Efforts to Develop Creativity in Vocational Education through a Learning Model Based on Student Research Activities

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Article History	Abstract
	This research was motivated by the research findings of The Global Creativity Index 2015 and The Global Innovation Index 2020 where the creativity and innovation index in Indonesia tends to be low. This was also reflected in vocational education, especially in Embroidery learning at the Padang State University (UNP) Fashion Design Study Program where the products produced are generally less creative. For this reason, efforts are needed to develop student creativity in learning. The purpose of this research was to obtain a learning model designed to encourage the development of students' creative attitudes, which is reflected in the creative products produced in learning. This research and development method uses the Plomp (2013) development model with three stages, namely the preliminary research stage, the design and develop prototype stage, and the assessment stage. The design of the learning model was validated by 5 people who were experts in their fields and tested the level of practicality in small groups and field tests. The data were analyzed using the Aiken V formula. The Learning Model Based on student research activities has been assessed as valid, and practical so that it can be used in learning, especially to develop student creativity to produce creative products in Embroidery learning. The syntax stages designed in the form of formulating general questions, integrating research, exploring ideas, designing, improvising and creating creative products, presenting and evaluating have been assessed as valid and practical and can be implemented in learning. **Keywords:** model learning, research creativity, Vocational Education.

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1. Introduction

Industrial revolution 4.0 requires every individual to be creative and innovative because the current digital era promises many opportunities for the young generation who are dynamic and creative to be able to compete globally. (Handayani, 2015); Creativity is one of the important competencies in the era of RI 4.0 in addition to critical thinking and problem solving, communication, collaborative, and innovation skills as well as digital literacy skills. (Care & Kim, 2018); (Chiong & Jovanovic, 2012); (Trilling & Fadel, 2009); (Wrahatnolo & Munoto, 2018). However, research results from Florida et al., (2015) which published The Global Creativity Index show that creativity in Indonesia was quite low compared to other countries in the world. Indonesia was in the 81st position out of 139 countries in the world. Likewise, with the publication of The Global Innovation Index in 2020, Indonesia is in the 85th position out of 131 countries. (Androschuk, 2021).

The problem of creativity and innovation needs to be addressed immediately. The world of education plays an important role in finding solutions to these problems because creativity problems occur from basic education to higher education (Asrani, 2019), (Maftukhah & Nurhalim, 2017), (Nurfaizal, 2014), (Suntusia et al., 2019).). For that, we need serious efforts that synergize with each other from various parties so that changes and improvements occur for the better. Especially in vocational education, learning needs to be adjusted to the main objectives of learning. (Vitriani, et, al, 2020); (Verawadina, et, al, 2020); (Krismadinata, et, al, 2020); (Hendriyani, et, al, 2020); (Nofrianto, et, al,2020); (Asnur, et, al, 2020). (Chappell, 2003) suggests that the learning approach to vocational education should refer to learner-centered (learning that activates the role of students in the learning process), work-centered (learning that leads to a particular job), and attribute-focused (learning that focuses on developing attributes)

One of the right efforts to develop creativity in learning is by designing innovative learning models. Joyce, Bruce, (2011) defines learning models, namely: "Models of teaching are models of Learning. As we help students acquire information, ideas, skills, values, ways of thinking and means of expressing themselves, we are also teaching them how to learn". This means that the learning model needs to be adapted to the learning objectives, material characteristics, methods, and characteristics of students and the objectives to be achieved.

Research-based learning in UNP Fashion education Study Program was still rarely applied, especially in Embroidery learning. Embroidery competence is a competency that adopts the local culture of the West Sumatra region. Most of the competencies learned in Embroidery lessons are available in the student environment. For this reason, it is important to design a research-based learning model that is carried out by students because with research activities it is very possible for students to be able to learn from the research, they do which is compared with research with the method of creation in the classroom. Research results can be used as a source of ideas for creative product development in the classroom.

The purpose of this research was to produce a research-based learning model that will guide students to produce creative products based on the designed learning scenarios. The resulting model describes the level of validity and practicality so that it can be used as the main model for educators who are oriented towards developing creativity in the form of creative products.

2. Method

This research was research and development. The stages of model development follow the flow of the Plomp (2013) model development which consists of three development phases, namely the preliminary research phase, the design and develop prototype phase, and the assessment phase. The preliminary research phase was conducted through interviews with lecturers and students. Interviews about learning problems, supporting infrastructure, learning media, and expectations of lecturers and students towards learning. After that, curriculum analysis, student analysis, and literature analysis were carried out, then the design and development stage of the prototype model was carried out. The model was designed based on the results of preliminary research analysis and was validated by 5 education experts from aspects of language, construction, model, evaluation, and material. This was followed by the practicality test of the model by asking for responses from lecturers and students as the subject of model users to obtain the level of practicality in implementing the model. The subjects of the practicality test of the model consisted of 2 lecturers and a one-to-one evaluation test of 3 students, a small group of 9 students who were taking Embroidery learning.

3. Results And Discussion

a.   Preliminary Research Stage Results

The initial activity of developing a student research-based learning model (S-RBL) was carried out by conducting a needs analysis. Interviews were conducted with 2 lecturers and 10 students in Embroidery learning with the following interview grid:

1)   What are the problems that you often experience in learning?

2)   Do you have any students assigned to the embroidery industry?

3)   What is your opinion on student creativity?

4)   What do you think about the Embroidery learning support facilities?

Based on the results of the interview, it was revealed that first, the lecturer delivered theoretical material in the form of lectures and questions and answers and continued with assignments for practice. Second, there is no research activity in the embroidery industry. Third, the activity of developing student creativity in the learning process is not optimal. The four supporting facilities in the workshop are sufficient for maximum practice.

Furthermore, the results of interviews with students revealed an analysis of student needs in learning. Questions to students are:

1)   What do you think about learning Embroidery?

2)   What media do you need in Embroidery learning?

3)   What kind of learning environment do you want to produce creative products in?

4)   What kind of learning do you expect to appear in the lesson?

The summary results of interviews with students illustrate that students assess that learning had not been optimal in developing student potential because it is still dominated by lecturer activities. Direct learning media is seen as the most effective medium in learning and the real environment of the embroidery industry or field studies is considered interesting for students to do together or collaborate.

Referring to the results of the interviews above, an analysis of the literature was carried out to obtain alternative learning model designs that were by the expectations and needs of lecturers and students. The research-based learning model is one of the alternative learning models that is considered appropriate to the learning problems and needs of lecturers and students. The S-RBL model is designed for Embroidery learning, but it needs innovation to match the expected Learning Outcomes.

Some of the literature analyzed among the opinions of Poonpan & Suwanmankha, (2005) suggests that research-based learning consists of four teaching methods; 1) teaching using research methods, 2) teaching with teacher participation in research projects, 3) teaching by studying research results and research procedures where students can learn about document synthesis because synthesis is an important skill in research procedures. 4) Teaching by using research reviews as lesson content. This opinion underlies the development of a model where the integration of research and involving students in research into the field becomes the foundation of model development.

There are many benefits of Research-Based Learning, including being able to provide opportunities for the development of learning methods or strategies, the existence of learning reforms that synergize learning with research results/research results, the emergence of active participation/involvement of students in the research process, the use of research instruments in learning, and the existence of efforts. inclusive research development. (Salimi et al., 2017), (Dafik et al., 2019). Another advantage is that students have the opportunity to construct their knowledge through the research process carried out because students are involved starting from collecting information, compiling research hypotheses, collecting and analyzing the data collected, and drawing research conclusions. Wardoyo (2013) Widayati et al., (2010).

Dekker & Wolff (2016) suggest the opposite where there are several obstacles to Research-Based Learning, namely the need for additional time in teaching because of research or research activities carried out and the need for teachers or lecturers who are researchers because teachers who are researchers will be better at learning than teachers who are not researchers. With the support of educational institutions, this certainly does not become an obstacle in the

implementation of RBL.

b. Results of the Design and Develop Prototype Stage

Syntax 1. Formulating General Questions (Formulating general questions). In this syntax, the lecturer asks general questions related to learning topics.

Syntax 2. Integrating Research

In this phase, the lecturer will present the results of existing research related to learning materials and students are assigned to analyze research journals related to the learning topics discussed.

Syntax 3. Explore ideas (Explore ideas).

In this phase, students in groups (3-4 people) begin research by exploring ideas according to the agreed theme. Ideas can be obtained from visits to embroidery industries to embroidery galleries, internet media, and literature studies or the result of his imagination.

Syntax 4. Designing (Doing the design)

In this phase, the students in small groups (3-5 people) do the design by pouring their ideas on the design paper. The results of the design are made several pieces (3-5 pieces) which are then selected by the group with the guidance of the lecturer to choose the best design. The results of the design which are still in the form of a sketch are then continued to the next stage.

Ex:

Figure 1. The Sketch of design

Syntax 5. Improvising (Improvising or experimenting)

At this stage, students improvise by making modifications in terms of colors, materials, techniques, and others so that several choices of improvisation and experiment results are obtained. The results of this improvisation and experiment will be analyzed and discussed again with group members under the guidance of the lecturer. The results of the selected selection will be continued by making it a real product.
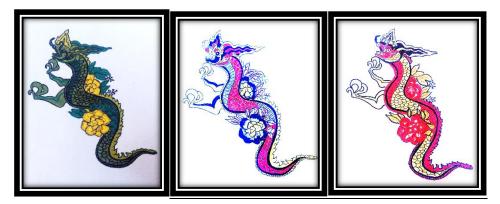

Figure 2. The Improvising designs

Syntax 6. Creating Ideas

At this stage, the results of improvisation and experimentation will be realized into a creative product.

Figure 3. The Result of product design

Syntax 7. Presentation and Evaluation

At this stage, the results of creative products that have been made are reported and presented.

The research methods applied to Embroidery learning are qualitative research methods and creation methods:

a. Qualitative Method

Qualitative research or qualitative research is a type of research that produces findings that cannot be achieved using statistical procedures or other quantitative means. (Kusumastuti & Khoiron, 2019), besides this qualitative research is research that can be used to examine people's lives, history, behavior, organizational functionalization, social movements, or kinship relationships and is a research procedure capable of producing descriptive data in the form of speech, writing, and behavior of the people being observed. (Nugrahani, 2014).

b. Creation Method

The method of creation is included in the category of Applied Research (Art and design as capability) whose output is in the form of works, models, prototypes, and prototypes. (Hendriyana, 2018). A very prominent characteristic of this type of practical research writing is at the stage of activities with a flow, as follows: (Sunarto, 2013); (Hendriyana, 2018)

1) The preparation stage consists of observation and analysis activities. At this stage, the researcher makes observations with preliminary research to find data related to issues and problems that can be obtained in the community, especially data related to the topics and scientific fields being studied. The results are then analyzed to find the formulation of initial ideas which then become the focus of research. Sources of inspiration and ideas can be obtained through one or more sources of problems such as case studies, problem-solving, cultural trends, and others.

2) Imagination stage. At this stage, the researcher finds the potential and opportunities that can be realized or developed (abstract images). At this stage, exploration of forms and experimentation of techniques and materials to be used (concrete images) is also carried out. The concept of form is an abstraction/depiction of the results of a person's creative actions as outlined in the form of basic sketches accompanied by a mind mapping schematic.

3) The stage of developing imagination is focused on the maturity of the concept, as a result of evaluation and improvement/increase in the value of the main problems found.

4) The work stage, namely the stage of implementing design decisions obtained from a mature concept. This work stage is a comfort zone where work tasks can be delegated to drafters and/or teamwork, focusing on working with materials, techniques, and forms to be realized.

The results of the analysis of the validator's assessment of the model contained in the Book of S-RBL Model can be seen in Table 1 below:

Table 1. The Results of Validation S-RBL Model

Aspect of Assessment	Validity	
	Skor (Aiken'V)	**Criteria**
Rational Learning Model	0,89	Valid
Supporting theory of Model	0,86	Valid
Characteristics of Model	0,80	Valid
Syntax of Model	0,90	Valid
Social System	0,88	Valid
Principle of Reaction	0,86	Valid
Support System	0,89	Valid
Instructional and nurturant effects	0,83	Valid
Average	**0,87**	**Valid**

Table 1 illustrates that validators assessed the S-RBL S-RBL Model Book with an average of 0.87 with a valid category. Overall, the results of the assessment for all aspects of the assessment are in the range of 80-100 with valid criteria. Thus, this S-RBL model book can be used for the assessment phase.

Furthermore, the practicality test was carried out through 3 stages, namely the results of the one-to-one evaluation stage, small group evaluation, and field test. The results of the model practicality test assessment can be seen as follows:

Table 2. The Results of Product Practicality Test at the One-to-One Evaluation stage

No	student category	Aspect of Assessment	Average Practicality Score (%)	Category
1.	I (Low ability)	The Practicality of textbooks	77,78	Practical enough
		The practicality of the student manual	80,00	Practical
2.	II (Medium ability)	The Practicality of textbooks	86,67	Practical
		The practicality of the student manual	87,27	Practical
3	III (High ability)	The Practicality of textbooks	91,11	Vey Practical
		The practicality of the student manual	92,73	Vey Practical
	Average		**86,67**	**Practical**

Table 3. The Results of Small Group Evaluation Practical Test

No	student category	Aspect of Assessment	Average Practicality Score (%)	Category
1.	I	The Practicality of textbooks	87,43	Practical
		The practicality of the student manual	87,27	Practical
2.	II	The Practicality of textbooks	90,37	Very Practical
		The practicality of the student manual	89,09	Practical
3	III	The Practicality of textbooks	94,81	Very Practical
		The practicality of the student manual	91,52	Very Practical
	Average		**90,08**	**Very** Practical

Table 4. The Results of Practicality Fields Test of the S-RBL Model

Aspect of Assessment	Average of practicality (%)	Category
The Practicality of textbook	93,73	Very practical
The practicality of the student guidebooks	88,98	Practical
Average	**91,35**	Very practical

Based on tables 2, 3, and 4, the level practicality of the model S-RBL is illustrated by the student guidebooks and textbooks used. The average achievement is 86.67% in the practical category, 90.08 in the very practical category and the field test is 91. ,35 with a very practical category.

Based on the results of the practicality test at the one to one stage, Small Group Evaluation, and field test, it can be seen that the S-RBL Model has practical textbooks and student manuals, meaning that the product assessed has a level of ease of use, such as easy to understand, easy to implement. , helps students' understanding, especially in developing student creativity, is easy to use and shortens time, supports the implementation of Embroidery learning both in groups with low ability, medium ability, and high ability.

The practicality test of the S-RBL model in terms of the responses of the lecturers who were assessed by 3 lecturers who were in charge of the Embroidery course obtained the following results:

Table 5. The Results Practicality Test of the S-RBL Model, the response of lecturers

Aspect of Assessment	Average practicality score (%)	Category
The practicality of the model book	95,38	Very Practical
Practicality of Textbooks	91,52	Very Practical
The practicality of the Lecturer's Guide	94,07	Very Practical
Average	**93,66**	**Very Practical**

Based on table 5, it can be seen that the lecturer's response in the practicality test of the S-RBL Model obtained an achievement of 93.66 with a very practical category. This means that the lecturer assesses that the S-RBL Model is generally easy to understand and implement in Embroidery learning, especially in encouraging the achievement of learning objectives and developing student creativity.

The S-RBL model as described above reveals that it has been assessed as valid, practical. The Student Research-Based Learning Model has seven syntaxes, namely 1) Formulating a general question; 2) Integrating research; 3) Exploring ideas; 4) Designing; 5) Improvising; 6) Creating; and 7) Evaluation and presentation of results. The social system gives roles to lecturers as facilitators, mentors, research supervisors, and reflectors. The principle of reaction in this model is realized by giving appreciation/appreciation for student work, motivating students, encouraging students to actively ask questions, actively discuss and be able to work together. Support systems for realizing these activities are model books, textbooks, lecturer guidebooks, and student guidebooks and workshop facilities.

4. Conclusion

The Student Research-Based Learning model was developed based on the results of Preliminary Research in the form of needs analysis and literature analysis resulting in several arguments for the importance of developing learning models that guide students to be creative. The first is the importance of integrating research results into learning. This is supported by the opinion of (Rahmiati & Saemah, 2017) and (Suntusia et al., 2019). which states that research-based learning strategies can successfully link teaching and research because research-based learning is a multi-phase concept that refers to various teaching and learning strategies that link research and teaching. Second is the importance of research activities by students in creating

creative products because research can help students develop methods of thinking and working scientifically, following the didactic concept of research-based learning. The results of the needs analysis found that students chose how to study in groups in the design of the S-RBL social system model. In addition, students also expect an active learning environment and help each other (collaborating). The same choice was also conveyed by the lecturer in the Embroidery course who stated that small teams with 3-4 members who collaborate and work together can encourage collaborative knowledge construction in teams. This model has been assessed as valid and practical and can be used for educators who teach lessons with almost the same course characteristics.

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