Innovative E-learning of The Folk Handmade Culture of Ratchaburi Province

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Abstract

The objectives of this research were 1) to decode the experience of the traditional handicraft culture 2) to develop learning innovation sets from the traditional handicraft cultural of Ratchaburi province.The target the research:1) an interview group, this included three groups focused on Ratchaburi's traditional handicraft local intellectuals, specifically those who worked in brickworks, Bankhubua Jok woven fabric, and brass bell. This group were selected purposefully using a snowball sampling technique, with at least two individuals from each group 2) an experimental group consisted of 30 Mathayom 3 students drawn by simple random sampling.The research instruments were an unstructured interview form and the traditional handcraft learning innovation. The data were analyzed by mean and E_1/E_2.

The research results were 1)The decoding experience (tacit knowledge) of the traditional handicraft cultural products through knowledge management process included Ratchaburi Mon brickworks, Bankhubua Jok woven fabric, brass bells of Bankhaoloymoonkho 2) The local curriculum for the cultural handicrafts of Ratchaburi also had a validity score (IOC) of 1.00, with reliability assessed by five experts, who evaluated its accuracy, appropriateness, feasibility, and potential for practical application, resulting in a score of 100%. This indicates that it is a high-quality curriculum that could be effectively used for teaching. 3) The innovative E-learning of the folk handmade culture of Ratchaburi province had validity with IOC value from 3 experts were .67-1.0, and reliability values from the trial of innovative E-learning in Pak Tho Pittayakhom school by using exams during study 60 points (result $\overline{X}$ =48.03) and after studying 45 points (result $\overline{X}$ =38.50) get the reliability value E_1=80.06 E_2 =85.56.

Keyword: Innovative E-learning, Folk Handmade Culture, Ratchaburi Province

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Introduction

In the present era, the world is characterized by a knowledge-based economic society, where every community must possess the capability to harness knowledge to create innovations that drive social development. The knowledge and innovations produced will benefit society as a whole, serving as a crucial foundation for the country's development process. Therefore, the participation of individuals in society is a key factor in facilitating development. Collaboration among people in society should be promoted at all levels, including family, community, nation, and globally.

Thailand has set a goal that embodies the social dimension (Office of National Higher of Education Science Research and Innovation Policy Council, 2024) for sustainable social development, which aligns with the Sustainable Development Goals (SDGs). This goal aims for balanced development across the three pillars of sustainability: society, economy, and environment. It incorporates the 17 goals established by the United Nations, which are categorized into five dimensions: Social (People), Economic (Prosperity), Environmental (Planet), Peace and Institutions (Peace), and Partnership for Development (Partnership). These goals are crucial for everyone globally to learn about, pay attention to, and collaboratively develop. Therefore, the SDGs delve deeply into the social dimension (People) to enhance learning opportunities for the elderly and improve learning for youth outside the formal education system, including the BCG Economy Model, among others.

The Office of National Higher of Education Science Research and Innovation Policy Council (2024) has set the times higher education rankings methodology framework for reporting impact rankings methodology data in 2024 according to the Sustainable Development Goals (SDGs). These goals aim for balanced development across the three pillars of sustainability: society, economy, and environment. The SDGs consist of 17 goals, 169 targets, and 232 indicators. Among the 17 goals of the National Policy Council are: Goal 1-No Poverty; Goal 2-Zero Hunger; Goal 3-Good Health and Well-Being; Goal 4-Quality Education; Goal 5-Gender Equality; Goal 6-Clean Water and Sanitation; Goal 7- Affordable and Clean Energy; Goal 8-Decent Work and Economic Growth; Goal 9 - Industry, Innovation, and Infrastructure; Goal 10-Reduced Inequalities; Goal 11-Sustainable Cities and Communities; Goal 12-Responsible Consumption and Production; Goal 13-Climate Action; Goal 14-Life Below Water; Goal 15-Life on Land; Goal 16-Peace, Justice, and Strong Institutions; and Goal 17-Partnerships for the Goals.

Rajapruk University, as researched by the investigator, has focused on Dimension 4: Quality Education, specifically addressing Target 4.1 regarding lifelong learning and Target 4.3 concerning the assessment of lifelong learning. The research titled "Knowledge Management to Develop Learning Innovation from the Traditional Handicraft Culture of Ratchaburi Province" aims to organize the SDGs ranking methodology for 2024 as an Action Framework: SDGs, which served as a conceptual framework for reviewing the future of current educational practices, the challenges faced, and setting future directions for local sustainable development. The research utilizes knowledge management processes to support arts and crafts in preserving cultural heritage that is currently lacking interest and may be at risk of disappearing, especially among the younger generation who show little interest in passing it on. If local wisdom intellectuals or community scholars pass away, there may be few or no successors, limiting the transmission of this knowledge to family members only, leaving outsiders without opportunities to inherit this knowledge, which could ultimately lead to its loss. Therefore, to gather local art and crafts from Ratchaburi, the researcher, who is a native of Ratchaburi and a Thai Yuan descendant originally from a northern province, has lived in Ratchaburi since the time of her ancestors. They feel a sense of loss and wish to document this artistic and craft knowledge so that it can be accessible to everyone. This research employs knowledge management processes to transmit local arts and crafts in the form of codifying tacit knowledge into explicit knowledge that everyone can grasp. As analyzed by Kriangsak Charoenwongsak.(2024), several specific characteristics pose obstacles to creating careers, building community economies, and achieving sustainability within commu-

nities. These include: 1) Lack of thriftiness; 2) Lack of activity diversity leading to some failures or insufficient income to support members; 3) Lack of leveraging existing strengths; 4) Deterioration of available resources; 5) Lack of technological capability to apply resources; 6) Lack of research and development; 7) Lack of integration in economic development; 8) Scarcity of quality labor; 9) Lack of Phakaratn Phinijwat (2023). on enhancing community livelihoods suggests promoting knowledge and experience in establishing various occupational groups; documenting processes; setting up sales venues; and training in other professions beyond those currently practiced within the group. Based on these policies, the researcher is interested in studying on Knowledge Management to Develop Technology Transfer Innovations for Community-Based Conservation of Traditional handicraft Arts to Preserve in Ratchaburi Province. This involves creating a set of learning innovations for arts and crafts aimed at preserving Ratchaburi's cultural heritage, including electronic books (E-books) on "Ratchaburi Mon Brickwork crafts", "Bankhubua Jok Woven Fabric," and "Brass Bell Crafts" from Bankhaoloymoonkho," as well as a local curriculum for cultural handicrafts preservation. The knowledge management process will be applied practically in educational institutions in Ratchaburi to engage local youth, fostering appreciation and positive attitudes towards preserving Ratchaburi's cultural heritage in the second phase of the second research volume.

This research has developed a set of learning innovations focused on traditional handicraft culture, which includes: 1) an electronic book (E-book) covering topics such as Ratchaburi Mon Brickworks, Bankhubua Jok Woven Fabric, and the Brass Bell Crafts from Bankhaoloymoonkho; and 2) a local curriculum centered on the traditional handicraft culture of Ratchaburi Province. The aim is to implement these resources in schools to educate youth in Ratchaburi Province and promote actions necessary for preserving folk culture and handmade heritage sustainably for future generations.

Research Methodology

Content Scope

This research was a qualitative study and participatory action research (PAR) conducted within the community, utilizing a multi-case knowledge management process. This included methods such as documentary analysis, interview analysis, observation analysis, and participatory action research in real settings, following the concepts of the Office of the Public Sector Development Commission (OPDC, 2024). The process consisted of: 1) Knowledge identification; 2) Knowledge creation and acquisition; 3) Knowledge organization; 4) Knowledge codification and refinement; 5) Knowledge access; 6) Knowledge sharing; and 7) Learning. The research aimed to create learning innovations that included: 1) A set of learning innovations for arts and crafts to preserve the cultural heritage of Ratchaburi Province, which consisted of three electronic books (E-books) covering topics such as Bankhubua Jok Woven Fabric, and the Brass Bell Crafts from Bankhaoloymoonkho; and 2) A local curriculum focused on arts and crafts for the preservation of Ratchaburi's cultural heritage. Through this knowledge management process, the goal was to implement these resources in schools to engage youth in Ratchaburi Province, fostering a sense of pride and positive attitudes toward preserving the cultural heritage of Ratchaburi.

Population and Sample Scope

The target population consisted of local wisdom from three groups:

Group 1: For interviews, the snowball technique was utilized, where the first participant recommended others. The group for the traditional handicraft culture of Ratchaburi Brickworks included Mr. Manoon Saisamorn and others he recommended. The group for the traditional handicraft culture of Bankhubua Jok Woven Fabric included Dr. Udom Somporn and others he recommended. The group for the traditional handicraft culture of the Brass Bell from Bankhaoloymoonkho included Mr. Wasan Pimphongklang and others he recommended.

Group 2: This group assessed the effectiveness of the learning innovation set for Ratchaburi's tradition-

al handicraft cultures by calculating the Index of Item Objective Congruence (IOC), consisting of three selected experts: consisting of Assoc.Prof. Dr.Chamrat Chaemchan, Dr. Prakong Rasameekaew and Dr. Alongkot Kotchasan.

Group 3: This group tried out the learning innovation set of local handicrafts aimed at preserving Ratchaburi's cultural heritage, comprising 30 students from Mathayom 3 at Pak Tho Pittayakhom School in Ratchaburi Province.

Research Instrument

1. An unstructured interview form

2. A set of learning innovations for Ratchaburi's local cultural handicrafts, consisting of three electronic books and a local curriculum for the preservation of the cultural heritage of Ratchaburi Province. The equipment used to collect data, included cars, cameras, sound recording equipment, computers, printers. photocopier, telephone, pen, pencil, paper, etc.

3. Materials and equipment used for data collection include a car, camera, audio recording devices, computer, printer, photocopier, telephone, pens, pencils, paper, etc.

Creation and development of research tools

1. The interview was developed by having the research advisor review, and provide feedback to refine it.

2. The 3 electronic books (E-books) were evaluated using the Index of Item Objective Congruence (IOC) and assessed for their effectiveness (E_1/E_2).

3. The local curriculum for Ratchaburi's traditional handicraft culture aimed at preserving the cultural heritage of Ratchaburi Province was evaluated by consulting expert panel regarding its validity, reliability, feasibility, and potential for practical application.

Data Collection

Using the knowledge management process according to the concepts of the Office of the Public Sector Development Commission (2024), tacit knowledge from local wisdom and community scholars was transformed into explicit knowledge. The process included: 1) Knowledge Identification; 2) Knowledge Creation and Acquisition; 3) Knowledge Organization; 4) Knowledge Codification and Refinement; 5) Knowledge Access; 6) Knowledge Sharing and Exchange; and 7) Learning.

Data analysis and statistics

By analyzing and synthesizing data from interviews, audio recordings, and photographs, this research led to the synthesis of knowledge regarding arts and crafts that were part of the cultural heritage of Ratchaburi Province. This resulted in the creation of three electronic books (explicit knowledge) on the topics of Ratchaburi Mon Brickworks, Bankhubua Jok Woven Fabric, and Brass Bell from Bankhaoloymoonkho, along with one local curriculum based on the traditional handicraft cultural heritage of Ratchaburi Province.

Research Result

1. The Knowledge Identification identified three sets of traditional handicraft culture in Ratchaburi Province: Ratchaburi Mon Brickwork, Bankhubua Jok Woven Fabric, and Brass Bell from Bankhaoloymoonkho.

2. The Knowledge Creation and Acquisition involved conducting interviews and engaging in hands-on activities with local wisdom for data collection.

3. The Knowledge Organization involved systematically organizing knowledge according to the steps practiced by local wisdom and synthesizing it into a body of knowledge (explicit knowledge) by creating a set of learning innovations from traditional handicraft culture aimed at preserving the cultural heritage of Ratchaburi Province.

4. The Knowledge Codification and Refinement entailed verifying the knowledge with local scholars and local intellectuals regarding the learning innovation set for arts and crafts to ensure it remained true to its original form.

5. The Knowledge Access involved the researcher searching for universal knowledge both domestically and internationally to support the studied knowledge.

6. The knowledge Sharing and Exchange was facilitated by presenting and developing a set of learning innovations for traditional handicraft culture aimed at preserving the cultural heritage of Ratchaburi Province for trial use in educational institutions.

7. The Learning was the process through which Mathayom 3 students at Pak Tho Pittayakhom School learn using the sets of learning innovations presented as electronic books (E-books), aiming at preserving Ratchaburi's cultural heritage, collecting research data on three areas: Ratchaburi Mon Brickworks, Bankhubua Jok Woven Fabric, and Brass Bell arts and crafts from Bankhaoloymoonkho. The details were as follow:

1. Ratchaburi Mon Brickworks:

This E-book served as a teaching media based on the cultural heritage of traditional handicraft from Ratchaburi Province, comprising 3 hours of theory and 3 hours of practice, with pre- and post-learning assessments.

Piyanart Boonmepipit (2024). E-book: *The Ratchaburi Brick*. Bangkok: Faculty of Liberal Arts, Krirk University.

Activities

1.1 Kneading Clay: Knead the clay using feet.

1.2 Preparing the Ground: Prepare a clay area for laying out the bricks that have been removed from the molds.

1.3 Transporting Clay: Use a wheelbarrow to transport the clay to the prepared area, placing it on plastic sheets to prevent direct contact with the ground, as this would cause the clay to dry too quickly and become unworkable, necessitating re-kneading.

1.4 Preparing Water and Rice Husk Ash: Prepare water, rice husk ash, and molds for shaping the clay into brick form.

1.5 Pressing Clay into Molds: Compress the clay into molds, which are square blocks sized to match a single brick, with each mold containing 4-6 cavities.

1.6 Sprinkling Rice Husk Ash: Sprinkle rice husk ash on the ground before inverting the molds to allow for drying.


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1.7 Sun-Drying Bricks: Arrange the bricks in

sunlight for approximately 6-8 hours, then refine their dimensions using a light tapping tool or a plane as needed, followed by additional sun-drying for another 2-3 days(depending on sunlight intensity)

1.8 Storing Raw Bricks: Place the raw bricks in a roofed kiln, stacking them alternately to a height of 1.50-2.0 meters while leaving gaps at the bottom to ensure uniform heat distribution during firing; the height is typically maintained at around 1.50-2 meters based on the quantity of bricks to be fired.

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1.9 Covering with Rice Husk: Cover the stacked bricks with rice husks to serve as fuel for firing; a substantial amount is required, approximately one truckload for firing 40,000-60,000 bricks.

1.10 Igniting Rice Husk Ignite the rice husks from below around the brick stack; as the fire spreads through the husks, it will continue until fully engulfed, requiring 12-15 days of firing at temperatures around 1,200 degrees Celsius.

1.11 Removing Ash Residue: Use a long-handled rake to remove rice husk ash from between the rows of bricks, ensuring all ash is thoroughly extracted.

Summary of good brick characteristics

A good brick: The properties of high-quality Ratchaburi Mon bricks include a vibrant orange color, a smooth and even surface without roughness, and sharp right angles. The color should be uniform throughout each brick, with no warping, cracking, or breaking. When struck, the bricks produce a sound similar to metal. Upon

(Summary, cont) inspection of the internal structure, there should be no voids or pores present. Each brick should have consistent dimensions and weight, allowing for efficient heat transfer in and out. They possess high thermal mass, enabling them to retain heat for extended periods. Additionally, they are highly resistant to high temperatures and do not crumble when exposed to fire. Ratchaburi Mon bricks exhibit high strength, effectively supporting weight and pressure. They are durable against weather conditions and temperature fluctuations, ensuring long-lasting performance without degradation.

2. Bankhubua Jok Woven Fabric:

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Piyanart Boonmepipit (2024). E-book: *Bankhubua Jok Woven Fabric*. Bangkok: Faculty of Liberal Arts, Krirk University.

2.1 Types of Bankhubua Jok Woven Fabric

1) Sin Tin Jok is a type of traditional Thai cloth that features a decorative hem, woven using the "Jok" technique, where special threads are pulled and intertwined with the warp threads to create various patterns. It consists of three main sections: the head of the cloth, the body of the cloth, and the hem. The Sin Tin Jok is commonly found among the Yuan ethnic women.

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1.1) Bankubua Jok Woven Fabric is Jok หhubua Jok Woven fonly the footer. The body is black or indigo color. Some Jok woven fabric is pearl-raise. The header of it uses red and white cotton. Some Jok woven fabric have pearl-raise.

1.2) Whole of the body Bankubao Jok woven fabric, it is creating into each piece of cloth, They are join together into one piece. The body is often woven with a Kaud pattern, Nok pattern, Malileay pattern. They had 9 patterns. It is a high-class art and handicraft of the Thai-Yuan Ratchaburi people.

2) Sin Ta has 2 types "Sin Ta Pha Puen"

2.1

2.2

2.1) Sin Ta Pha Puen: It is woven with various colors into bands wrap around the body.

2.2) Sin Ta Moo**:** It is a cloth where the body features grouped patterns wrapped around it, with intervals between them. Common patterns include "Hak Kho Liao," "Creeping Jasmine," and "Star Flower." This type of cloth represents a level of weaving artistry that is secondary to the Sin Tin Jok. Currently, it is not commonly woven due to its complex patterns, which require more time and effort.

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2.3 Sin Sew is a cloth woven for everyday work at home. The hem is made of black fabric, while the body is green with patterns connecting the hem and the body of the cloth.

2.4 Sin Rae has has a body woven entirely in black, continuing from the hem, but features a red band connecting to the hem. This cloth is used for work both at home and outside and is relatively easy to weave. In the past, Tai Yuan women had to weave Sin Lae for their own use.

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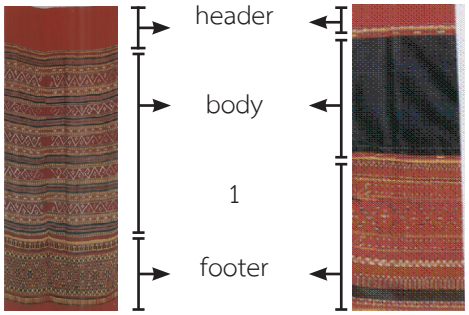
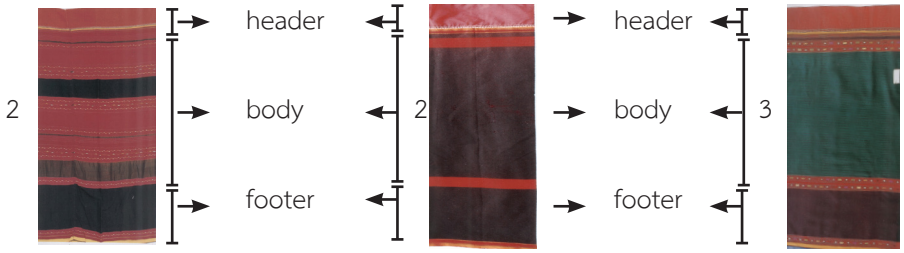
Baankubua Structure of the Sin



1. Bankhuboa Structure of Sin Tin Jok: The Sin Tin Jok of the Tai Yuan people has a structure consisting of three parts: the head of the cloth, the body of the cloth, and the hem.



2. Structure of Sin Ta: The body of the cloth is woven together with the hem as a single piece. The body is typically woven in a red background with decorative patterns, incorporating black stripes at intervals.

3. Structure of Sin Rae: This cloth is woven entirely in black, with a red band connecting to both the hem and the head of the skirt.

4. Structure of Sin Sew: The fabric is woven with a green background and decorative patterns throughout, with additional embellishments connecting the head of the skirt to the hem for aesthetic appeal.

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The Patterns and Weaving techniques of the Tai Yuan's fabric: It is divided into two categories: main patterns and complementary patterns.

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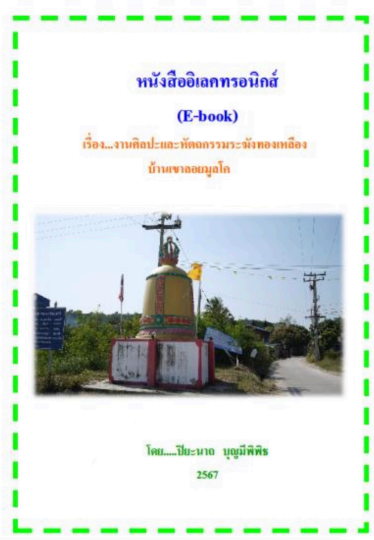
1. Main patterns These are large patterns used in the center of the hem of the cloth, with a total of eight patterns identified: 1) Flower Pattern (Lai Dok Sia), 2) Leaf Pattern (Lai Kab), 3) Pillow Surface Pattern (Lai Na Morn), 4) Gong Keng Pattern (Lai Gong Keng), 5) Jasmine Petal Pattern (Lai Kab Dok Kaew), 6) Overlapping Gong Keng and Sia Pattern (Lai Gong Keng Son Sia), 8) Overlapping Leaf Pattern (Lai Kab Son Hak), 8) Pair of Birds Pattern (Lai Hak Nok Khu).

2.Complementary patterns Example of complementary patterns encompass a range of design; however, it is noteworthy that some of these lack available models for scholarly examination at present.The following are included:

1) Key Hook Pattern (Lai Kho Prajae), 2) Hook Pattern (Lai Kho), 3) Rice Flower Pattern (Lai Dok Khao Tok), 4) Creeping Jasmine Pattern (Lai Mali Lueai), 5) Goud Pattern (Lai Gud), 6) Curved Hook Pattern (Lai Kho Liao), 7) Entering Bird Pattern (Lai Nok Khao Hong), 8) Pair of Birds Drinking Water Pattern (Lai Nok Khu Kin Nam Huam Tao), 9) Naga Pattern (Lai Nak), 10) Horse Pattern (Lai Ma), 11) Bird Pattern (Lai Nok), and 12) Sapaow Pattern (Lai Sa Pao)

Summary:The cultural heritage of handwoven Jok fabric from Ban Khubua represents a traditional art form that involves multiple manual processes. Each step is performed by hand, reflecting the local cultural heritage of Ban Khubua, Don Rae, Na Nong in Ratchaburi Province, which continues to exist to this day. This heritage should be preserved and passed down to future generations to prevent it from disappearing over time and amidst the changes of urban society that are increasingly integrated with traditional cultures today.

3. Brass Bell of Bankhaoloymoonkho.



This E-book served as a teaching media based on the cultural heritage of traditional handicraft from Ratchaburi Province, comprising 3 hours of theory and 3 hours of practice, with pre and post-learning assessments

Piyanart Boonmepipit (2024). E-book: *Brass Bell of Bankhaoloymoonkho*. Bangkok: Faculty of Liberal Arts, Krirk University.

3.1 Activities

Step 1 Preparation 1) Prepare the clay or soil from the mountain or the agricultural field of Bankha-

oloymoonkho, which is clay mixed with sand, 2) Cow dung, 3) Wax candles, 4) Brass 5) Rice husks, 6) Brazier 7) Charcoal 8) Polishing liquid and 9) Cloth and Various tools.

Step 2: Crafting the Brass Bell

Activity 1 Kneading Clay: Utilize clay and knead it thoroughly, incorporating water until it achieves a uniform consistency.

Activity 2 Shaping the Clay: Mold the clay into a bell-shaped form.

Activity 3 Creating the Bell Opening: Employ a pointed tool to pierce through the center of the clay bell form, ensuring it extends to the top.

Activity 4 Drying the Clay Form: Allow the shaped bell form to dry in a shaded area for one day. If it rains or humidity is high, extend the drying time.

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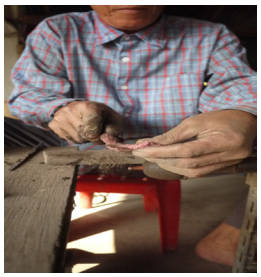
6 

Activity 5 Turning the Clay Form: Once dried, place the bell-shaped clay on a lathe with a protruding pointed shaft that continuously rotates. The turner will use a pointed metal tool to press rhythmically against the clay, creating a smooth surface or desired patterns.

Activity 6 Smoothing the Clay Form: Using a damp cloth, wipe the surface of the clay bell while it is still on the rotating lathe to achieve a smooth finish.

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Step 1

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Step 2

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Activity 7 Melting Wax: Melt wax until it reaches a viscous consistency similar to condensed milk.

Activity 8 Inserting the Clay Form: Insert a pointed stick into the clay form, leaving approximately five inches protruding.

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Activity 9 Dipping the Clay Form in Wax: Hold the pointed stick and dip the clay form into the hot wax, ensuring that it does not submerge completely; leave about 0.5 mm exposed. Lift it out and dip again to build up the wax layer to a desired thickness of approximately 2 mm.

Activity 10 Cooling in Cold Water: Submerge the wax-coated clay form in cold water to solidify the wax. Maintain a thickness of about 2 mm and leave it for one hour.

Activity 11 Turning with a Pointed Tool: Place the wax-coated clay form back onto the lathe and use a pointed tool to create patterns by pressing into the wax. The pressure applied will determine the depth of the grooves, allowing for customized designs

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Activity 12 Creating an Angel Symbol: Craft an angel symbol as an emblem for the brass bell from melted wax by pouring thickened wax onto a mold. Once cooled, remove and trim it into a leaf shape.

Activity 13 Attaching the Angel Symbol: Affix the angel symbol to both sides of the clay bell form so that they face each other.

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Activity 14 Enveloping the Bell Form: Mix soil sourced from local mountains or fields, which consists of clay mixed with sand, until it reaches a thick, viscous consistency suitable for shaping (this local soil does not crack when fired like regular soil).

Activity 15 Sealing the Bell Form Opening: Insert a pointed piece of clay into the opening of the bell form until it fills completely and compactly; this prevents molten brass from flowing inside during casting.

Activity 16 Creating Bell Handles on the Clay Form: Use a pointed tool to puncture two small holes at slightly spaced intervals on top of the clay form, ensuring they are balanced; otherwise, the bell may become distorted.

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Activity 17 Attaching Handles and Wicks to the Clay Form: Attach handles made from molded wax to each side of the bell form, ensuring they are balanced above. Insert wicks made from wax about one centimeter long into each handle.

Activity 18 Preparing Local Soil Mixture: Combine local soil with cow dung and water until achieving a sticky consistency, then use this mixture to seal any gaps between handles securely.

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Activity 19 Enveloping with Local Soil Mixture: Knead local soil mixed with cow dung until it resembles a thick liquid similar to condensed milk.

Activity 20 Sun-Drying the Clay Form: Leave the clay form in a shaded area for approximately one day. If exposed to strong sunlight, it may crack; during rainy seasons, allow for extended drying time due to higher humidity levels.

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Activity 21 Covering with Clay Soil: Prepare moldable clay suitable for shaping into desired forms.

Activity 22 Shaping Clay into Cups: Mold clay into cup shapes and allow them to dry in sunlight.

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Activity 23 Preparing Brass in Two Shapes: Prepare two forms of brass: one shaped like a "Khanom Krok" (a traditional Thai dessert) and another rectangular shape. This brass is an alloy made from copper mixed with zinc.

Activity 24 Setting Up for Brass Bell Casting: Take one cup-shaped mold and place a "Khanom Krok" shaped brass piece on top, followed by placing a smaller piece on top of that.

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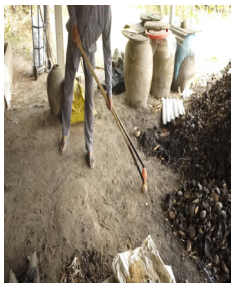
Activity 25 Firing the Clay Form: Prepare a charcoal furnace, traditionally used for cooking rice, consisting of two sections; an upper section for charcoal and a middle section made from clay with holes for ash drainage. The lower section has wider openings for airflow or stoking flames.

26 

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Activity 26 Closing Furnace Lid and Removing Clay Form After Firing Time: After approximately 1.5 hours, check if sufficiently heated until seeing greenish hues indicating that brass inside has melted into liq-

uid form. Add more charcoal if necessary, close with a zinc lid, and let sit for another 15 minutes.

Activity 27 Breaking Open Clay Mold: Carefully break apart the clay mold surrounding your newly cast bell.

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Activity 28 Turning Brass Bell: Place your brass bell onto a lathe using its wooden handle to remove any rough edges from its surface.

Activity 29 Polishing: Polish your brass bell on an appropriate lathe until achieving a bright, shiny finish.

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Activity 30 Creating Suspension Mechanism for Bell Striker: Finalize by attaching any necessary components such as clappers or decorative leaves to complete your beautifully crafted brass bell.

4. The Local Curriculum on Traditional Handicraft Culture of Ratchaburi Province for Basic Educational Level

The scope of the course content was on the traditional handicraft culture of Ratchaburi province, totaling 18 hours, conducted by using child- centered approach, and the System Approach theory for developing learning activities. The process was as follows:

1. Developing a local curriculum based on the community's issues.

2. Surveying community problems.

3. Analyzing community issues and determining learners' needs.

4. Writing lesson plans.

5. Organizing learning activities using E-books on three topics.

6. Conducting evaluations.

Conclusion

This research resulted as follows:

1. Three electronic books (E-books) had been produced, which included: 1) Ratchaburi Mon Brickworks, 2) Bankhubua Jok Woven Fabric, and 3) Brass Bells of Bankhaoloymoonkho. The Index of Item Objective Congruence (IOC) values ranged from 0.67 to 1.00, indicating a high level of reliability, with E_1/E_2 efficiencies recorded at E_1 = 80.06 and E_2 = 85.56.

2. The local curriculum on traditional handicraft culture of Ratchaburi province, under the subject area of careers, focusing on crafts and trades at the basic education level, consisted of a total of 18 hours of instruction. The validity of the curriculum was assessed by three experts, resulting in an IOC value of 1.00. Furthermore, the curriculum underwent a comprehensive evaluation for reliability, appropriateness, feasibility, and practical application by five qualified experts, who concluded that the local curriculum for arts and crafts achieved a score of 100%. This indicated that it was a high-quality curriculum suitable for implementation in teaching and learning activities.

Discussion

1. Three electronic books (E-books) were developed, consisting of: 1) Ratchaburi Mon Brickworks, 2) Bankhubua Jok Woven Fabric, and 3)Brass Bell from Bankhaoloymoonkho. These books had an IOC value ranging from 0.67 to 1.0 and reliability with values of E1 = 80.06, and E2 = 85.56. This was due to the fact that these electronic books were developed through a research process that incorporated knowledge acquisition via knowledge management. As a result, experts regarded them as modern innovative media that were appropriate for contemporary contexts and aligned with the interests of learners. The content was beneficial and aimed to foster characteristics in learners related to the preservation of cultural arts, which were local heritage. Therefore, collaboration was necessary to promote and support their practical application in educational institutions, benefiting learners, schools, researchers, and the higher education institutions affiliated with researchers. This aligned with the research of Pipat Sak Chaiyong (2019), which focused on developing E-learning lessons for Grade 9 students at Yang Talad Wittayakhan School, aiming to assess effectiveness using an 80/80 criterion. The results indicated that the E-learning lessons met the criteria with values of 80.17/87.22. This was consistent with the research of Khwanchai Khawna (2020), which aimed to develop online learning lessons (E-Learning). The research findings showed that the E-learning lessons for learning management had an efficiency value of 81.65/85.45, exceeding the established criteria and consist with the research of Duanpenporn Chaipugdee. (2022) which focused on Development of learning innovation of vocational skills and self-reliance for underprivileged youths using lifelong learning resources. This research aiming to develop learning innovations. The research findings as models for learning innovation development, consisting.

2. The local curriculum on the traditional handicraft culture of Ratchaburi Province, designed to preserve the region's cultural heritage, exhibited a high level of effectiveness, with expert evaluations indicating that it achieved 100% accuracy, appropriateness, feasibility, and utility. This might be attributed to the credibility of the curriculum development process, which involved participatory engagement from the local community, instilling confidence that it was a quality curriculum. This finding aligned with the research conducted by Rawit Rattanapaisankit (2021), which focused on developing an innovative arts curriculum based on Lanna cultural resources for youth, using design thinking. The objective was to study the essential needs of the curriculum, develop the innovative arts curriculum from Lanna cultural resources, and evaluate its quality. The research findings indicated that the overall quality of the developed curriculum was deemed highly appropriate.

Additionally, this was consistent with the research by Methawee Chamnian (2021) and others, which investigated the development of a local curriculum for classical folk dance called "Ram Thon" in Krung Ching Subdistrict, Nopphitam District, Nakhon Si Thammarat Province. The objective of this research was to develop a local curriculum for the "Ram Thon" and the findings revealed that it was also consistent and appropriate a high level.

Research recommendations

1. Local communities have actively participated in the research process, resulting in the acquisition of knowledge and research experience in collaboration with the researcher.

2. Educational institutions can utilize teaching media and local curricula to instill a sense of appreciation and stewardship for the valuable assets of the locality among youth, fostering their cooperation in the conservation of local resources.

3. Continuous research should be conducted on the implementation of this innovative media in basic education institutions to ensure the highest quality of educational resources.

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