The Validity of Tri Hita Karana (THK) Oriented Blended Learning Tools to Improve Student's Critical Thinking Ability

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Abstract. The aims of this study was to develop a valid Tri Hita Karana-oriented blended learning tools on anatomy and human physiology to improve students' critical thinking in Biology. Learning tools in this study were developed using a 4D development model consisting of the following stages. 1) Define, 2) Desing, 3) Development stage, and 4) Diseminate. At present the research is at the stage of developing and validating learning tools. The validity test performed are content validity and construct validity. The content validity was carried out by finding the relevance of THK-oriented learning tools with the theory of blended learning and learning materials that were used as guidelines. The construct validity test was carried out by looking at the consistency of each component of THK-oriented learning tools with the blended learning learning characteristics obtained from the results of the validator's assessment. Based on the validator's assessment, the validity of the learning device in this study is classified as a very valid category. Furthermore, a limited trial is conducted to see the practicality and effectiveness of learning tools.

1. Introduction

The technology develops rapidly in this industrial revolution era 4.0. It brings a huge impact on every life. The era where every human necessity needs a sophisticated technology. Generally, the characteristic of the industrial revolution era 4.0 covers digital, automation, and artificial intelligence. The consequence of this era is that everything in human lives is completely about the digital machine, automation, even all can be made. The internet mainstream brings massive change to the attitude of business, industry, trade, and education. The challenge we face in the education world in the 4.0 era is that the necessity of how to integrate with the digital world, big data, and humans in the process of learning. Thus, it can produce adaptive, critical, and creative human resources in facing every change. The most important element of the five elements which will be executed by the Ministry of Research, Technology, and Higher Education to push the economic growth and national competitiveness is to prepare the more innovative learning system in the universities. It includes adjustment of learning curriculum, increasing the students’ ability in Information Technology (IT), Operational Technology (OT), Internet of Things (IoT), and Big Data Analytics, integrating physical objects, digital, and
human to produce competitive and skillful university graduates, especially in data literacy, technological literacy, and human literacy.

As directed by the Ministry of Research, Technology, and Higher Education related to the impact of the 4.0 industry, the first step that can be done to adapt to the existing changes is to modify the learning system. It is used to be face to face in the classroom. That can be blended with the live lecturing mode using an internet network. It is well known as blended learning. Susilo [1]

The implementation of Blended Learning is in line with the six elements of the 21st century learning style, they are 1) core subject knowledge, 2) core learning skill development, 3) utilizing 21st century learning tools to develop learning skills, 4) learn students in the context of the 21st century, 5) learn the content of 21st century; and 6) using the 21st century assessment to measure the skill of 21st century.

The 21st century learning method requires students to have characteristics of learning they are: 1) learning and innovation skills: critical thinking and problem-solving in communication and collaborative and innovative creativity; 2) digital literacy skills: new media literacy and ICT literacy; and 3) life and career skills: have a capability of flexible and adaptive initiatives, and social skills in intercultural interaction, productive and accountable leadership skills, and responsibility. In response to this, lecturers are required to be able to carry out blended learning. Before implementing this method, lecturers should have thorough preparation and valid blended learning tools so that the learning process is directed and can help students. The preparation of a valid blended learning tool is done through development research following a particular development model.

The Ganesha University of Education is one of the leading universities in the province of Bali. The Ganesha University of Education has a vision "to become a superior university based on the philosophy of Tri Hita Karana in ASIA in 2045". Inclusion of Tri Hita Karana (THK) philosophy in Undiksha's vision has implications for efforts to develop policies for the implementation of the Tri Dharma of Higher Education at Ganesha University of Education. One of them is in the field of implementing education as one of the Tri Dharma Colleges. The vision of the Ganesha University of Education has implications for the innovation of learning development based on the philosophy of THK. The development of learning based on THK is very important, in addition to the demands of the university's vision as well as the factual demands of Indonesian multicultural society. Wirawan [2] said that the values contained in THK's philosophy are universal. It can be used as a foundation in creating a sense of life that is comfortable and peaceful both physically and naturally. The philosophy of Tri Hita Karana teaches us to always maintain a harmonious relationship with the creator, nature or the surrounding environment and also with fellow human beings; in this case, learning based on THK philosophy can be used as a means of forming good character and increasing critical thinking skills in students. THK-based learning can foster a sense of awareness and sense of responsibility for self-prosperity and the environment, facilitating the growth and development of learners' potential, namely the ability to use thoughts, words, and deeds to create a work. These three potentials continue to be developed and reflected into a skill and competency that is the focus of 21st-century learning.

The philosophy of Tri Hita Karana in the process of education is a very monumental concept and is noble in building harmony that is full of virtue values, moral values, ethical values, values of unity so that there is a harmonious life between all God's creations. The emission of very high educational values provides a very strong appeal for educational providers to elevate it as a source of inspiration in the process of improving the quality of education to realize quality outputs and character. Higher education as the most strategic formal educational institution as a cultural center is very appropriate to implement the concept of Tri Hita Karana in building students' values and critical thinking skills. The ability of humans to adapt to the environment to maintain their survival depends very much on their thinking abilities. Someone who has good high-level thinking skills (critical and creative thinking) will be able to analyze situations that occur and can predict the impact that will occur and be able to make logical problem-solving. Learning done in class should help students more to develop students' critical thinking skills as a preparation for dealing with problems in their daily lives. Based on the results of observations made in May 2018, there are still many students who have not been able to make
practical reports following scientific methods. The average value of practicum reports made by students is still relatively low at 69. Generally, students have not been able to interpret the results of the practicum that is under the aims of the practicum. Students also have not been able to make in-depth discussions or logical reasons regarding the findings or results of the practicum. There are still many practicum data that are left unchecked without being included in the discussion because the ability to do induction or deduction is still less. Students are not keen to respond or respond to data of practical results, less able to link the theoretical basis with the results obtained. For this reason, it is deemed necessary to develop a THK-oriented blended learning tool to improve students’ critical thinking skills. Bearing in mind: (1) the development of THK-oriented blended learning is in line with Undiksha's vision and offers many alternative learning resources for students outside the material given by lecturers through the use of information technology and can cover limitations on face-to-face learning, (2) Undiksha already provides wifi / hotspot network in all campus environments both in each faculty and lecture hall that can be used by all parties in the Undiksha environment, both lecturers, students and staff, (3) most students who have brought laptops and android mobiles to support teaching and learning activities as well as for completing assignments on campus. This shows that facilities are available as technical support to implement blended learning. Whereas, consideration number 1 above is expected to be one of the means for increasing critical thinking skills and students.

1.1 Blended learning

According to Bielawski & Metcalf [3] Blended learning is a relatively new concept in learning where instruction is conveyed through a mixture of online and conventional learning which in its implementation is led by instructors. Face to face collaboration with online methods is designed proportionally and systematically where educators and students meet directly and also through online media that can be accessed anytime, anywhere, 24 hours a day and 7 days a week. According to Hasumah [4] in general, the characteristics of Blended learning are as follows: a) Learning that combines various ways of delivery, teaching models, learning styles, as well as a variety of diverse technology-based media, b) as a combination of direct teaching (face-to-face ), independent study, and independent study via online. c) learning supported by an effective combination of delivery methods, teaching methods and learning styles, d) instructors and parents of learning participants have the same important role, teachers as facilitators, and parents as supports.

The basic principle of Blended learning is direct face-to-face communication and online written communication. The concept of Blended learning seems simple but its application is more complex. Garrison & Vaughan [5] tell the main assumptions of Blended learning design are 1) thinking combining face-to-face and online learning, 2) fundamental rethinking about course design to optimize student engagement, and 3) structuring and rearranging traditional lecture hours. Woodall & Hovis [6] show blended learning in this study was carried out by applying eight stages, namely: a) prepare me: the teacher conditions students to be ready to follow the learning to be done and divides students into several groups heterogeneously, b) tell me: Teacher guide students to understand the topics given to each group, c) show me: the teacher guides students to make observations, so students can explain the topics discussed, d) let me: the teacher guides students to do the classification of the material discussed, as well as completing student worksheets using a variety of learning resources obtained from books or the internet, e) coach me: the teacher guides students to discuss in small groups and bring it in discussions online, f) connect me: The teacher guides students to communicate the results of small group discussions in front of the class. The teacher guides the students to summarize the results of the learning activities that have been carried out. g) support me: the teacher confirms students so that no misconceptions occur. The teacher guides students if there is a shortage in a discussion or search for learning resources, h) check me: the teacher gives an evaluation in the form of a test on each student to find out how far the mastery of the concept of material obtained by students. The teacher assigns assignments to students to link students’ knowledge of learning that will be done at the next meeting.
1.2 Tri Hita Karana

Tri Hita Karana (THK) comes from the word "Tri" which means three, "Hita" means happiness, and "Karana" means cause, thus Tri Hita Karana means "Three causes of happiness". THK cosmology concept is a very formidable philosophy of Hindu life. This philosophy has a concept that can preserve the diversity of culture and environment in globalization and homogenization. The essence of Tri Hita Karana's teachings emphasizes the harmonization of three human relationships in life in this world. The third harmony includes relationships with fellow humans, relationships with the natural surroundings, and relationships with God. The concept is very relevant to be integrated into the world of education today.

The integration of THK philosophy in schools is very appropriate to be used as a basis for innovation and the development of quality education to address the challenge of declining cultural values to produce educational output that has an international identity and competitiveness. Concrete implementation or manifestation of the Tri Hita Karana concept can be used as a learning experience for students so that they can foster thinking skills, more easily construct meaning or information from an event. THK's local wisdom-based education development supports the development of students' fundamental skills. Based on THK's main principles that emphasize the growth of mental awareness over physical awareness by utilizing the potential in themselves, the basic skills of students will increase in the form of ability and sensitivity in listening, reading, and writing. Besides, thinking skills will also increase, namely intelligence and learning skills, problem-solving skills, developing and finding problem solutions, decision-making skills, management skills and directing thoughts. Sudira [7] tell the personal qualities of responsibility, morals, character, integrity, self-confidence, loyalty will also grow well as part of fundamental skills for students who are educated in the THK-based education environment.

One form of THK practice is maintaining harmonious relationships with fellow humans. Harmonious relations with fellow humans can be realized through the ceremony of Manusa Yadnya. It is a ceremony that is a sincere offering offered to fellow human beings. One of the forms of Manusa Yadnya ceremonies carried out by the Balinese people is the megedong-gedongan ceremony and the Ngeraja Sewala ceremony. Megedong-gedongan ceremony and Ngeraja Sewala are closely related to the human reproductive system. Therefore, in substance, the ceremony can be integrated into the learning of human anatomy and physiology at the tertiary level, especially in the matter of the reproductive system. By integrating the values contained in the ceremony, the students can recognize or understand the meaning of the ceremony while understanding its relation to the physiology of the reproductive organs. Thus students have higher confidence in the implementation of the ceremony because the ceremony has a logical connection with the physiology of the reproductive organs, not just a myth. In other words, the truth of the purpose of the megedong-gedongan ceremony and the Ngeraja Sewala ritual can be studied scientifically.

1.3 Critical thinking ability

Thinking is also a mental activity to build and gain knowledge. In a learning process, students' thinking ability can be developed by enriching meaningful experiences through problem-solving. The ability of humans to adapt to the environment to maintain their survival depends on their ability to think. Thinking is the most important competitiveness. The thought process is also a mental activity that is realized and directed for a specific purpose. Possible intentions of thinking other than to build and acquire knowledge, also to make decisions, make plans, solve problems, and to assess actions.

Critical thinking based on Sadia [8] opinion is intended as thinking right in the search for relevant and reliable knowledge about the world of reality. According to Ennis [9], critical thinking is thinking reasoned and reflective with an emphasis on making decisions about what to believe or do. Therefore, indicators of critical thinking ability can be derived from students' critical activities as follows: (1). Look for a clear statement of each question. (2). Finding reason. (3). Trying to know the information well. (4). Use credible sources and mention them. (5). Paying attention to the situation and condition as a whole. (6). Trying to stay relevant to the main idea. (7). Given the original and fundamental
interests. (8). Look for alternatives. (9). Behave and think openly. 10). Take a position when there is sufficient evidence to do something. 11). Look for as many explanations as possible whenever possible. 12). Be systematic and orderly with the parts of the whole problem.

Indicators of critical thinking ability derived from critical activity no.1 can formulate the main points of the problem, critical activities no. 3, 4, and 7 can reveal the facts needed to solve a problem, no. 2, 6, and 12 can choose logical, relevant and accurate arguments. Indicators derived from critical activities, number 8,10, and 11 are capable of detecting bias based on different points of view. The last indicators numbers 5 and 9 can determine the effect of a statement taken as a decision.

2. Method
This research is Research and Development Study (R and D). The development method used the 4D model; Define, Design, Development and Disseminate. The first stage carried out in this study was the Defining stage. There were several points at this stage, they were analyzing the situation and needs of students of Biology Education Study Program at Ganesha University of Education, identifying the characteristics of students in Biology education study program, identifying THK concepts that would be integrated in blended learning tools, composing blended learning orientations, summarizing the design of THK-based blended learning devices. The second stage was the Designing phase. At this stage, the things done were designing THK-oriented blended learning tools including determining the proportion of face-to-face and online schedules, preparing syllabus, RPS, and RTM-oriented THK and preparing critical thinking tests. The third stage was the development stage. At this stage was expert validation of THK-oriented blended learning tools and research instrument testing, respondents' trials to students and lecturers of the Biology Education study program at the Ganesha University of Education. The next stage was the dissemination stage which was the validated learning tools that were then applied in the learning process in the Biology Education Study program.

There were three criteria for the success of the development of learning tools, namely: validity, practicality, and effectiveness. The validity of the learning device was measured by content validity and construct validity. Content validity was seen from the coherence of learning tools developed with relevant theories. The construct validity was seen from the interrelationship and compatibility between the components of the developed learning device. The practicality of the developed learning device was measured by the improper use of the learning device in lectures in class. Data on the practicality of the developed learning device was obtained from the results of the student response questionnaire and the lecturer response questionnaire to the learning device developed. The effectiveness of learning devices was measured based on the achievement of learning objectives using learning tools that were developed. To assess the effectiveness of teaching materials was done by collecting data through critical thinking test scores. The instrument used in this study was the validation sheet for teaching materials. In the validation sheet, the validator's opinion was categorized into four, namely: very valid (score 4), valid (score 3), invalid (score 2), and very invalid (score 1). The average score of each validator was determined by summing the scores of each item on the validation sheet then determining the average. In addition to evaluating quantitatively, the validator also assessed qualitatively from the quality of teaching materials. The average score obtained from each validator was summed and then averaged again until an average total score was obtained. The validity of teaching materials was determined by converting the average total score to a qualitative value using the following criteria in the table below.

| Table 1. Learning Tool Validity Criteria |
|-----------------------------------------|
| Score | Validity            |
| 3.5 ≤ Sr ≤ 4.0 | Very Valid          |
| 2.5 ≤ Sr < 3.5 | Valid               |
| 1.5 ≤ Sr < 2.5 | Invalid             |
| 1.0 ≤ Sr < 1.5 | Very invalid        |
3. Results and Discussion

3.1 Result
The learning tools developed in this study included Semester Lesson Plan (RPS), Student Worksheet, and THK-based Reproductive System Teaching Materials. The process of developing learning tools referred to the 4D development model.

3.1.1 Semester Lesson Plan (SLP)
The Semester Lesson Plan (SLP) developed by researchers referred to the analysis of student characteristics and KKNI formats by considering the breadth of the material presented. The SLP was made in 6 meetings with an allocation of 3 x 50 minutes each time. The lesson plans that had been developed by these researchers were then validated by 2 experts as the results presented in Table 2.

| No. | Aspect       | Average Score Assessment | Average | Criteria       |
|-----|--------------|---------------------------|---------|----------------|
|     |              | Validator I | Validator II |       |               |
| 1   | Format       | 3.5          | 3.6         | 3.55  | Very Valid    |
| 2   | Content      | 3.6          | 3.6         | 3.6   | Very Valid    |
| 3   | Language     | 3.6          | 3.8         | 3.7   | Very Valid    |
|     | Average      |              |             | 3.61  | Very Valid    |

Based on table 2, it could be interpreted that criteria of the developed Semester Lesson Plan was very valid and feasible to be used with a few improvements.

3.1.2 Student Worksheet
The next learning tool developed by researchers was the Student Worksheet. It had been validated by 2 experts with the results as follows in Table 3.

| No. | Aspect       | Average Score Assessment | Average | Criteria       |
|-----|--------------|---------------------------|---------|----------------|
|     |              | Validator I | Validator II |       |               |
| 1   | Format       | 3.6          | 3.6         | 3.6   | Very Valid    |
| 2   | Content      | 3.7          | 3.6         | 3.65  | Very Valid    |
| 3   | Language     | 3.7          | 3.8         | 3.75  | Very Valid    |
|     | Average      |              |             | 3.66  | Very Valid    |

Based on the table 3, it could be said that the Student Worksheet developed was suitable for use in learning which the criteria was very valid.

3.1.3 THK-Oriented Reproductive System Teaching Material
The teaching material developed in this study was THK-oriented reproduction system teaching material. In this case, THK in question was the implementation of the ceremony of Manusa Yadnya which aimed to maintain harmony between fellow humans. Manusa Yadnya ceremony that was integrated into learning the reproductive system was the megedong-gedongan ceremony and the ngeraja sewala. This teaching material was then validated by 2 experts with the results shown in table 4.
Table 4. Validity Results of the THK-oriented teaching materials

| No. | Aspect       | Average Score Assessment | Average  | Criteria  |
|-----|--------------|--------------------------|----------|-----------|
|     |              | Validator I              | Validator II |           |
| 1   | Format       | 3.8                      | 3.6       | 3.7       | Very Valid |
| 2   | Content      | 3.8                      | 3.8       | 3.8       | Very Valid |
| 3   | Language     | 3.5                      | 3.6       | 3.55      | Very Valid |
|     | Average      |                          |           | 3.68      | Very Valid |

Based on the table 4, the criteria of THK-oriented reproductive system teaching materials was very valid and appropriate to use in the learning process.

3.2 Discussion

3.2.1 Lesson Plan

Based on Table 2 above, it could be seen that the lesson plans that had been developed were feasible to be applied in the learning process in tertiary institutions. That was because the Semester Lesson Plan developed had been in accordance with the technical guidelines for the preparation of national higher education standards in 2017 where the components of the Semester Lesson Plan include the identity of the courses, graduate learning outcomes, the final ability planned and the time provided at each stage of learning, study material, learning methods for student learning experiences, assessment methods and reference lists.

Besides, the compiled lesson plan was very valid because the aspects of format, language and content were appropriate or meet very valid lesson plan criteria. The content aspect got the smallest average compared to the other two aspects. This meant that the contents of the Semester Lesson Plan still needed to be improved in terms of sorting out the learning achievements namely attainment of learning attitudes, spiritual, knowledge, general skills, and special skills. Besides that revisions were needed in the selection of learning methods and assessment instruments.

3.2.2 Student Worksheet

Student worksheets developed in this study were THK-oriented student worksheets. In the development process covered several analyzes which included: (1) objective analysis (referring to several theories about THK-oriented blended learning models as well as critical thinking indicators as considerations in compiling the stages in student worksheets so that the worksheet reflected the character of blended learning and critical thinking indicators consisting of the stages of giving arguments, identifying problems, formulating problems, making hypotheses, collecting data and conducting analysis or induction, designing problem solutions and making conclusions. The preparation of student worksheet refered to several learning theories, namely Piaget’s theory of schemes, Vygotsky’s theory of proximal and scaffolding development zones, and Bruner’s theory of discovery learning). Table 3 above showed that the three aspects, namely: aspects of format, aspects of language, and aspects of content were on average very valid. This meant that worksheets that had been developed were feasible and could be used as learning tools with further revisions.

3.2.3 THK-oriented Reproduction System Teaching Material

The teaching material developed in this study was THK-oriented reproduction system teaching material. In this case, the THK in question was the implementation of the megedong-gedongan ceremony and the ngaraja sewala ceremony. Development of teaching materials was based on the results of researchers’ analysis of (1) analysis of student characteristics (aiming to determine the level of cognitive development, background knowledge, and socio-cultural background); (2) task analysis (used to identify selected material); (3) problems in learning and goal analysis (to determine the fundamental problems faced by students in the learning process of human anatomy and physiology
courses. By Table 4 above it was known that all three aspects of assessment had very valid average criteria, which meant teaching materials were developed appropriately for use in the learning process. The average was very valid because the teaching material developed included all material that was following the learning objectives, the content of the teaching material links between the megedong-gedongan ceremony and the ngeraja sewala ceremony with the reproduction system material that was packaged very interesting (equipped with image and sound).

The learning tools that development believed able to improve Student's Critical Thinking Ability because in every step or stage of blended learning student’s are given opportunity to find information in their own way and learned to make a decision systematically. With the THK orientation the student’s are trained to examine the relationship between culture in society with theoretical truth using the scientific method. In this activity all of critical thinking indicators were trained and make student’s ability are improve. This research are synergized with Anggreni, at all [10] that finding there is an significant effect of blended learning on critical thinking ability. The result of this research are synergized with another research such as Sari [11] that finding blended learning success to improve the student’s critical thinking, Desy M & Setyoko [12] that finding the development of website based blended learning is suitable to be used by the students of Biology Education of University of Samudra in learning which combines face to face learning at class and online.

4. Conclusion and Suggestions

Based on the validator’s assessment, the validity of the learning device in this study is classified as a very valid category. With detail of result are Semester Lesson Plan was very valid (3.61), the Student Worksheet developed was suitable for use in learning which the criteria was very valid (3.66), THK-Oriented Reproductive System Teaching Material 3.68 (very valid). Furthermore, a limited trial is conducted to see the practicality and effectiveness of learning tools. The results of the development of THK-oriented blended learning tools were appropriate for use in learning human anatomy and physiology. The results of this study can be used as a reference for future studies. For the next research can continued with implementation this learning tools with other variables or combining with other learning metode.

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