nonparametric tests is used for data analysis (this study uses the Wilcoxon Signed Ranked Test [24]) to understand the course pre-test and post-test differences.

2. Course feedback survey

After the course had concluded at the end of the semester, the students had to complete a 13-item course feedback survey that was designed by the university administration (see Appendix B). Nine items pertained to the students’ perceptions about the teachers’ preparedness, professionalism, and attitudes during the course, while four items pertained

to the students' own learning attitudes. All items were measured on a five-point Likert scale. Additionally, one item can be free to fill in the open opinions.

2.5.2. Qualitative Instruments

1. Display and evaluation of 3D wearable creations

The evaluation criteria and score weighting of the wearable creations are shown in Table 1. The criteria were the overall performance of the creations (concept, aesthetics, and innovative thinking), which accounted for 70%, the application of technology, which accounted for 10%, and teamwork, which accounted for 20%. The evaluation process was jointly carried out by the teacher and the three co-instructors.

Table 1. Criteria for the end-of-semester evaluation of the wearable creations.

Team Member					
Title					
Creative Concept					
Evaluation Items	Overall Performance (70%)			Technology (10%)	Teamwork (20%)
	Concept (20%)	Aesthetics (20%)	Innovative Thinking (30%)		
Description	The appropriateness of a creation with respect to the definition of the problem and the subjectivity if conversing with urban spaces.	The overall aesthetics that constitute the shapes, colors, artistic expression methods of the wearable creations' shapes, colors, and expression skills.	The conceptualization of the creations as well as the means of conversion, interpretation, and expression, and the ability to demonstrate a unique and innovative imagination of the cultural landscapes.	The originality and appropriateness of applying technology when creating wearable creations, as well as the completeness of the audiovisual storylines.	The communication within team members and their rapport during the creation process.
Score					
Total Score					
Comment					

2. Focus group interview records

DBL emphasizes learners' autonomous learning after facing problems. Correcting and constructing knowledge in the continuous learning experience, finding solutions, and obtaining practice are also important. Additionally, this study aimed to understand the various views of team members who performed better overall when participating in this innovative curriculum design. Therefore, we will invite the top three teams with the best overall performance after 18 weeks to engage in semi-structured focus group interviews. Each interview lasted for 60 to 90 min and focused on the underlying context of the students' creations, the students' attitudes toward the course, their opinions on teamwork, and their personal views (see Appendix C for the interview outline). The reason for employing the focus group interview approach was to allow team members to interact with one another freely in small groups of three to five. Since everyone had cooperated and performed tasks alongside each other, they could elaborate more freely about their overall learning experience, situation, feelings, and opinions toward group interactions when asked open-ended questions. The host of the interview (the researcher) played the role of asking questions, listening, and maintaining the order of the interview process, as

well as ensuring that everyone had a chance to speak. The entire interviews were recorded in audio, transcribed, and then coded.

3. Results

3.1. Student Core Competencies Scale Results

Figure 7 shows the total pre-test and post-test mean values of the five core competencies of “team communication”, “implementation”, “field-based knowledge and skills”, “technological value”, and “reflection”. The results indicated that the students had positive growth in all five competencies. Furthermore, the pre-test and post-test, which use the Wilcoxon signed ranked test (see Table 2), revealed that the level of significance of the students’ “field-based knowledge ($z = -2.987, p = 0.003$)” and “skills and technological value ($z = -2.192, p = 0.028$)”, with a significant value as $p < 0.05$. This indicates that after participating in the course, the students significantly improved their “field-based knowledge” and “skills and technological value”.

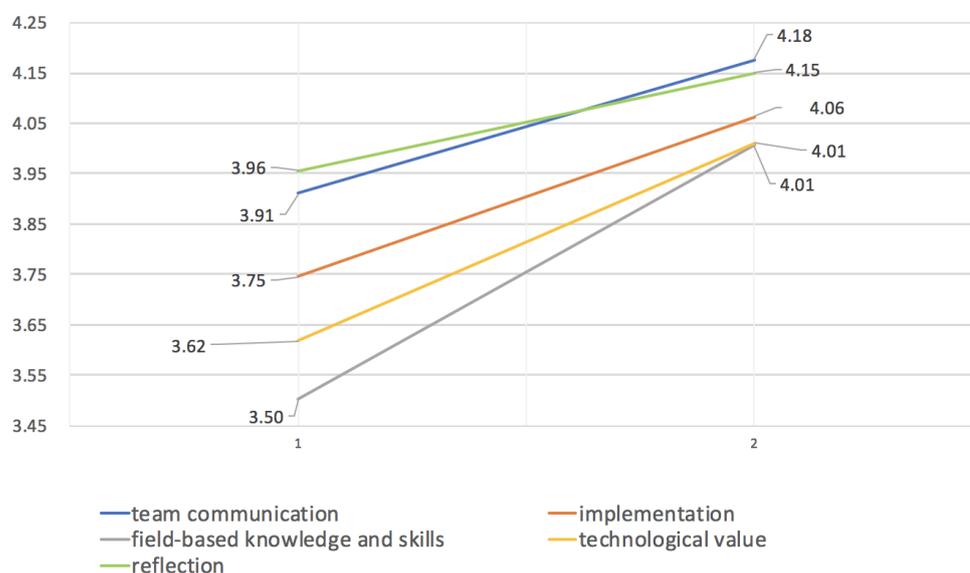


Figure 7. Pre-post-test analysis of the five core competencies (source: this study).

Table 2. Pre-post-test of the Wilcoxon signed ranked test results.

	Negative Ranks			Positive Ranks			Test Statistics		
	<i>n</i>	Mean Rank	Sum of Ranks	<i>n</i>	Mean Rank	Sum of Ranks	Ties	Z	<i>p</i>
Team communication (post-pre)	6	7.58	45.50	12	10.46	125.50	3	-1.747 ^b	0.081
Implementation (post-pre)	6	10.33	62.00	14	10.57	148.00	1	-1.610 ^b	0.107
Field-based knowledge (post-pre)	3	10.00	30.00	18	11.17	201.00	0	-2.987 ^b	0.003 *
Technological value (post-pre)	5	7.10	35.50	13	10.42	135.50	3	-2.192 ^b	0.028 *
Reflection (post-pre)	7	9.79	68.50	12	10.13	121.50	2	-1.068 ^b	0.286

* $p < 0.05$; ^b Based on negative ranks.

3.2. Course Feedback Survey Results

The results of the students’ 13-item course feedback survey. The overall satisfaction was 4.44 (standard deviation = 0.66), indicating that the course received a strong and favorable reception from the students. Additionally, the students gave substantial positive feedback for the course in the open opinions on the last question of the questionnaire, such as:

The teacher pays attention to our study (student 1). She is a very serious and friendly teacher (student 2). I think I have learned a lot (student 4). The teacher is really hardworking in class, showing us a lot of work, guiding us really hard, and giving us a lot of new stimuli (student 7). The teacher was very thoughtful and asked us to go to Dalin to do local cultural connection creation (student 11). I hope to have more time to do it next time (student 12). The creation combines old and new elements and creates unique ideas and finished products, and because of the combination of local customs, the whole event has a strong human touch (student 17). Although I feel tired during the creation period, the sense of accomplishment at the moment of making the work is full of emotions (student 19). Very happy with the finished product (student 20).

3.3. Displaying the Wearable Creations

Figure 8 shows the students displaying their creations of cultural landscape images. The researcher and the three interdisciplinary teachers co-evaluated the creations, and the results are shown in Table 3.



Figure 8. The seven teams wearing their creations on the 18th week of the course (source: this study).

Table 3. Evaluation results of 7 groups of end-of-term wearing works.

No	A	B	C	D	E	F	G
Works							
Team name	Do you remember you?	Jingle bells	Elves	Migration	Bless and light	Slow city slow travel	Time machine
S1	64	65	61	67	66.5	60	58
S2	6	8	7	8	8.5	6.5	6.5
S3	17	18	17	19	17	15.5	15.5
Sum	87	91	85	94	92	82	80

S1: overall performance of the work (70%); S2: technology application (10%); S3: teamwork (20%); Sum: total score.

The three winning teams were team D “Migration”, team E “Bless and light”, and team B “Jingle bells”. The teams discussed their creations and then consolidated them into a storyline titled “Hi Dalin! A conversation with slow-paced life” (The order of presentation of the three groups of works: team D-team B-team E).

Wandering around Dalin at a slow pace.
The bygone era of the town is rooted in its serenity,
the flowers bloom and wither, the times change, yet the one thing that
remains is Dalin’s distinctive warmth.
Those who migrated away return to their hometown and recollect the fond
memories of their childhood.
The residents express gratitude to the gods for blessing them all year
round.

1. Migration (team members: You Songlin, Wang Yixin, Shi Huiwu, Chen Yaqi, Liao Chuying)

Wandering around Dalin at a slow pace. Dalin is renowned for being a “slow city” and has unhurried and genial beauty. We used snails and migratory fish to symbolize a person’s return to their hometown and to showcase the traditional features and wonders of Dalin. We take you on a tour of Dalin’s incomparable traditional serenity. Here, roots begin to grow on an unassuming plot of land, and then flowers begin to bloom. From generation to generation, the antiquated and natural ambiance of the town awaits our senses (see Figure 9).



Figure 9. Images of team D’s wearable creation themed “Migration” (source: this study).

2. Jingle bells (team members: Li Kaili, Luo Peiyun, Lin Lian, Zhang Jiayu)

Returning home and reminiscing about childhood. We transformed into “jingle fairies” who wander around the city. The fairies’ style of carrying an umbrella and a mock water heater is inspired by the old ceramic tiles found in the streets and alleyways of Dalin (in days of yore, Taiwanese bathtubs were often furnished with decorative tiles). The ceramic tiles decorated on the transparent raincoat and the paper-folded water splashes on the umbrella are depictions of a fairy returning to its hometown in search of the subtle beauties within (see Figure 10).



Figure 10. Images of team B’s wearable creation themed “Jingle Bells” (source: this study).

3. Bless and light (team members: Wu Zhixian, Song Peirong, Zheng Xuan)

The gods bless and protect the people. The inconspicuous Dalin Wusheng Temple is hidden in a secluded alleyway. Although the temple does not boast a majestic grandeur, the resident Holy Emperor Guan has blessed the people of Dalin and overseen countless miracles in the form of divination block tossing. Many have borne witness to its divinity. Our concept is based on the practice of divination block tossing, which symbolizes the blessing of the gods: yellow symbolizes the god's divine brilliance, the green poncho, cloud patterns, and the blue and white paper quilling designs each represent the land, sea, and sky and personify the unity between humans and the heavens. Streams of light are generated on the Arduino platform via Bluetooth. With the blocks held in both hands, a sincere heart would light up the head-mounted block to show that the gods understand your inner thoughts and feelings (see Figure 11).



Figure 11. Images of team E's wearable creation themed "Jingle Bells" (source: this study).

4. Reflection and Discussion

4.1. Perspectives of the Students

To consolidate the students' reasons for participating in this innovative course, the top three performing design teams (twelve students: five from Team D, four from Team B, and three from Team E) participated in focus-group interviews after the course had concluded to share their personal opinions about the course. The interviews were held on the Monday of the 19th week at 10:00, 13:00, and 15:00. Each group's interview lasted 60–90 min. The entire interviews were recorded in audio, transcribed, and then coded. (Coding format: D1-Q1-03 refers to Student No. 1 from Team D, who was the third person to respond to the first question.) The five major perspectives of the students in general toward the course are summarized as follows.

1. Creativity stems from the interpretation and conversion of cultural symbols. Lynch (1960) suggested that various differences and relationships exist in the environment, and the observer employs a strong ability to adapt, choose, organize, and give meaning to what they see in accordance with their goals [16]. During the course, the students collected and interpreted cultural symbols around them based on their own observations and experiences. Their ability to do so was rooted in their prerequisite knowledge and literacy as well as their imagination of local stories from an observer's standpoint.
 - Team D interpreted the symbols and metaphors of local cultural symbols by illustrating the atmosphere of a slow city and migrants returning home. They emphasized the application of paper materials, the dynamic aesthetics of wearing the creations, and the use of lighting to form images and cultural storylines (see Table 4).

Table 4. Team D members' ideas on the interpretation and conversion of cultural symbols.

Verbatim	Coding
Clothes and accessories are made of origami fish, which symbolizes migration. Many young people in Dalin leave their hometowns. There are many fish heads facing the protagonist in the work, hoping that young people can go back to their hometowns.	(D4-Q1-10)
The snail represents Dalin's guardian elf, who illuminates the road in the dark at any time and protects everyone.	(D5-Q1-15)
Three-dimensional window grilles are made of origami, and the cellophane is translucent and shiny, which means breaking through the tradition, and the feet are surrounded by trees and vines.	(D3-Q1-16)
The long skirt symbolizes the snail's saliva, and the traces of walking, and there are different kinds of fish, which means that the heart is attached to Dalin.	(D2-Q1-21)

- Team B was inspired by time traveling in which the interactions between antiques and childhood scenes resulted in conversations between childhood merriment and old spaces (see Table 5).

Table 5. Team B members' ideas on the interpretation and conversion of cultural symbols.

Verbatim	Coding
The abandoned shower room represents the childishness of the old space, with green iron grilles on the raincoat and apple green and purple floor tiles.	(B1-Q1-12)
There are many cats in the community, and they are talking with the enthusiastic and lively Jingle Fairy wearing a red scarf.	(B2-Q1-17)
Using slow-motion photography, the little elves walking through the alleys seem to be back in the Japanese alleys.	(B4-Q1-11)

- Team E was inspired by the spiritual sustenance of local religious beliefs. To symbolize the gods' spiritual blessing of Dalin residents, they fused innovative interactive technological elements with temple imagery, folklore, and colorful structures (see Table 6).

Table 6. Team E members' ideas on the interpretation and conversion of cultural symbols.

Verbatim	Coding
The temple is the patron saint and belief of the region, and the lights bring the image of hope and protection.	(E3-Q1-26)
The stand-up of moon blocks of Liyan in Wusheng Palace represents the coming of the gods. The color is bright red and green of traditional temple fairs.	(E1-Q1-02)
When the small moon blocks in the hand collide, the LED light of the big moon blocks on the head will be triggered and light up, representing the feeling of the coming of the gods. Use exaggeration to collide with traditional elements.	(E2-Q1-25)

2. The learning outside-the-classroom approach reinvigorated the students' curiosity and motivation. Huang (2013) suggested that the prerequisite for shaping new cultures is for people to leave their personal space, show concern for society and their surroundings, and reassess themselves based on their position in the world [25]. In the post-lesson interviews, several students divulged that they grew up in rural areas or that their grandparents had lived in rural areas. Taiwan's economic boom, however, has changed livelihoods as people have moved to the city, thereby widening the urban-rural gap. When they had the chance to revisit rural areas and observe agricultural landscapes, the students had fond recollections of their childhood, which triggered ripples of nostalgic affection and imagination (see Table 7).

Table 7. Student perceptions of learning outside-the-classroom.

Verbatim	Coding
Impressed to go out and enjoy the course schedule.	(E1-Q4-01)
Few teachers take us out of school to attend classes. After seeing the experience with my own eyes, I will have more ideas before making work.	(D5-Q2-03)
Create after actually feeling, the things you make will have feelings.	(D4-Q4-05)
You can go out to play for the first time in class. I was shocked to see things that I couldn't see before, like the stories of old theaters. The tour guide told a lot of secrets about Dalin and interesting stories about residents' lives. Our younger generation doesn't know the real face of Taiwan.	(B1-Q3-03)
Most of the students are very willing to spend time on this course. Although it is troublesome to go to Dalin all the time, I am very happy every time I go to Dalin to find inspiration.	(B4-Q3-13)
I feel that I usually see too few things. If I didn't go to that community to see so many things, I wouldn't have seen a lot of connotations.	(E2-Q6-02)
Going outside is not just in the classroom, digging out local characteristics.	(B2-Q6-02)

3. Gaining a sense of achievement and confidence through learning-by-doing. By answering questions during the learning by doing the teaching approach, the students were able to systematically activate their insight and observation skills to identify target users and solutions through group discussions. This process of searching data to solve problems is in line with the principles of Dewey's learning-by-doing approach and is the primary goal of DBL, i.e., the most effective learning outcomes are acquired through problem-solving (see Table 8).

Table 8. Student perceptions of learning-by-doing (1).

Verbatim	Coding
I like to choose the objects I want to make, and I am very excited when I see shelves full of materials.	(E2-Q4-21)
Origami for the first time requires patience, and it often breaks accidentally, but it is amazing, to see a piece of paper turn out to be very powerful. In the future, I would like to continue to study.	(B1-Q3-09)
I like that after the work is finished from the sketch, the whole work is then shot in real life. The work is very beautiful and has a sense of accomplishment.	(D2-Q4-06)
The overall sense of accomplishment the moment the work is completed.	(B2-Q3-10)

In a TED talk, sports psychologist Dr. Ivan Joseph stated that creative confidence is like muscle strength: it can be improved through training and gaining experience [26]. In general, people with more creative confidence are more capable of making good decisions, are willing to try new things, and find solutions to overcome adversities (Table 9).

Table 9. Student perceptions of learning-by-doing (2).

Verbatim	Coding
During the process, I was a little anxious, had too little time, unable to complete it, and there were many negative emotions. But in the end, the team completed the finished product together and won awards in the competition. The feeling of being recognized after suffering first, I feel a sense of accomplishment.	(E1-Q7-02)
It feels very fulfilling to finish the cloak, and I like that everyone stays up all night doing it together.	(E3-Q4-06)
Although I feel tired during the creation period, it is very fulfilling and special. I am very excited that the work can return to its original place and interact with the space.	(D3-Q2-05)
At the presentation of the results, everyone's works are very interesting, and everyone is on the stage together.	(B2-Q3-02)
In the beginning, you need to overcome the eyes of others, but some persistence is necessary, so do it if you feel confident.	(D1-Q3-08)

Axel Honneth stated that when a person receives gratitude from society, they recognize their value and worth to society and others. This recognition allows the person to discover their usefulness to society and others [27] (see Table 10).

Table 10. Student perceptions of learning-by-doing (3).

Verbatim	Coding
I like the feeling of returning to Dalin after the actual operation. It is a good thing to give back to it with my own strength and help it with my thoughts on this town.	(D1-Q4-04)
Dalin has a common memory of us coming from the countryside.	(D5-Q2-07)
Help towns develop (discover) local characteristics that cannot be replaced by others, and will want to join the community to assist in the future.	(D1-Q6-03)

4. Creating more possibilities through the joys and sorrows of teamwork. Shan and Ho (2003) indicated that teamwork is characterized by helpfulness, coordinated efforts, a shared approach to working, open communication, and friendliness [28]. For art students, however, teamwork is often a major obstacle because students prefer and are used to making creations by themselves, in freedom and without constraints from others. Even though they have excellent individual performances, they crumble during teamwork efforts and are unable to listen to others or express themselves to others, and they have poor emotional quotient levels. By implementing design-based learning and teamwork tasks, this course exposes students to longer opportunities for balancing their relationships with others. This is important in teamwork as some people are natural leaders while some prefer to be subordinated (see Table 11).

Table 11. Student perceptions of teamwork (1).

Verbatim	Coding
This course pays attention to teamwork, and it is really difficult for one person. I used to think that doing things alone is more efficient, but this time I have a chance to think that the group is not bad.	(D4-Q3-06)
If you have any ideas, you must speak them out. Some team members may be afraid of being denied or afraid to speak up. Our group was very excited during the discussion as if they were debating, but it was fine after the discussion.	(D3-Q7-2)
In my department, we all created by ourselves. This time we all made it together. No one was particularly tired or idle. We all thought made and cut together . . . It was hard work but fun.	(B1-Q7-05)

Cooperation requires expressing opinions, sharing tasks, taking coherent action, and excellent communication. Rapport is formed between team members when, after prolonged acquaintance, they get along well with one another. Interestingly, even when each team member had their own firm beliefs (their pursuit of perfection), they were still able to work as a team to produce creations that were consistent with their designs and that surpassed their expectations. The students gained more experience in experimenting with different materials and methods, and overcame their shyness when performing in the community with their teammates. In addition to gaining more interactive experience, they also formed friendships with kindred spirits. Even when everyone insisted on pursuing their own way to perfection, the students nonetheless worked well as a team (see Table 12).

Table 12. Student perceptions of teamwork (2).

Verbatim	Coding
I insisted on a lot of things. I thought the window grille was ugly after it was finished. I took it down and tried three different materials before it succeeded.	(D3-Q4-11)
I stick to film quality.	(D1-Q4-12)
The persistence of the team makes our work perfect, thank you for everyone's persistence, and let us keep doing it.	(D4-Q4-27)
There are so many situations in the process that make people want to give up, but in the end, it is persistence, so I want to cherish it very much.	(B4-Q6-07)
I would like to thank my team members for their hard work in making the quality of the work achieve excellent results, and I would also like to thank the teachers for their hard work so that our creative ideas can be revealed and put into practice.	(B3-Q3-05)
Learned a lot from the team members and enjoyed the cooperation.	(E3-Q5-02)
During the process, we were arguing about the design performance. (Ha) In the end, the quarrel became very pleasant.	(E2-Q5-03)
The risk of cooperation is shared by everyone, which is more efficient, and it is great to have a chat partner.	(E1-Q4-26)

5. Discovering one's unique interests and expertise through diverse exploratory tasks during the course. Wu (2019) found that regardless of their academic achievements or social participation, university students were capable of gaining a sense of accomplishment and reinforcing their confidence when they expressed themselves [2]. The curriculum of the course in this study was designed in accordance with DBL. The students would seek solutions through discussions or learn new things from external sources when they encountered problems. This indicates that every student had their own talent and had opportunities to discover their strengths and interests when they were dealt with different possibilities for exploration and stimulation. These experiences gradually became their nourishment and source of empowerment as they intangibly unlocked their hidden potential (see Table 13).

Table 13. Student perceptions of diverse exploratory tasks.

Verbatim	Coding
The most impressive thing is origami. The first time I came into contact with it (laughs), I was crazy about folding, and then I started to pay attention to origami skills.	(D3-Q3-01)
Because origami is difficult to fold, I thought it was cool when I first came across it.	(E2-Q3-05)
I insisted on various camera angles, and later went to take photography courses and paid attention to the application of clothing styling.	(D2-Q3-02)
I take photography classes, learning photography skills, dynamic photography, and various composition.	(D1-Q3-03)
Interactive art has always been difficult, but after getting in touch with it, it is really interesting and I really want to learn it.	(D5-Q3-05)
The creative thinking unit is very interesting, the teacher's course presentation file is very exciting, the expression of crack transformation is great, and the use of paper to make clothes is also amazing.	(B1-Q3-14)
The bionic design is so cool, I never thought that nature can be our teacher everywhere, and the example of machinery using wind and kinetic energy to rotate itself is attractive.	(E1-Q3-15)

4.2. Reflection of the Teacher

After a semester of the 18-week course, the presentation of students' creative works, the feedback on students' core competencies self-evaluation, and the perspectives of three groups of students' focus group interviews were assessed. The teacher reflected on the course and summarized the feasibility of designing and implementing innovative courses

under three themes: conversing with methods, conversing with cultures, and conversing with teams.

1. **Conversing with methods.** This study applied the learner-centered learning teaching strategy in combination with DBL so that students could learn outside the classroom and connect with their surroundings, thus generating more motivation and direction. Learning by doing allowed them to have practical hands-on experiences in which they experimented with various materials and new technologies and widened the depth and breadth of their perspectives, thus sparking more creativity. Lastly, by implementing multidimensional evaluations, the teachers were able to identify the advantages and drawbacks of the curriculum design and the students' learning habits and genuine opinions, which served as a reference for future revisions to the teaching approach. Rapid social developments in recent years have broadened the scalability of design thinking and creating. Therefore, this teaching method should be more in line with the market situation and environmental conditions, with revisions and adjustments made whenever necessary. This is especially important in teaching art design courses, as teachers not only have to impart theoretical knowledge, but must also be able to design practical tasks to increase the significance of accumulating knowledge and experience. When correct teaching methods are used, students will react positively to teachers' dedication and useful teaching content.
2. **Conversing with cultures.** The course connected local agricultural and rural resources to simulate the students' thinking skills with respect to humanities exploration, media integration, innovative performance, and localized implementation. This concept is not merely a sudden flash of inspiration, but an entire storyline about a life or some other issue. An environmental image is the result of the mutual effects between an observer and their surroundings. Through different perspectives, students learned about the diversity of people, matters, time, land, and objects in urban landscapes, thus expanding the meaning of observing. The students also exuded different levels of self-confidence through their creations.
3. **Conversing with teams.** The course emphasizes teamwork and interdisciplinary co-teaching, as well as the 4D framework (discovering, defining, developing, delivering), to enable the students to improve their practical skills and rapidly transform their ideas into action while continuously making revisions and adjustments to complete their creations. The process of teamwork is marked with highs and lows and it takes time for team members to get along well with each other. However, with the correct materials and a spirit of experimenting with different approaches, the students overcame their reservations about performing in public, took their share of the blame for making mistakes, and enjoyed the process of chatting and debating. They truly experienced the value of having a friend in need. The students were also grateful for the opportunity to cooperate with one another as they found that, instead of doing it alone, they required a partner to make their creations. Additionally, interdisciplinary co-teaching allowed the experts to impart knowledge about diverse technical concepts to the students and break down the barriers or difficulties of teachers teaching alone, thus adding more creativity and modernity to the overall course.

Design-based learning (DBL) with the Double Diamond (4D) design process combined design thinking and design practice education methods. It conducted a series of experiences, capture, transformation, deconstruction, re-organization, interpretation, and practice through the process of learning by doing [10]. Students can not only learn the ability to solve problems but also improve their ability to communicate, share, and team-work in group learning. It indicated that the introduction of curriculum design thinking in the new era increased students' new learning perspectives and further understanding of what is meant by the foundation of innovation, the breakthrough of creativity, and the value of creation.

5. Conclusions and Suggestions

Tertiary education should not only stress enhancing students' professional knowledge but also underscore their thinking skills and problem-solving capabilities. After experimenting with various teaching methods, the researcher concludes that design should not only be confined to objects, but more importantly, the underlying human-to-human, and human-to-environment relationships. As such, design creations can be applied in life more actively to create greater value. The curriculum enabled students to gather local elements by starting from the standpoint of agricultural spaces and cultural contexts. By mixing paper-folding techniques with other composite materials as well as interactive Arduino lighting modules, the students produced wearable creations that reflected their imagination of the current cultural landscapes. Lastly, through photographic compositions and aesthetics, the team members wore their customized creations and took part in photoshoots around the community to evoke their imagination of specific cultural spaces and cultural stories. The students perceived this series of curriculum designs as a novel, out of the box, challenging, and interesting activity, and as a suitable platform for younger generations to express their opinions on current issues. According to this purpose, the key research results were as follows:

First, the quantitative results showed that the students experienced positive growth in their core competencies of "team communication", "implementation", "field-based knowledge and skills", "technological value", and "reflection". The Wilcoxon signed ranked test results reveal that after taking the course, the students significantly improved their "field-based knowledge" and "skills and technological value". This suggests that the integration of theory and practice evoked the students' curiosity and motivation, and the combination of learning and living environments expanded their views and allowed them to acquire more enjoyment and knowledge. The introduction of new technology broadened the scope of their imagination.

Second, the five major perspectives of the students in general toward the course are summarized as follows. (1) Creativity stems from the interpretation and conversion of cultural symbols. (2) The learning-outside-the-classroom approach reinvigorated the students' curiosity and motivation. (3) A sense of achievement and confidence is gained through learning by doing. (4) More possibilities are created through the joys and sorrows of teamwork. (5) One's unique interests and expertise are discovered through diverse exploratory tasks during the course. During the process of innovative thinking and hands-on experience, the students became more confident, gained practical skills, and naturally came to relish the sense of achievement brought on by their efforts. They also found opportunities to infuse vitality and imagination into community spaces.

Finally, the teacher reflected on the course. (1) Conversing with methods: design-based learning (DBL) with the Double Diamond (4D) design process, to bring students more creativity and motivation. (2) Conversing with cultures: step out of the classroom to activate the students' five senses to explore and create inspiration. The diversity of people, things, time, place, and cultural landscapes had become the best nutrient for students to learn, and it also increased their sense of identity and self-confidence. (3) Conversing with teams: the student team achieved design practice in the division of labor, joint learning, exploration, and communication, and also under the collision of introducing cross-field teaching, it stimulated more sparks of innovation for students.

It is worthy of congratulations that the students' work "Hi Dalin! A conversation with slow-paced life" won a special award in the "Innovation, Creativity, and Entrepreneurship" three-creation competition of the Smart Life Integrated Talent Cultivation Program of the Ministry of Education in Taiwan. It was the greatest affirmation of the efforts of the course students. Moreover, the school courses entered the community, and after a long period of communication, a relationship of mutual trust and assistance was established. We were also invited to be partners of the "Community Empowerment Project". Thus, curriculum planning that combines design-based learning (DBL) with the Double Diamond (4D) design process has positive feedback on teaching innovative design. It can nurture

students' active stance, proactivity, creativity, social compassion, and interdisciplinary and integrated thinking skills.

In addition, due to the time factor and the purpose of this research, this study only conducted focus interviews of the top three teams with the best overall performance. In the future, curriculum planning for all students to be interviewed can provide a more comprehensive understanding of students' views on innovative teaching methods. Additionally, the gap between different groups of students can be analyzed, and more complete insights on instructional design-based learning (DBL) and the 4D design process can be put forward.

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Institutional Review Board Statement: Ethical review and approval were waived for this study due to the fact that this study does not involve human experimentation, psychological stress, or anything that may cause physical or psychological damage to the students.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

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Appendix A

The questionnaire of the student five core competencies scale.

Dear students: This questionnaire mainly wants to know the status and thoughts of each student's five core abilities before and after the course of "Introduction to Design" this semester, so please tick the box with your exact thoughts at this stage.

No	Question	strongly disagree	disagree	neutral	agree	strongly agree
core competence: team communication						
1	I can listen to the professional opinions put forward by team members.	1	2	3	4	5
2	I can give back my ideas to my team members.	1	2	3	4	5
3	I can understand the main direction of the discussion when discussing it with team members.	1	2	3	4	5
4	I can understand the professional terms used by team members when communicating.	1	2	3	4	5
5	I can use effective communication tools to facilitate communication with team members.	1	2	3	4	5

No	Question	strongly disagree	disagree	neutral	agree	strongly agree
6	I can work together with team members to complete the task objectives.	1	2	3	4	5
7	I enjoy working with team members to accomplish mission goals.	1	2	3	4	5
core competence: implementation						
8	I can actively discover problems encountered in the process of teamwork tasks.	1	2	3	4	5
9	I can propose practical solutions to problems identified during teamwork tasks.	1	2	3	4	5
10	I can evaluate how I was doing in teamwork when working with team members on tasks.	1	2	3	4	5
11	I can evaluate how my peers were doing in teamwork when working with team members on tasks.	1	2	3	4	5
12	I can evaluate how the overall performance of were doing in teamwork when working with team members on tasks.	1	2	3	4	5
13	I can make specific suggestions for improving the performance of the teamwork after completing tasks in cooperation with team members.	1	2	3	4	5
core competence: field-based knowledge and skills						
14	I can notice current conditions and trends in rural communities	1	2	3	4	5
15	I can understand the advantages, disadvantages, and characteristics of spaces in rural communities	1	2	3	4	5
16	I can understand the distinctive places or cultural stories of the spaces in rural communities	1	2	3	4	5
17	I can understand the domain knowledge of the field (e.g., size, style, media, sense of space) when performing spatial creation in a rural community.	1	2	3	4	5
18	I can understand the correlation between the domain knowledge of the field (e.g., customs, human geography) when performing spatial creation in rural communities.	1	2	3	4	5
19	I can propose solutions to problems when performing spatial creations in rural communities.	1	2	3	4	5
20	I have grown in domain knowledge while performing spatial creations in rural communities.	1	2	3	4	5
core competence: technological value						
21	I can notice the current trend of interactive technology	1	2	3	4	5
22	I can understand the basics of interactive technology.	1	2	3	4	5

No	Question	strongly disagree	disagree	neutral	agree	strongly agree
23	I want to combine my work with interactive technology	1	2	3	4	5
24	I can propose a form of expression that combines space creation with interactive technology	1	2	3	4	5
core competence: reflection						
25	I can understand my preferred learning style (e.g., prefer reading or learning by doing).	1	2	3	4	5
26	I can understand my preferred creative methods (e.g., individual creation, team creation, single material creation, and mixed media creation).	1	2	3	4	5
27	I can understand the ways in which I am good at interacting with the outside world (e.g., oral, written, non-verbal, drawing, and digital media).	1	2	3	4	5
28	I can understand my role in teamwork (e.g., note-taker, leader, reporter, innovator, executor, chore, etc.) when working with team members on tasks.	1	2	3	4	5
29	I can understand why everyone with different specialties has different perspectives when working with team members on tasks.	1	2	3	4	5
30	I can reflect on myself from the interaction with teamwork when working with team members on tasks.	1	2	3	4	5
31	I can generate new ideas from the interaction with teamwork when working with team members on tasks.	1	2	3	4	5
32	I can clearly understand the problems encountered in the completion of the current work task when working with team members on tasks.	1	2	3	4	5
33	I can actively seek solutions to possible problems encountered when working with team members on tasks.	1	2	3	4	5
34	I can understand the learning objectives of this course	1	2	3	4	5
35	I can fit into the learning method of the course	1	2	3	4	5
other opinions:						

Appendix B

The questionnaire of the course feedback survey.

No	Question	strongly disagree	disagree	neutral	agree	strongly agree
1	The teacher is fully prepared before class and teaches according to the syllabus.	1	2	3	4	5
2	The teacher curriculum design can enhance relevant practical experience.	1	2	3	4	5
3	The teacher's explanations are clear and organized, making it easy for students to understand.	1	2	3	4	5
4	The teacher can demonstrate relevant practical skills in a timely manner.	1	2	3	4	5
5	According to the situation of the students, the teacher can provide practical operation opportunities and individualized guidance.	1	2	3	4	5
6	The teacher values student learning responses and responds appropriately to questions.	1	2	3	4	5
7	Teacher–student interaction is good.	1	2	3	4	5
8	The teacher assesses student learning outcomes (e.g., assignments, tests, reports, portfolio presentations, learning attitude, etc.), which can objectively reflect students' learning performance.	1	2	3	4	5
9	The teacher is serious and enthusiastic about teaching.	1	2	3	4	5
10	My absence status in this course:	(1) more than 7 times	(2) 5–6 times	(3) 3–4 times	(4) less than 2 times	(5) never absence
11	My attendance status in this course:	(1) less than 1 week	(2) 12–13 weeks	(3) 14–15 weeks	(4) more than 16 weeks	(5) all attendance
12	My attitude towards this course:	(1) strongly not serious	(2) not serious	(3) neutral	(4) serious	(5) strongly serious
13	The teacher of this course respects gender equality and do not use sexist language or sexually treat students with different attitudes.	1	2	3	4	5

other opinions:

Appendix C

The interview outline of the focus group.

1. Please talk about the work created by your teamwork (form, technique, characteristic, connotation, symbol, concept . . .).
2. Have you ever encountered the same learning method before?
3. Which part has impressed you the most with the course? (or which time, which type)
4. What is your favorite part of the course?
5. What was the most difficult part of the course?

6. What have you learned in this course? What changed? (change in thinking/practice)
7. In your opinion, to complete a creative design of a wearable device with the theme of rural space, what do you think is lacking in the teaching of the course (or can be further improved)? What is lacking in teamwork learning (or can be further improved)? What is lacking in personal learning (or what can be further strengthened and improved)?

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