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The Effectiveness of the by doing Model in Increasing the Learning Outcomes of Volley Ball Reservation at Sports Science Faculty

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Abstract

This research was conducted in line with the low competence of students in volleyball refereeing material. The purpose of this study is to improve student competence in refereeing material through the application of an experience-based by-doing model. By doing model is a learning stage that starts with simulation, observation, reflection and application. This study uses an experimental method involving two intervention groups. The sample of this research is the students of the Physical Education Study Program, Health and Recreation. The sample was divided into two groups, namely the experimental group of 15 people and the control group of 15 people. The instrument for collecting data in this study was a questionnaire with a performance test. Then each data obtained was analyzed by the technique of calculating the percentage. Based on the implementation, the results of the data analysis of this study explain that through the application of the by-doing model, it can improve student competence in volleyball refereeing material. And based on the percentage results obtained between the experimental group and the control group, it is evident that the experimental group has a higher percentage than the control group. These results explain that the application of the experience-based by doing learning model in refereeing material is better than the conventional learning model. Thus, based on the results of the study, it can be conveyed to educators that using the by-doing model is suitable to be applied in practice-based learning.

Keywords
model by doing; volley ball; sports science

I. Introduction

The government through the Ministry of Education and Culture (Kemendikbud) continues to make various efforts to improve the quality of Indonesian education. One of them in 2019 the Kemendikbud conducted an educational program at all levels of education, namely the independent learning program. The independent learning program in principle has a goal to face the challenges of the era of the data technology industry, in this era almost all aspects of life depend on technology (Kemendikbud, 2016).In line with the good intentions of the Ministry of Education and Culture, the Chancellor of Universitas Negeri Medan responded to this through his policy so that students learn to collaborate with the outside world (the world of work), with the hope of enriching and improving student competencies. The concept of independent learning where students can study wherever they are, classrooms, laboratories, fields, libraries are no longer the only places to gain knowledge and skills, but industry, villages, training centers, research activities are also centers of knowledge for students.

Volleyball is a compulsory subject for students of the Faculty of Sports Science, Universitas Negeri Medan. So far, students after graduating from this course, one of the competencies that are expected to be possessed is being able to be a referee in a distant match event, but in reality, students' mastery of refereeing material is still far from what is expected (Beutelstahl, 2016). Based on the results of assessments and interviews, the refereeing ability of students who have passed this course, only 30% of students are able to become referees in accordance with the objectives of this course, the rest cannot be categorized as capable. So far, the forms of learning that students get in volleyball courses are based on the materials provided by their lecturers, namely in the form of textbooks, lecturers and videos, the learning resources are actually good. Regarding how to train student refereeing skills through various practical activities so far, lecturers have done it through procedures; the lecturer explains and demonstrates-students pay attention and demonstrate, then students practice independently (Kok et al., 2021). The main problem is that this way of lecturing makes students tend to be slow in mastering the subject matter of volleyball, so that learning objectives in the skill aspect are difficult to achieve. This condition makes it difficult for students to practice their abilities in refereeing, of course this is a weakness that must be considered. If left unchecked, it is feared that it will have an impact on students (Xu & Liu, 2021).

In principle, even though practical learning is done online, it is hoped that students can still learn without experiencing obstacles by providing the right academic models, variations and services (Avugos et al., 2021). Therefore, the researcher wants to develop a by doing learning model for e-learning-based volleyball learning in the hope of increasing student competence in volleyball refereeing material. Learning by doing is one of the types of learning with experiential concepts, before learning begins, students are given experience. The experiences gained by students will give rise to perceptions, reflections of difficulties, errors or incompetence and this can be a parameter for educators in designing the material to be given. This model has four elements of stages, namely:

1) Do, means carrying out various experiences that can take the form of exercises, simulations and real activities into the world of work (Wang et al., 2021).
2) Observation, means educators make observation during the Do
3) Then, educators do reflection, educators inject various corrections, suggestions and improvements to students. After all three stages have been passed,
4) Next students do aplly or re-do the training model based on the improvements that have been given by the educator.

The intended model is a volleyball refereeing learning model, this model will be developed with the rationale of theoretical studies, student characteristics and the environment.

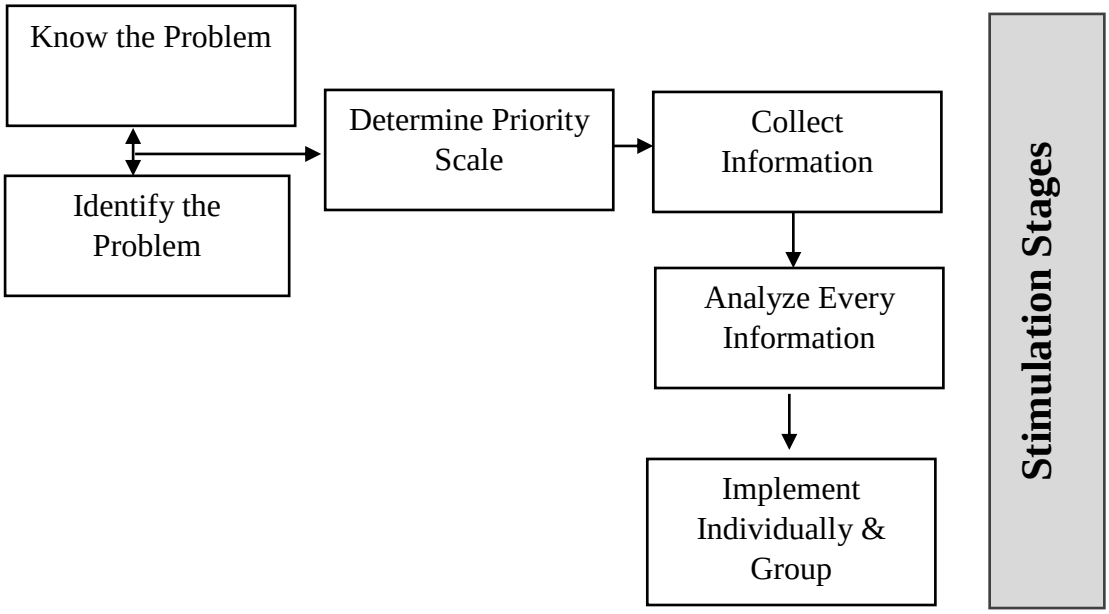
II. Review of Literature

The learning model is a procedure for learning activities that are arranged from pre-learning to the end of learning (Prahmana et al., 2021). The learning model should refer to the learning objectives, learning stages, learning environment and classroom management. According to (Trianto, 2012) identify five characteristics of a good learning model, which includes the following:

1) The scientific procedure of a learning model must have a systematic procedure to change the behavior of students or have a syntax which is a sequence of learning steps carried out by teachers and students. (Wendi K.ZimmerSharon D.Matthews, 2021).

2) Specifications of planned learning outcomes, a learning model mentions detailed learning outcomes regarding the appearance of students.
3) The specification of the learning environment, a learning model explicitly states the environmental conditions in which student responses are observed.
4) Appearance criteria, a learning model refers to the acceptance criteria of the expected appearance of the students. The learning model plans the expected behavior of students which can be demonstrated after certain teaching steps.
5) The ways of implementation, all learning models mention mechanisms that show the reactions of students and their interactions with the environment.

Learning by Doing (Joyce, Bruce and Weil, 1980) is developed in the concept of Do, Observation, Reflection, and Apply. The four dimensions are stages and a unified stage of learning that is passed when applying learning by doing and the four dimensions are carried out systemically to achieve learning objectives. The first step of Do at this stage is that students carry out real or experimental practices, exercise simulations, real activities according to their abilities without blaming students. There are two sources of student learning, namely from lecturers and places/clubs for coaching table tennis practice (2) Observation means observing, here the lecturer observes the development of children's practice virtually by using observation instruments. Through this observation, information on the strengths and weaknesses of the students will be collected. Then (3) reflective activities means strengthening in depth the results of observations to find a way out of weaknesses, difficulties that students still face after reflection, then students return (4) Application means returning to practice again. This step of learning by doing is sourced from experience learning, namely experience-based learning. (Flores et al., 2021) Learning that departs from an experience is a way that can stimulate learners to be serious in following the teaching-learning process. (Samsuddin Siregar, 2008). Learning model by doing based on e-learning. The following are the concepts and steps for implementing the By Doing learning model that will be treated in research:



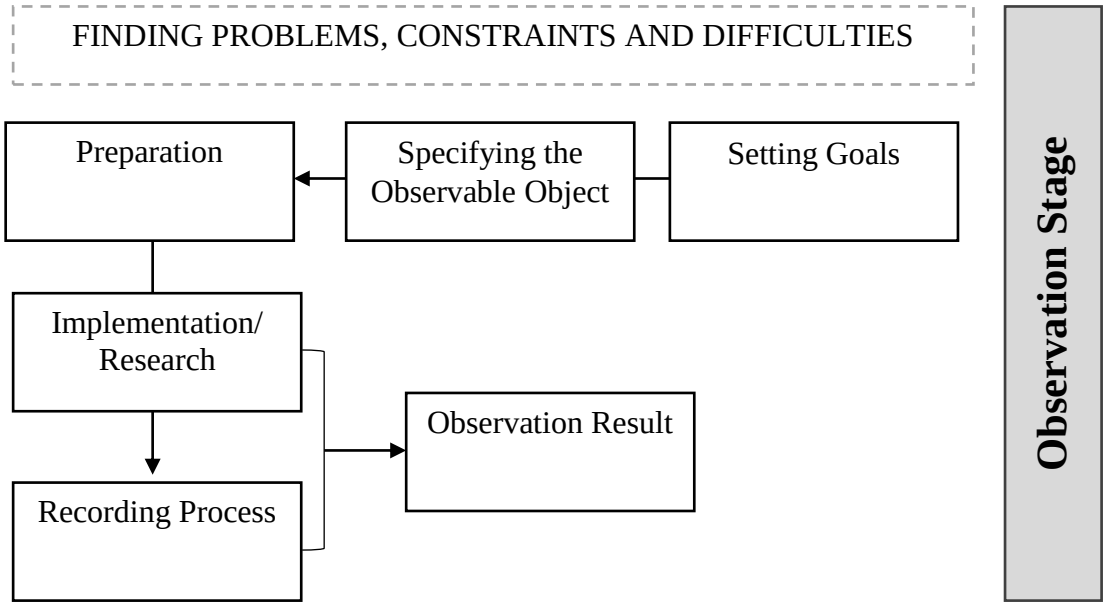


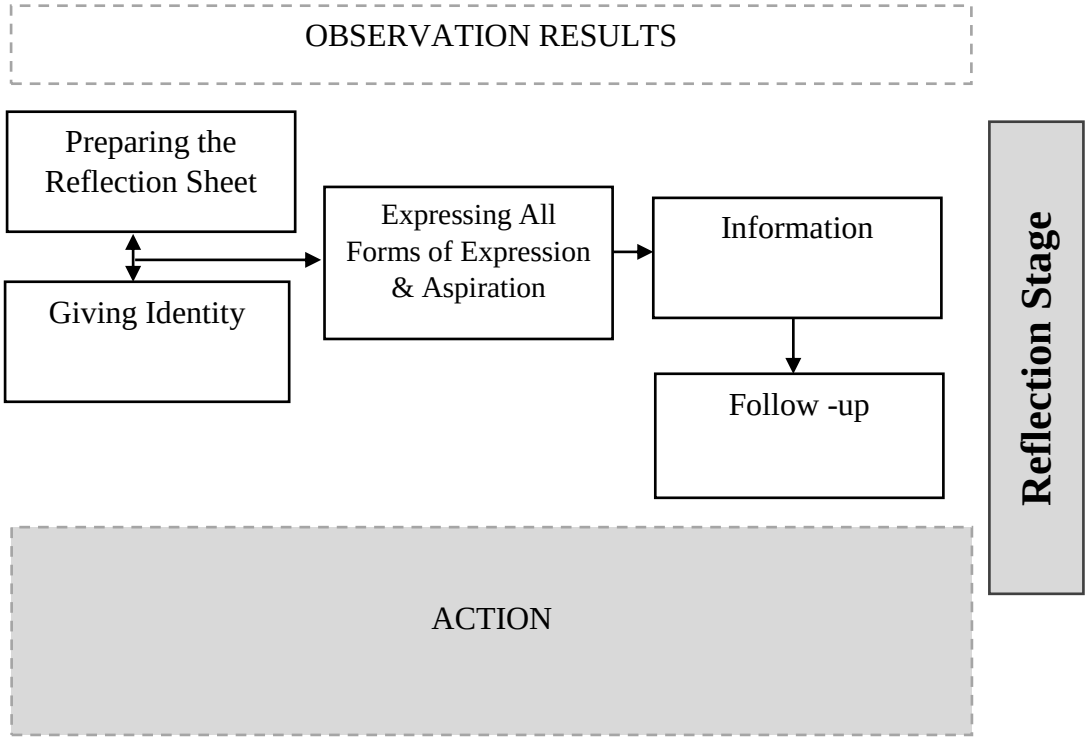
Figure 1. *Simulation and Observation Stages*

a) Simulation (Critical Thinking)

- Meet 1. Mapping Information. In this activity, students mapped the main refereeing materials that students must master, this can be seen from the semester learning plans. Mapping this material is done to make it easier for students to determine targets that will be used as sources of information and so that students are more systematic in digging up information. The document requirements prepared by the lecturer at this stage are the existence of a special lesson plan for refereeing material. Information mapping activities can be carried out in groups or individually. Through this activity, the steps that will be carried out are more systematic in determining the main material to be repaired or improved.
- Meet 1-1. Collecting Information, In this activity, students independently conduct brainstorming, collecting as much information as possible related to volleyball game refereeing material. Students must prepare a brainstorming sheet so that the information extracted is well documented and in order to minimize the occurrence of misdata (missing data). Sources that can be used by students in this brainstorming activity can be in the form of refereeing experts, YouTube and relevant books. This activity can be done by students in groups or individually, in this case the lecturer can direct students.
- Meet 2. Analysis of Every Information, Information collected by students is analyzed and compiled in the form of a report. This report is the steps and forms of decisions that are used as a reference for students at the stage of practical activities, so that at this stage students already have a clear concept related to refereeing material..
- Meet 2-2. Preparation, Conducting meetings and coordinating with teams involved in practical activities. The team consists of students, observers and lecturers. Preparation is emphasized on whatever is needed so that the simulation stage can run well. Such as simulation plans, media and tools, places, observation rubric sheets and video recording tools.
- Meet 3. Implementation, Implementation is carried out when the planning is good in the hope of testing the simulation program whether it can achieve the goals. To measure At this stage of activity can be done individually or in groups. Methods that can be used in the simulation are lecture methods, peer tutoring, practice methods and demonstrations.

b) Observation (*Problem Solving*)

- Knowing the Problem and Its Purpose, Strategies to determine the problem, students conduct an analysis based on the results of previous simulations. Then students determine the problem that is compiled from the topic of the material to be studied and this is used as an object to be observed. Problems can be structured in the form of questions that require answers or solutions. In determining the problem students can do it through discussion with peers. After the problem has been determined, the student can decide the purpose of the observation. With constructivism theory students can think to solve problems, find ideas and make decisions (Songsiri in Syakur, 2020).
- Determining the Observation Object (Direct (Competition) and Indirect (Youtube Video)), The object of observation intended in this case is a source of information that can be used to overcome or schedule student problems. then the object to be observed must be in accordance with the problem at hand and what is the objective of the observation.
- Observation Preparation, Observation preparation aims to complete the needs needed during observation, including; team, observation unit, tools and media, schedule, and correspondence. Preparatory activities are carried out with discussions between students, teams and lecturers. Everything that is determined through discussion is used as the basis for carrying out observations.
- Recording Information (Recording), During the observation, students collect information based on the observation rubric provided previously. This activity can be done in groups or individually. It is necessary to coordinate between students and lecturers regarding the implementation of observations to overcome any obstacles faced by students. During observation, students must do documentation which can be done by recording activities.



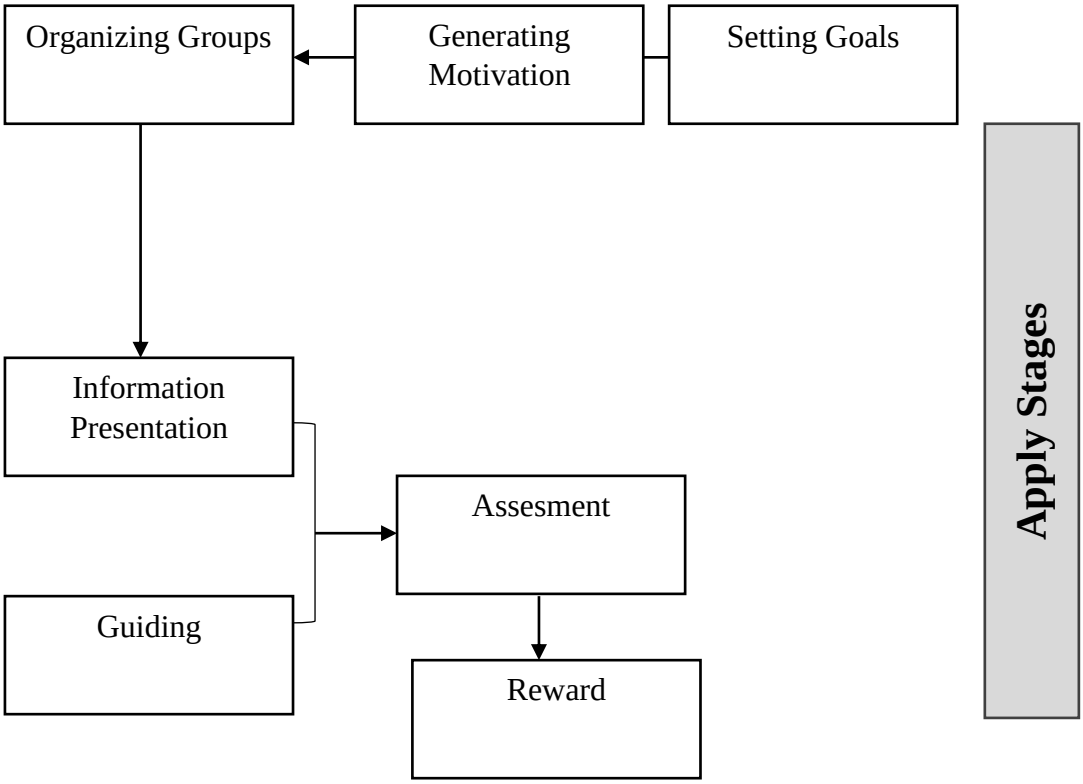


Figure 2. *Reflection and Apply Stages*

- Prepare a Reflection Sheet (Paper), The reflection sheet is a note sheet to record the activities that have been carried out and analyze the obstacles that occur to find solutions to overcome existing obstacles.
- Giving Identity, After reflecting, then this activity is carried out giving identity to each reflection report that is made
- Expressing All Forms of Expression (Impressions, Aspirations, Criticisms), At this stage the learner explains, it may also be stated in a paper related to the impressions, criticisms experienced by students. Expressing what students get will provide valuable experiences for students
- Freedom of Expression Both Negative and Positive, Students express various behaviors that are raised by themselves and other team members.
- Expressions of Aspirations and Suggestions for Follow-up, All episodes passed by students, then continued to give suggestions based on their respective experiences
- Information. The results of the reflection will be used as an evaluation material for the activities that have been carried out. The results of reflection will solidify the application stage.

c) Apply (Comunication and Collaboration)

- Submission of Learning Objectives, Before the implementation is carried out, the learning objectives are conveyed to all students. Learning objectives will make students more patterned how to learn.
- Generating Motivation, As educators, motivation in learning is a vitamin to encourage students' enthusiasm and perseverance in learning.

- Organizing Groups. For the implementation of this model, it is necessary to prepare a team in learning activities. The team will become a discussion group to set the strategy to be carried out, so that the goals set are achieved properly.
- Presentation of Information (Demonstration), At this stage students in groups present various experiences gained during the activity
- Guiding and Organizing Groups. Every group work, educators must provide guidance to students so that every problem that exists has a habit of analyzing and solving every problem.
- Implementation Assessment, this application activity will be carried out an assessment to measure the extent to which the greeting program has achieved the existing goals
- Giving awards, groups that can display their performance will be an indicator of the success of a learner.

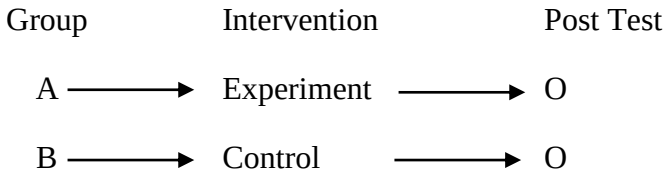
The basis for developing this model is the characteristics of students, material and home environment. Through this model, learning is more attractive and educative. It is attractive because this model is designed with activities to find alternative solutions for each given task, both individually and in groups. And it is educational because this model has the aim of helping students to have an active and independent behavior and improve their own skills (HaitaoHAO et al., 2021). The level of learning outcomes obtained by students is influenced by the ability of teachers to manage learning evenly according to the educational background of the teacher (Simanjuntak, 2020). These results can also be called conventional learning, attractiveness, student character formation, learning innovation, time efficiency, ease of learning, speed of understanding, and assignment (Syakur, 2020).

Volleyball courses are practical courses that aim to provide educational services to students in order to understand the concept of teaching volleyball and optimize basic volleyball technical skills (Sheikh Ali et al., 2021). One of the materials that must be mastered by students is refereeing material. The referee is the court during the match, so it is expected that the match will run according to the existing rules (Nikos et al., 2010). (Zetou et al., 2008) In volleyball matches, the equipment must be owned by a referee, namely the requirements to be a referee, referee equipment, and referee duties. The requirements to become a volleyball referee are: be in good health and have a normal physique, have the talent to be a referee, enjoy playing volleyball, have a minimum education of high school graduates, aged between 20-40 years, have good dedication, must be a member of a volleyball association (Bisagno & Morra, 2018). Then the referee's equipment is wearing white pants, a plain white shirt with a collar, white rubber shoes, and wearing a referee badge according to his classification. and the duties of the referee consist of leading the match so that it runs smoothly, improving skills, abilities, and knowledge about volleyball refereeing, for example referee signals, disseminating volleyball game rules in the community, improving the quality of refereeing in the community in particular and in Indonesia in general. Generally, in achieving this goal, the role of the learning model is something important (Zulaeha, 2013). Determining the right learning model is certainly adapted to the learning objectives, adapted to the characteristics of students and the elements of volleyball refereeing.

III. Research Methods

The effectiveness test is a product test to determine the reliability of the model in achieving the goals that have been set (Snyder, 2019). The purpose of this study is to provide a meaningful learning experience for students so that student refereeing skills in volleyball games can be improved. In order for the by doing model to be considered as a product that

has different advantages with other models, it is necessary to test the effectiveness. Subjects involved in this effectiveness test consisted of 2 groups, namely the experimental group and the control group (Maksum, 2012). The experimental group is a group of students who learn volleyball refereeing material using the by doing model and the control group is a group of students who learn volleyball refereeing material using a conventional model. There were 30 students involved in this effectiveness test. Of the 30 people, 15 were in the experimental group and 15 in the conventional group. The implementation time of this stage is 6 meetings. The method used in this research is the experimental method. The following is the research design that will be carried out:



Prior to intervention, the researcher ; prepare lecture plans for the two groups, prepare various learning tools and media, assessment instruments, teaching materials used, and the subject is given an explanation related to the steps and objectives of this activity to avoid misperceptions. After giving learning actions to both groups, the next step, at the end of learning, is a test to measure the level of knowledge and ability of students in volleyball refereeing material (James Tangkudung, 2016). As explained, there are 10 aspects that are used as indicators to determine the level of knowledge and abilities of students.

III. Discussion

The results of the assessment obtained through test observations using questionnaires in both groups, then the data obtained were analyzed using the formula for finding the average and determining the percentage of each aspect observed. In the table below, the data and results of the analysis of the refereeing abilities of students who study with the conventional model are presented with a group of students who learn refereeing using the by-doing model.

Table 1. Recapitulation of Refereeing Competency Data Results of Students Studying with Conventional Models (Control Group)

Students	**Question Indicator**									
	A	B	C	D	E	F	G	H	I	J
1	3	7	4	4	2	6	3	4	4	2
2	4	9	4	5	3	7	4	3	3	2
3	4	7	5	5	3	7	4	3	5	3
4	3	7	5	6	3	7	4	3	5	3
5	4	7	4	3	3	8	4	3	4	2
6	5	9	5	6	4	9	4	3	4	2
7	5	8	5	6	3	5	3	3	4	3
8	5	7	5	7	2	8	4	4	3	3
9	4	8	5	7	4	9	5	3	5	3
10	4	7	6	7	4	7	4	3	4	3
11	5	9	6	5	4	8	5	3	3	2
12	5	7	6	7	4	8	5	4	4	2
13	5	7	6	7	3	8	4	3	5	2
14	5	9	6	6	4	8	4	4	4	2

15	5	7	4	5	3	7	4	4	4	2
Total	66	115	76	86	49	112	61	50	61	36
%	88	85,19	84,44	81,9	81,67	82,96	81,33	83,33	81,33	80

Table 1 above is the result of data analysis on student refereeing abilities who study with the conventional model. The percentage on the aspect; Field Facilities by 88%, Equipment by 85.19%, Communication by 84.44%, Attention And Understanding by 81.9%, Ease Of Coordination by 81.67%, Competition Performance And Professionalism by 82.96%, Service To Players is 81.33%, Referee Response To Suggestions is 83.33%, Match Signals And Referee Attitude is 81.33%, and Constancy is 80%. From the percentage level obtained by all students on each indicator, it can be seen that the level of understanding and ability of students in this group is categorized as good (source Sugiyono). The results of data analysis are also arranged in the form of a diagram, as described below.

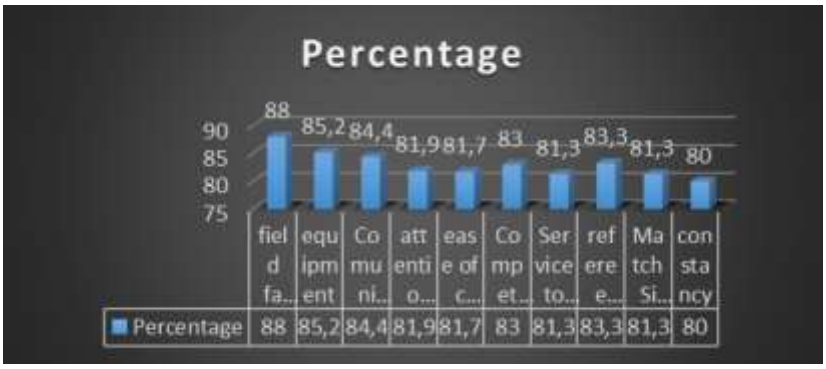


Figure 3. *Diagram of the Percentage Level of Understanding and Ability of Control Group Students*

Then, the results of the data analysis of student refereeing abilities who study with the by-doing model are presented in the table below:

Table 2. Recapitulation of Refereeing Competency Data Results for Students who Study with the By Doing Model (Experimental Group)

Student	**Question Indicator**									
	A	B	C	D	E	F	G	H	I	J
1	4	7	6	5	2	6	3	4	5	2
2	4	9	4	7	4	9	4	4	3	2
3	4	7	5	7	4	9	4	3	5	3
4	4	9	5	6	4	8	5	3	5	3
5	5	8	5	4	3	8	4	4	4	2
6	5	9	5	7	4	9	5	4	5	3
7	5	8	6	6	4	6	5	4	4	3
8	5	8	5	7	2	8	5	4	4	2
9	4	9	5	7	4	9	5	3	5	3
10	4	8	6	7	4	8	4	3	5	3
11	5	9	6	6	4	9	5	3	4	3
12	5	8	6	7	4	9	5	4	4	3
13	5	7	6	7	3	8	4	3	5	3
14	5	9	6	7	4	8	5	4	4	3
15	5	8	5	5	3	7	4	4	5	2
Total	69	123	81	95	53	121	67	54	67	40
%	92,0	91,1	90,0	90,5	88,3	89,6	89,3	90,0	89,3	88,9

Table 2 above is the result of data analysis on student refereeing abilities who study with the conventional model. The percentage on the aspect; Field Facilities by 92%, Equipment by 91.1%, Communication by 90%, Attention And Understanding by 90.5%, Ease Of Coordination by 88.3%, Competition Performance And Professionalism by 89.6%, Service To Players by 89.3%, Referee Response To Suggestions 90%, Match Signals And Referee Attitude 89.3%, and Constancy 88.9%. From the percentage level obtained by all students on each existing indicator, it can be seen that the level of understanding and ability of students in the experimental group is categorized as good (source Sugiyono). The results of data analysis are also arranged in the form of a diagram, as described below.

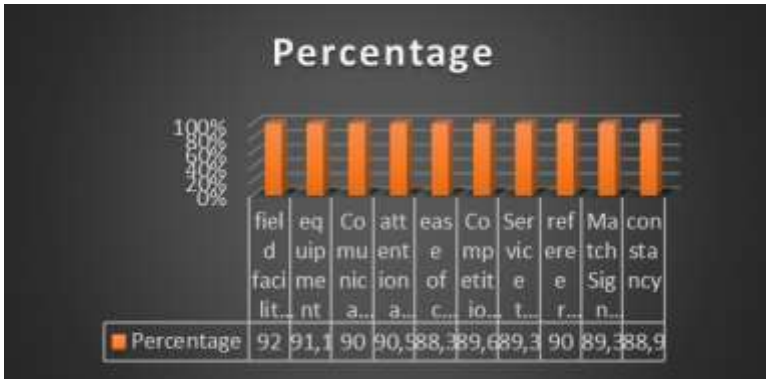


Figure 4. *Diagram of the Percentage Level of Understanding and Ability of Experimental Group Students*

The by doing model is designed to achieve learning objectives, the systematic application of this model has a purpose that is not only to increase students' knowledge and skills in refereeing material. However, from the results of this field trial, there are still some things that need to be improved, especially in the first step of this model, namely the Simulation Stage. At the simulation stage, there were still some students when collecting information did not fully show strong sincerity, so it seemed that it was not done optimally and information related to refereeing material had not been optimally used as a source of guidance in conducting simulations. The obstacles experienced by students are then given reinforcement to correct any weaknesses that occur, one of which is to be more precise in determining the source of information to be explored.

After field testing and the product is suitable for use by users, the next step is to test the product's effectiveness. Based on the analysis of the effectiveness test data that has been described in the research results section, it is evident that the percentage of ability and level of understanding of the experimental group is better than the control group. However, the results of the effectiveness test of the two groups were both in the good category. The percentage comparison of the two groups can be seen in the following diagram.

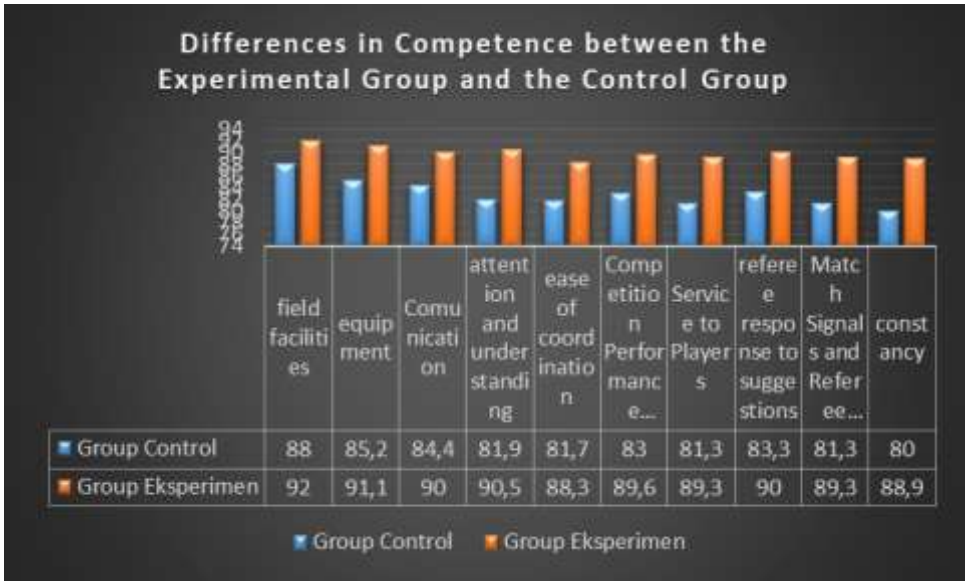


Figure 5. *Diagram of the Difference in Ability between the Experimental Group and the Control Group*

Based on the diagram above, when viewed in all indicators, it is stated that the experimental group is better than the control group. things that make the level of understanding and ability to arbitrate the experimental group better, this is because learning by doing makes students more active in learning. Based on the cases given and students looking for their own sources to overcome existing cases, students directly experience and find information with their groups. In learning, what students see is then given the task to practice it, try and try. Through this activity students will get new experiences, then from this new experience, mentoring efforts are carried out through observation, interviews with experts to find actual knowledge, movements, and information.

The results obtained by students from observations and interviews became material for reflection to correct deficiencies in refereeing volleyball games. During reflection, students are guided by a supervisor to direct students to reflect correctly. After students have reflected on themselves and feel capable of arbitrating, then students apply their knowledge and abilities into a volleyball game event that is carried out by peers. This application stage is the stage of strengthening the student's abilities (mental, technical, professional) in refereeing a volleyball match.

Thus, based on the results of the research and discussion above, it can be seen that the by doing learning model is an experiential learning that starts from experience (Rong-Da Liang, 2021). Through these experiences, students will create new perceptions, namely difficulties, errors and incompetence (Rong-Da Liang, 2021). And this will be a parameter for educators in conveying material through four elements, namely stages (1) *Do*, (2) *Observation*, (3) *Reflection*, (4) *Application*. *Do* means doing various experiences that can take the form of exercises, simulations and real activities. *Observation* means the teacher makes observations during the Do period. Furthermore, the teacher does *reflection*, here the educator injects various corrections, suggestions and improvements to students. After the three stages have been passed, then the students *apply* or re-do the training model based on the improvements that have been given by the educator.

IV. Conclusion

Based on the results of the research above, it can be concluded that through the application of the by-doing model, students' competence in volleyball refereeing material can be increased. And based on the percentage results obtained between the experimental group and the control group, it can be seen that the experimental group has a higher percentage than the control group. These results explain that the application of the experience-based by doing learning model in refereeing material is better than the conventional learning model.

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