

NEW MODEL FOR TEACHING AND LEARNING TRADITIONAL CRAFT COURSEWARE: ANALYSIS AND DESIGN PHASE

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ABSTRACT

This research seeks to look into a design process of the development of a model for teaching and learning traditional craft courseware called CDTC model. Specifically, this research focuses on analysis and design phase. The model was developed according to an established methodology and it is relied upon a conceptual framework consisting of four development phases starting from Analysis, Design, Development and Evaluation. The research begins with the preliminary analysis to look into the problems in conventional traditional apprenticeship method for teaching and learning traditional craft by looking at students and craft instructors' perceptions. Various weaknesses were identified in acquiring the craft skills taught to students especially when instructors need to teach a group of students. The results of analysis helps to suggest and determine a practical way to map out the suitable teaching environment and strategy that would best serve for teaching and learning traditional craft. As a result from initial analysis, the proposed CDTC model for educational courseware development for teaching and learning traditional craft was developed consisting of two main components. In Design phase, the proposed CDTC model's components was evaluated by selected craft instructors through initial validation process in order to verify its' components. The results from initial validation among instructors help in establishing and designing a preliminary version of the model.

Keywords: *Model development, Traditional craft courseware, Web-based learning, Craft Education*

1. INTRODUCTION

The preservation of culture heritage in community is very important to make sure the vital legacy of cultural will be maintained for future generations of people. One major issue of traditional cultures is globalization processes. Greater chance of reactions for globalization being violent in an attempt to preserve cultural heritage. Refer to United Nations Educational, Scientific and Cultural Organization (UNESCO), even though the globalization processes create conditions favourable for inter-community dialogue, but it threaten the preservation of tradition. UNESCO developed the "Convention for Safeguarding Intangible Cultural Heritage" that was adopted and inured in 2006. The

convention includes issues of the preservation and development of traditional crafts [10].

In Malaysia, one of the most concerns of the modern world is the preservation of producing traditional craft. Traditional crafts are reflecting to patterns of thought and culture and these arts were very popular among the local communities in the past. However, in recent years, traditional crafts have been experiencing dramatic changes in the country. The make use of more modern equipments such as the use of mechanical equipments in producing hand crafts [7] has led to neglecting traditional teaching and learning of hand crafts [8]. In addition, young generations are no longer interested to learn this traditional heritage as they

claimed that teaching and learning through the conventional method is unattractive and boring [8].

Over the decades, the way of teaching and learning traditional crafts have always used traditional apprenticeship learning methods where the expert facilitates transfer of practice skill sets to novices [18],[11]. The view of learning implicit in the traditional concept of apprenticeship involves four main elements – the apprentice as learner, the idea of trade or craft knowledge as fixed and unproblematic, the master as teacher and the idea that learning in workplaces is a form of context-bound understanding not conducive to transfer [12],[6]. This conventional learning is through direct observation for educating students in the fields of practices to obtain practical skills, guidance and assistance from instructors [5]. As the learning is mostly done through observation, student has put high level of dependency to instructor [2]. There is an obvious problem in conventional approach when instructor needs to teach a group of students. It is potentially limiting the support from instructor to monitor, focus and assess student individually. This type of learning also reduce students' ability to solve their own problems especially at the beginning of learning as they much like referring and asking to the instructors and this directly influence the students' cognitive and construction of knowledge. This phenomenon needs careful analysis in order to identify the problems or weaknesses in conventional face-to-face lectures and skills demonstration in traditional apprenticeship.

A better approach is needed to attract young people to learn these traditional crafts in order to avoid boredom and boring learning, and the most important is the learning can be easily learned at any desired paced and time. This seems to have an alternative method for teaching and learning traditional craft. Today's world is rapidly changing from the technology and computer-mediated communication is transforming the way of people live and work. As online education is evolving, there have been many efforts to integrate technology into teaching and learning practices. The utilization of web based features, interactive multimedia based tools and delivery mechanisms in teaching and learning environments are becoming important aspects of the implementation of a more innovative approach to teaching in education. One of the key elements of a multimedia learning environment is its ability to provide the learner with control, which is the essential feature of a "democratic environment" for learning [3]. In this

case, to conserve teaching and learning of traditional crafts, it is appropriate to provide digital learning environment that enable craft information available to a wide range of people. Besides, it helps to reduce dependency level on instructors as the learning offers individual learning and personalized guidance. Thus, to provide digital teaching and learning of traditional craft, a new model for courseware development for teaching and learning traditional craft was developed as a guide to developers and other researchers. This paper explains a design methodology in developing a general model for courseware development for teaching and learning traditional craft covering from analysis phase to design.

2. METHODOLOGY FRAMEWORK FOR MODEL DEVELOPMENT

This section describes the methodology framework for CDTC model development. The CDTC model was developed based on user-centered design and constructed using methodologies synthesized from related research. The model went through several validation processes among craft instructors. The final version will be documented for utilization by educators, instructional designers, and product developers as a reference for developing similar applications. Development process was followed evolutionary development model for product development which emphasized on iterative process of rapid development followed by a refinement phase [16]. The process for designing the model included four phases as shown in Figure 1. However, for this paper only analysis and design phase will be discussed.

Phase 1 involves an analysis process sought to establish the components to ensure they are relevant to the model. In Phase 2, the design phase utilized the validated components to design a preliminary version of the model. The development phase in Phase 3 focuses on the development of the model and a working courseware prototypes derived from the model. The courseware prototype will be developed in a web-based environment and all models' components will be absorbed in the design of prototype in various ways and activities. The web-based prototype will be implemented based on the Dick and Carey's model as the flow guidelines for the whole prototype development process.

Finally, in phase 4 the evaluation phase will be conducted using quantitative research methods to test the model through effectiveness and usability

testing of the prototype derived from the model. Effectiveness evaluation aimed to compare the effectiveness of using an interactive multimedia courseware prototype for teaching and learning traditional craft with a traditional apprenticeship experience of teaching craft skills to weaving craft students, meanwhile the usability testing is to identify students' perception toward the interface of courseware. After all, the final validation by selected craft instructors will be conducted to finalized the components correspond to the model and produced the final version of CDTC Model. The final validation will be done by all instructors after completing using the prototype.

3. ANALYSIS PHASE

Analysis phase involves comprehensive study of relevant teaching and learning theories, related learning models development, multimedia applications for teaching and learning crafts, literature review on teaching and learning traditional craft approaches and preliminary study to identify problems in conventional teaching and learning traditional craft. This phase also sought to establish the components of proposed CDTC Model. In order to ensure the proposed model can work, different teaching and learning theories were revised and structured based on curriculum of domain knowledge, learners, instructors and the relationship among them. Such theories that have been considered include Social Learning Theory, Behaviourism Theory, Cognitive Theory, Constructivism Theory, Mastery Learning Theory and Adult Learning Theory. Several model associated with teaching and learning were compared and considered as a guide in creating the course structure, in designing layout of the elements in the presentation, in designing course material as well as creating the constructivism environment in order to consider learner satisfaction in terms of content, delivery, service and learner outcomes.

3.1 Preliminary Analysis

A preliminary analysis was carried out to identify problems in traditional apprenticeship method in teaching and learning traditional craft. The subjects in this study were selected from National Craft Institute, Malaysia. There were two groups of subjects: students and instructors. IKN was chosen because this institution offers courses at diploma and certificate level that were designed purposely for teaching traditional crafts. The study

was done through quantitative investigation using purposive sampling procedures among students which involves selecting a sample population those have experience with traditional apprenticeship learning. Meanwhile, investigation using simple random sampling method was done among instructors.

3.1.1 Design

The survey administered at the beginning of semester was using questionnaire where the instruments were distributed among 20 instructors from three different faculties and to 25 final year diploma students from Fakulti Seni Kraf Tenunan. The questionnaire focuses on the respondents' perception of experience towards current teaching and learning traditional craft using traditional apprenticeship approach. Respondents were asked to rate all factors under studied using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The scale was then divided into two groups, the scale of 1 and 2 in the Low category and scale of 3, 4 and 5 in the High category. The percentage of each problem was obtained by the total points given by the respondents in each category.

3.1.2 Data Collection

Among 45 people called up for the questionnaire, feedback received from 36 respondents which is 80% of response rate (students n=20, instructors n=16).

3.1.3 Data Analysis

Data were analyzed using Statistical Product and Service Solution software (SPSS 17.0). A descriptive analysis was performed to compute the means for each item.

3.1.4 Results and Findings

Respondents of student category were 10% males (n=2) and 90% (n=18) females. Results show that

- 90% of the students agree that they put high level of dependency to instructor.
- 100% students agree that they need frequent repetition of the teaching process because the conventional learning itself took a long time to memorize the learning process (100%).

- 75% of the students agree that they found difficulty in obtaining instructor assistance anytime and anywhere when learning traditional craft through traditional apprentice.
- 65% of the students agree that they found difficulty in obtaining course materials anytime and anywhere.
- 80% of the students agree that they have communication problems because the learning is delivered verbally.
- 90% of the students agree that they were facing problem in visualizing practical teaching that is delivered verbally.
- However from students' perspective also showed that traditional apprenticeship is not a major problem for them to understand the learning process because they mostly learned through observation on instructors and with continuous focus, they will master and become expert in learning in short time duration (see Table 1).
- Same as results from students' perception, instructors found two issues: having difficulty to understand learning process and took long times to expert the learning were not contributed as major problems for students in traditional apprenticeship learning which gave both 43.75% respectively (see Table 2).

From the analysis, it showed the weaknesses of conventional learning and the results from analysis were taken into consideration in designing a proposed CDTC model.

4. DESIGN PHASE

4.1 Designing a Model

It is very important to identify components for possible inclusion in the model for teaching and learning traditional crafts courseware, therefore some main aspects were taken into account to produced well-developed model. Extensive review of prior studies including a number of applications, multimedia technologies, theories and existing teaching and learning framework was conducted. More specifically, a number of website and instructional design guidelines have been reviewed as well as analyzed from sources like books, proceedings, journals and online information in order to represent such model. As a result of the analysis of relevant theories and findings from previous discussions, the proposed model for teaching and learning traditional craft courseware was developed [13].

4.2 Proposed Components for CDTC Model

The model consists of two main components illustrated in Figure 2: (i) teaching and learning components and (ii) digital traditional craft components. The teaching and learning components comprised of the following elements:

Meanwhile, 9 out of 16 respondents from instructors were 56.2% males and 43.8% (n=7) females, came from 37.5% (n=6) instructors from Fakultas Seni Tenunan, 31.25% (n=5) Fakultas Seni Kraf Kayu instructors and 31.25% (n=5) from Fakultas Seni Kraf Rotan. From instructors' perception

- 100% agree that the most problem for instructors in traditional apprenticeship was level dependency of students to instructors.
- 100% of the instructors found their students took a long time to memorize the learning process.
- 87.5% of the instructors claimed that they need to frequently repeat the learning in teaching traditional craft.
- 68.75% of the instructors agree that they were facing difficulty in assisting students anytime and anywhere through traditional apprenticeship method.
- 81.25% of the instructors agree they were having difficulty in preparing course materials that can be accessed by students anytime and anywhere in conventional learning.
- 62.5% of the instructors agree that communication problems occur when practical teaching was delivered verbally.
- 75% of the instructors found students have difficulty to visualize practical learning when teaching them verbally.

1. *Teaching and learning goal setting*
Emphasize on the teaching and learning objectives. It is very important to clearly define teaching and learning goal setting in order to accomplish teaching and learning goals for selected traditional craft.
2. *Teaching and learning theories adaption*
Adaption selected teaching and learning theories into teaching and learning traditional craft courseware enable to

- provide the appropriate learning environment and improve learning effectiveness. Such theories are Social Learning Theory, Cognitive Theory, Constructivism Theory, Behaviorism Theory, Mastery Theory and Adult Learning Theory (Andragogy).
3. *Course Materials Design*
There are various types of traditional crafts. Designing course material involves selecting contents and elements used for appropriate craft learning. It is tailored to selected teaching and learning theories. This component divides the contents into sequence of delivery.
 4. *Teaching and Learning Strategy*
Learning strategies determine the approach for achieving the learning objectives and are included in the pre-instructional activities, information presentation, learner activities, testing, and follow-through. The strategies are usually tied to the needs and interests of students to enhance learning and are based on many types of learning styles. Cognitive apprenticeship method was identified to be used for online teaching and learning craft and can be highlighted through simulations, discussion, tutorials and exercises [15],[17]. It was proven that the integration of cognitive apprenticeship method in educational courseware gave positive impact on attitudes and performance [4].
 5. *Course Structure Design*
Course structure design involves designing layout of the elements in the presentation. The elements such as visual, verbal, animation and chunking of information will be drawn on as the way of information is placed on the screen.
 6. *Delivery design*
The presentation will be divided into several parts such as introduction, body, conclusion and assessment.
2. *Immersive*
Courseware should make learners absorbed with the environment and the student can experience a sense of presence and interact with the other characters within that place (virtual world).
 3. *Interactive Design*
User is allowed to control what elements are to be delivered and when they are to be delivered. Interactivity is important as intermediary between learners and contents.
 4. *Adaptive Crafts Modules*
Module is designed based on learning goals and it is structured by following course materials design.
 5. *Self assessment*
Through self-assessment, learners can track their personal development and deepen their learning experience. They take more responsibility for their own learning and become more aware of their own knowledge gaps too. Learners can evaluate their performance based on level of difficulties.
 6. *Rewards*
Each exercise determines the level of learner's performance. Reward is given after completing each exercise.

4.3 Initial Validation

Initial validation was done to validate the components of the proposed CDTC model by selected craft instructors. The validated components will be used for designing a preliminary version of the model. To validate the components of the proposed model, Delphi Technique was used in the study. This technique is a group process used to survey and collect the opinions of experts on subject [9]. The proposed components were derived from a literature review of recent and current studies as discussed before. The proposed model was presented to the experts, and they were required to provide feedback to a proposed components and the feedback from the experts was used to outline a potential components for a preliminary version of the model.

The initial validation study was conducted through a survey based on a Likert Scale among experts (instructors) from National Craft Institute, Rawang, Malaysia and comes from Fakulti Seni Kraf Tenunan, Fakulti Seni Kraf Kayu and Fakulti Seni Kraf Rotan. These instructors (called Evaluator Committee) comprised of sixteen (16) experts in

For digital traditional crafts components, elements that need to be considered during courseware development are elaborated as follows:

1. *Multimedia Technology and Delivery Medium*
Selective multimedia technology that allow learners to visualize craft learning and thereby improving their learning (retention) and their performance when transferring from the virtual world to the real world.



the areas of traditional crafts was established to assist in determining the appropriate components and also assist in providing feedback to improve and enhance the proposed model. All of them had completed their diplomas and degree in the respective craft field. Instructors that have been chosen as Evaluator Committee must have at least one year experience in teaching traditional craft.

The questions were designed based on the proposed CDTC model components. By following basic steps of the Delphi process, the questionnaire was given to each Evaluator Committee asking for a list of opinions involving experiences and judgements, predictions and recommendations activities. On the second process, Evaluator Committee examined and evaluated the importance and efficacy of each components listed according to its relevance to the design of the model. The proposed components was rated on a Likert Scale ranging from 1 (very unimportant) to 5 (very important) as refer to previous study [1]. It was agreed by all evaluators that components receiving an average rating less than 2.0 would be removed from the list. Evaluator Committee also allowed to suggest any appropriate components that relevant to proposed CDTC model. The proposed component that was suggested by more than five (5) members from Evaluator Committee will be considered and then will be verified through second validation session with five (5) selected evaluators that were randomly chosen from Evaluator Committee members. The second validation method was basically same as Initial Validation using five categories of Likert Scale.

Result from initial validation showed mean score for each component of the proposed model (See Table 3). From the table, only one component (component 8) received average rating below than 2.0 (mean=1.94), meanwhile other elements was ranked above an average mean score. Because the score of component 8 was below the 2.0 scoring margin, it was agreed to remove it from the list. Other result from the reviewed questionnaire showed that one (1) new proposed component (multimedia database) was recommended by seven (7) members from Evaluator Committee as suggestions for improving the model.

After second validation was conducted among five selected instructors, the result showed that proposed component should be listed as one of the primary component in the CDTC model because it received average rating of 4.4. Multimedia database

component is appropriate to the model to allow accessibility of data and enable more flexible learning and provides more options in hosting one or more primary media file types. After the primary components of the model were determined (from initial validation and second validation for the proposed component), a preliminary CDTC model was developed as shown in Figure 3.

5. CONCLUSION

Acknowledging the preservation of traditional cultures and the revival of traditional crafts should be given increased attention, a new approach of digital teaching and learning traditional craft was introduced to attract younger learners and to extend the current practice. In order to deliver teaching and learning of traditional crafts with the support of teaching and learning pedagogy, a model called CDTC Model for courseware development of teaching and learning traditional craft was developed as a guide to courseware developers and other researchers. This paper presented the design process of CDTC model that is accompanying with four phases: Analysis, Design, Development and Evaluation. This paper focused on analysis and design phase. The model is intended to assist and guide educators or developers in developing multimedia courseware for teaching and learning traditional craft. In order to provide a relevant model to users, the CDTC model was developed from the theory of reading-based and preliminary study done in analysis phase. Initial validation was examined in this study in design phase and was done by selected committee to improve and enhance the proposed components. Further studies will focus on development and evaluation phase, in which development phase emphasizes on adapting a CDTC model into multimedia application prototype development. Besides, this phase also concentrates on developing appropriate Instructional Design for the prototype and a pilot test will be carried out in order to obtain a user feedback for further improve of the courseware prototype. Evaluation phase will be conducted to investigate the effectiveness and usability of preliminary CDTC model applied in web-based courseware for teaching and learning traditional craft. Finally, final validation will be done among selected instructors to confirm the final version of the model.



REFERENCES:

- [1] Biello, A. D., "A Model for Developing Interactive Instructional Multimedia Applications for Electronic Music Instructors". *Proquest Dissertations And Theses 2006*. Florida: Nova Southeastern University, 2006, Publication Number: AAT 3206011.
- [2] Collins, A., Holum, A., & Brown, J.S., "Cognitive Apprenticeship: Making Things Visible", <http://www.21learn.org/site/archive/cognitive-apprenticeship-making-thinking-visible/> (accessed 15.2.2012).
- [3] Dharmappa, H.B., Corderoy, R.M., & Hagare, P., "Developing an interactive multimedia software package to enhance understanding of and learning outcomes in water treatment processes". *Journal of Cleaner Production*, 8, 2000, 407–411
- [4] Dickey, M. D., "Integrating Cognitive Apprenticeship Methods in a Web-based Educational Technology Course for P-12 Teacher Education". *Computers & Education*, 51, 2008, 506–518.
- [5] Gamble, J., "Modelling the Invisible: the pedagogy of craft apprenticeship". *Studies in Continuing Education*, 23, 2, 2001, 185-200.
- [6] Guile, D., & Young, M., "Apprenticeship as a conceptual basis for a social theory of learning", *Journal of Vocational Education & Training*, 50:2, 1998, 173-193
- [7] Jamil Salleh, Wan Yunus Wan Ahmad, & Mohd Rozi Ahmad. "Songket Weaving Using Jacquard Technology". *Textile Convention 2009*, 2009, 168-176
- [8] June Ngo Siok Kheng., "Innovating The Traditional Malaysian Handwoven Songket For Today's Living". *Textile Convention 2009*, 2009, 160-167
- [9] Muhammad Imran Yousuf., "Using Experts' Opinions Through Delphi Technique". *Practical Assessment, Research & Evaluation*, Volume 12, Number 4, 2007
- [10] Oktyabrskaya, I.V., Pavlova, & E.Y., Skovpen, A.V., "The Cultural Heritage And Crafts of The Eurasian Peoples Modern Altai Crafts". *Archaeology Ethnology & Anthropology of Eurasia*, 37/1, 2009, 129–135
- [11] Oriol, M.D., Gail, T., and Snyder, K., "Cognitive Apprenticeship as a Framework for Teaching Online". *MERLOT Journal of Online Learning and Teaching* .Vol. 6, 2010, No. 1
- [12] Pratt, D., "Concepts of teaching", *Adult Education Quarterly*, 42(4), 1992, pp. 207-220.
- [13] Salyani Osman, & Nor Azan M. Z., "Proposed Model for Courseware Development of Virtual Teaching and Learning Traditional Craft". *Proc. The 4th International Symposium on Information Technology*, 2010, pp.293-298.
- [14] Salyani Osman, Nor Azan M. Z., Noraidah Sahari@Ashaari, & Yuhanis Omar, "Model for Courseware Development of Teaching and Learning Traditional Craft (CDTC Model): Initial Validation". *Proceedings of 2011 IEEE Symposium on Computers and Informatics (ISCI 2011)*, Malaysia, pp.64-67.
- [15] Shabo, A., Guzdial, M., & Stasko, J., "An apprenticeship-based multimedia courseware for computer graphics studies provided on the World Wide Web". *Computers and Education*, 29(2/3), 1997, 103–116
- [16] Sommerville, I. *Software Engineering, 6th ed.* Boston and Harlow, England: Addison-Wesley, 2001
- [17] Stockhausen, L. J., & Zimitat, C., "New learning: Re-apprenticing the learner". *Education Media International*, 39(3/4), 2002, 331–338
- [18] Wood, N., Rust, C., & Horne, G., "A tacit understanding: The designer's role in capturing and passing on the skilled knowledge of master craftsmen". *International Journal of Design*, 3(3), 2009, 65-78.

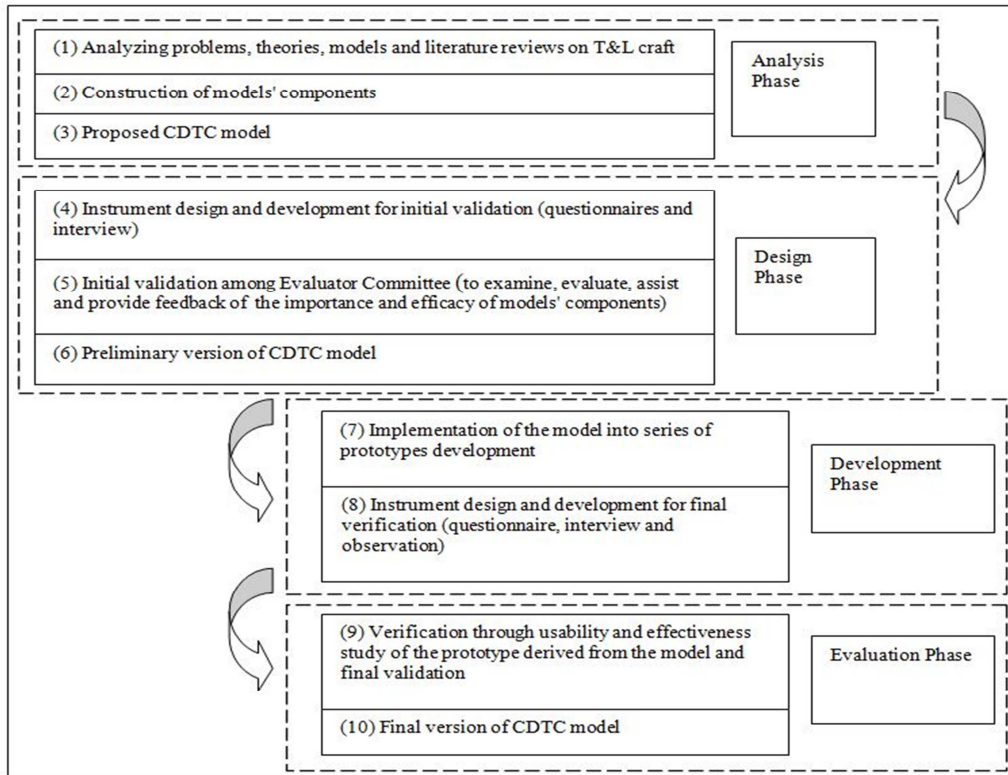


Figure 1: Methodology workflow for CDTC Model

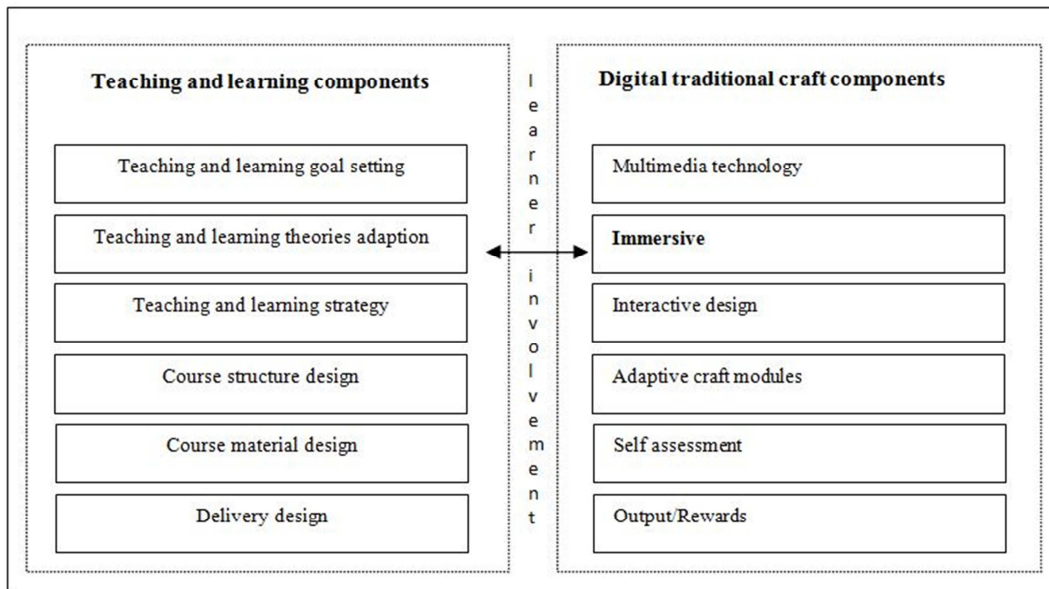


Figure 2: Proposed model for teaching and learning traditional craft courseware

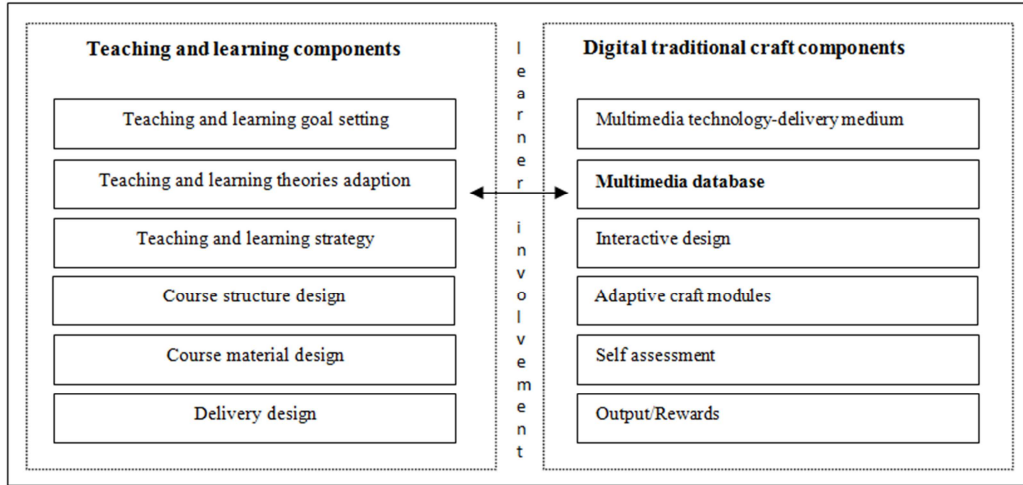


Figure 3: Preliminary Model For Teaching And Learning Traditional Craft Courseware After Initial Validation [14]

TABLE 1: Problems of learning traditional craft using traditional apprenticeship method from students' perception

Problems in Traditional Apprenticeship Method	Percentage %	Mean Score
High level of dependency to instructor.	90.00	3.70
Difficult to understand and follow learning.	43.75	2.60
Takes a long time to memorize the learning.	100.00	3.40
Difficult to obtain instructor assistance anytime and anywhere.	75.00	2.90
Difficult to obtain course materials anytime and anywhere	65.00	2.85
Communication problems occur when practical teaching is delivered verbally.	80.00	3.10
Difficult to visualize practical teaching that is delivered verbally.	90.00	3.40
Takes a long times to expert the learning.	43.75	2.70
Frequent repetition of the teaching process.	100.00	3.90



TABLE 2: Problems of learning traditional craft using traditional apprenticeship method from instructors' perception

Problems in Traditional Apprenticeship Method	Percentage %	Mean Score
High level of dependency to instructor.	100.00	4.25
Difficult to understand and follow learning.	43.75	2.25
Takes a long time to memorize the learning.	100.00	3.50
Difficult to obtain instructor assistance anytime and anywhere.	68.75	3.00
Difficult to obtain course materials anytime and anywhere	81.25	3.07
Communication problems occur when practical teaching is delivered verbally.	62.50	3.00
Difficult to visualize practical teaching that is delivered verbally.	75.00	3.00
Takes a long times to expert the learning.	43.75	2.25
Frequent repetition of the teaching process.	87.50	3.56

TABLE 3: Components mean scores

Proposed Model Components	Mean Score
A. Teaching and learning Components	
Teaching and learning goal setting	3.94
Teaching and learning theories adaption	3.63
Course Materials Design	4.00
Teaching and Learning Strategy	4.00
Course Structure Design	3.63
Delivery design	3.88
B. Digital Craft Components	
Multimedia Technology and Elements	3.94
Immersive	1.94
Interactive Design	3.63
Adaptive Crafts Modules	3.75
Self-assessment	4.19
Outcomes / Rewards	4.13