

Building Sport Student Self-Esteem in Learning Statistics through SRLE

Statistical Reasoning Learning Environment

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Abstract: Self-esteem is a person's overall judgements of himself. The results of previous research showed that students with high self-esteem looked more optimistic, confident, and positive about everything and their failure. Therefore, self-esteem is very important in the learning process, especially in statistical learning for sports students. This study described the level of self-esteem of sports students in statistical learning through SRLE learning model. SRLE stands for Statistical Reasoning Learning Environment, a student-centred learning model proposed by Garfield dan Ben-Zvi (2007) aims at developing statistical reasoning skill. It is also a learning model based on constructivist social theory with six learning principles designed by Cobb and McClain (Garfield, 2002). These principles focus on developing statistical content, using real data, using classroom activities and technology assistance, improving classroom conversations and using alternative assessments. The instrument used is questionnaire referring to Coppersmith which defines self-esteem as a person's judgment of capability, successfulness, significance, and worthiness expressed in form of attitude toward himself. Of 43 students attending statistics lecture, the overall descriptions about self-esteem level was obtained. 34.88% of the students had low self-esteem, 58.14% belonged to medium self-esteem, and 6.97% to high self-esteem. From the gender perspective, 28 male students were categorized to have low self-esteem with the percentage of 25%, medium self-esteem 64.3%, and high self-esteem 10.7%. 15 female students had a low self-esteem rate of 53.3%, medium 46.7% and a high self-esteem rate of 0%. While viewed from the profession perspective between athletes and non-athletes, 29 athletes were included to have low self-esteem with the percentage of 34.5%, medium self-esteem 58.6%, and high self-esteem 6.9%. In the other hand, 14 non-athletes had low self-esteem 34.5%, medium 58.6%, and high self-esteem 7%. From the overall results, it can be concluded that the sport students' self-esteem level in learning statistics in terms of gender and professions (athletes or non-athletes) still needs to improve.

1 INTRODUCTION

The statistics course is seen as a fairly difficult course for most sports students and some of them are even shocked to learn it. This perception is one of the obstacles for the lecturers in this course. Besides, students' field activities also affect their concentration during the statistic lecture in the classroom. This problem motivates the lectures to provide the material presentation more creative and innovative. A preliminary study was conducted on sports students regarding statistical learning. Four questions were given to the students: (1) Is learning statistics fun? Why? (2) Is learning statistics difficult? What are the difficulties? (3) What do you know

about the benefits of statistical courses for sports? (4) What do you expect in a statistical course study? These questions were given to 20 students of the sport coaching program who had attended statistical lectures. The results of preliminary survey showed that 90% of the students enjoyed learning statistics because it was not boring and very useful for processing and measurements of the data in sports, the learning process also used technology which made it more interesting, the presented material was understandable and delivered well. Contrarily, 10% of the students were not pleased to study statistics as it was difficult course. With regard to the question of whether it is difficult or not in the lectures of statistics, 80% of students had difficulties in learning

statistics, especially on understanding and analyzing, selecting and using statistical approaches (formulas) and concluding meaning of the calculation/processing results and 20% of the students had no difficulties in learning statistics. The survey also revealed some benefits of statistics course for sport students such as processing data for the research paper (30%), understanding the athletes' development and making statistics as the reference in planning better exercise program (45%), and the other 25% responded that statistics was useful to process the data before the decision made and to become a reference in making exercise program so it could produce the best athlete. It is expected that the results of learning statistics can be applied in sport activities, especially for the coaches in planning exercise program and for the students in writing the research paper and for their future work.

Statistics has very important roles in sports because there are many measurements which need to be processed and analyzed statistically. The results of processing and analyzing the data are very useful in obtaining conclusions or decisions to improve the quality of physical education, to develop an exercise program or to choose the right measuring tools in improving achievement. The use of statistics at sport cannot be avoided because in a variety of competitions there will be some achievements according to statistic calculations, such speed (in sport and running), frequencies (multiple scores) in basketball, soccer, badminton, volleyball and so forth. Hence, the results of matches and race competition result the data that can be processed and presented statistically. There are a number of previous researches related to the sports and statistics. One of them is a research conducted by Kuper dan Elmer from University of Groningen entitling "Modelling the Development of World Records in Running". This research described a new development model for a world record run from 100 meters to marathon both for men and women by using time-series method. Another study was "Statistical Analysis of The Effectiveness of the FIFA World Rankings" conducted by Ian McHale and Stephen Davies from the University of Salford. This study proposed a model for predicting the soccer match result for the national teams, and assessed the extent to which such result contributed to the FIFA rank of one country (Albert J. Koning, 2008).

Statistics learning is taught by making sport as its context. The real data for sports investigation as discussed in various media either through internet or directly from field was given in statistics learning (Tabor, 2013). Referring to the importance of

statistics for research, education, and evaluation in practice or competition, the previous research showed that the literacy ability and statistical reasoning of sports student were still not satisfied. This indicated that the results of learning process had not reached the expected goals. Therefore it is necessary to engage the psychological factors that students need in the learning process to encourage learning statistic results. One of the psychological factors that can support success in the learning process is self-esteem. Rusli Lutan (2003) states that self-esteem is self-acceptance, by oneself that we are worthy, valuable, capable and useful no matter what is, or will be. The growing feeling of "I can and I am worthy" is the essence of self-esteem. He further elaborates that self-esteem for someone is like the foundation of a house building. Self-esteem is an important structure for the development of other abilities. Based on self-esteem there will be an achievement. When self-esteem and self-assessment are low then anything we build on will undoubtedly be cracked easily. That is why self-esteem should be built as strong as possible in order to achieve a better quality of life. Coopersmith (1967) defines self-esteem as a person's judgment of capability. Someone's success, significance, and worthiness of himself are expressed in his attitude to himself. Pujiastuti (2014) stated that a person's self-esteem in a particular field is a person's judgment about his or her own ability, success, usefulness, and worthiness in the field. Statistical self-esteem is a person's judgment of capability, successes, significance, and worthiness in statistics.

In this study we will illustrate how the level of self-esteem of sports students in statistical learning is reviewed in whole, by gender (male, female) and by profession (athlete, non-athlete).

1.1 *Self-esteem Statistics*

Self Esteem is the way in which a person evaluates himself. This evaluation will show how the individual's judgment of respect for himself, believes himself to have the ability or not, the admission (acceptance) or not. The Self Esteem as defined by Coopersmith (1967: 4-5): "Self Esteem was the evaluation which the individual makes and customarily maintains with regard to himself: it expresses an attitude of approval or disapproval, and indicates the extent to which the individual believes himself to be capable, significant, successful and worthy. In short, self Esteem is a personal judgment of worthiness that is expressed in the attitudes the individual holds toward himself".

Self Esteem is an evaluation made by individuals and habits of seeing themselves especially about acceptance or rejection, and an indication of the magnitude of individual confidence in capability, One's success, significance, and worthiness of himself. The level of Self Esteem is a "personal judgment" of a valuable or meaningful feeling expressed in the individual's attitudes toward him. thus, aspect of self esteem studied in this research is capability aspect that is showing a high performance to fulfill requirement to reach achievement where level and duties depend on age variation of someone. successness of a person's ability to manage and control behavior and gain recognition of the behavior from others. The significance refers to the concern, attention, affection and expression received by someone from others who show the acceptance and popularity of the individual from the social environment. Worthiness implies an obedience to the moral and ethical standards and religions in which the individual will stay away from behaviors that should be avoided and conduct the behavior permitted by morals, ethics and religion.

The beginning of a healthy self-esteem coaching is to teach students to understand who they are, especially with regard to the advantages and disadvantages of the students. In the context of statistical learning, the environment in question is a statistical learning activity that involves the active participation of all students in implementing the teacher's teaching. The goal is no other to provide a successful experience through awarding (rewards that become part of the feedback) to each student so that each student is able to appreciate the advantages possessed by each student.

A person with high self esteem tends to be more attractive to have a good relationship with others and can make good impressions than those with low self esteem (Braumeister, 2003). In a group, a person with a high self-esteem tends to be more daring to appear and critical of his group. Although not directly affecting self-esteem can also affect the nature of one's leadership. This is because someone with high self esteem tends to be superior than those who have low self esteem.

According to Alhadad (2010), students with high self-esteem look more optimistic, confident, and always be positive about everything, also against the failure that happened. At the time of failure, students with high self-esteem tend to see the failure not as the end of everything, but make the failure as a valuable experience to move forward. Looking at the mistakes

that have been done before as a valuable lesson and provision to achieve better results, it is because the success basically achieved at this time can not be separated from mistakes that have been done before. Students with high self esteem, able to appreciate himself and see the positive things that can be done for success in the future.

On the contrary, students who have low self-esteem believe and see that he is weak, unable to do nothing, not have the ability, tend to feel himself always failed, unattractive, disliked, and lose the appeal to life. Students with low self esteem tend to be pessimistic about life and opportunities. They do not see a challenge as an opportunity, but rather as an obstacle, give up easily before trying and when they fail, blame themselves and blame others. It is possible that the low self-esteem of students can negatively affect their learning achievement. Therefore, self esteem needs to get special attention from parents and teachers.

Teachers and parents should focus on developing student self esteem, because with high self esteem many positive things that can arise from the students. Braumeister (2003) also stated that high self esteem is a part of good student achievement in school. According to Alhadad, low student achievement in mathematics lessons tends to frustrate students. Students will assume that forever they will not be able to achieve a good achievement in math lessons. When dealing with mathematical problems, students feel desperate and think they can not solve them, even before they make the most of their efforts to solve them. Attitudes like this certainly can negatively affect the development of students in the learning process. Therefore, teachers as educators have an important role in building and developing self esteem students.

One effort to develop self esteem of students is by giving responsibility to students in learning (Muijs and Reynolds, 2008). Teachers can assign tasks to students in the form of challenging issues and give them confidence and convince them that they can accomplish these tasks well. Teachers can reward or appreciate the results of student work. even they are simple ideas, opinions, questions, or results obtained by students, teachers still give appreciation to students wisely. When students make mistakes, the teacher must make sure that the error is part of the learning process, not a failure. With this process, students will feel appreciated, needed, and will slowly awaken confidence and pride in themselves.

In addition, students' learning environment also affects students' self-esteem. As according to Tran (2012) that the learning environment is very

influential on student self-esteem. A conducive-learning environment can support and help students develop their self-esteem. In this case, teachers have an important role to play in creating a conducive learning environment that provides opportunities for students to contribute and be actively involved in learning. Involvement and participation of students in the learning process, will make students feel that their existence is needed and appreciated. Therefore, to develop student self-esteem, the teacher should consider aspects of the self esteem. Tracy (2007: 50) suggests that self esteem is a person's ability to appreciate himself, appreciate the advantages and know his own weakness.

Based on the definition and explanation described above, by taking the definition of Coopersmith it can be concluded that one's self esteem in a particular field is one's judgment about the ability, success, usefulness, and self-worth in the field (Pujiastuti, 2014). The self-esteem studied in this study is particularly relevant to the context of statistics and hereinafter referred to as self-esteem statistics (SES). Thus, statistical self-esteem is a person's assessment of capability, success, significance, and worthiness of himself in statistics.

Students who have high statistical self esteem will show optimism and positive thinking toward statistics, feel that they have a high ability in mathematics, and feel proud of the potential it has in statistics. Students with high statistical self esteem will view a statistical problem as a challenge to be faced and strive to find its solution. When these problems can not be solved immediately, they are not easily discouraged.

Students with high statistical self esteem feel their existence play a role and determine the success of statistical learning process conducted in the classroom. Feeling that he has contributed to the implementation of learning that occurred. Questions, opinions or ideas also provide its own color in the learning process. Students with high statistical self esteem feel that they deserve a high score in statistics, and feel themselves needed by others in terms of statistics.

While students with low statistical self esteem will view statistics as a burden. Feeling no pride and any excess in statistics. It's more interesting to talk about something else than to talk about statistics. Despair and pessimism when faced with a statistical problem. a statistical problem is regarded as a problem that can never be solved well. In the classroom learning process, students with low statistical self esteem will feel that their existence does not make any contribution and feel they can not

provide any assistance when others are experiencing difficulties in statistics.

1.2 SRLE (Statistical Reasoning Learning Environment)

This learning model is a learning model to develop the ability of statistical reasoning introduced by Garfield and Ben-Zvi (2007) that is "Statistical Reasoning Learning Environment" or abbreviated as SRLE. SRLE is a learning model based on constructivist social theory with six learning principles designed by Cobb and McClain (Garfield, 2002) focusing on developing statistical content, using real data, using classroom activities, using technology help, improving classroom conversations and using alternative assessments .

Fundamental ideas or statistical content by researchers has contributed to a learning approach emphasizing Data Exploration Analysis (EDA), focusing on building students 'conceptual understandings, and curricula aimed at developing students' reasoning, thinking and literacy (Ben-Zvi and Garfield, 2004; Garfield and Ben-Zvi, 2008). There are many ideas or statistical content that the students must master in depth. This includes data, distribution, concentration measures and data trends, variability, etc. Many textbooks present materials based on logical content analysis, students often view the content as a set of tools or procedures and do not see how concepts are interconnected. The focus of learning objectives is no longer just that students can count, but rather emphasize how they know the reasons for the answers and help them recognize how they form the supporting structures of statistical knowledge.

The effectivity of learning and assessment of the real situation depend on the data understanding and analysis, and types of conclusions that can be drawn through learning data. The students should collect and produce their own data, find out why these method affect the quality of the data, and know the appropriate type of analysis. A set of interesting data will encourage the students to engage in activities, especially activities that require the students to conjecture the data before analyzing.

One of important parts in SRLE is that it should be designed carefully such as research-based activities which improve the students' learning by means of collaboration, interaction, discussions of interesting problem. There are two different classroom activity models in SRLE. The first activity involves the students in making conjecture related to the problem or data. This method involves discussing

of student conjecture, collecting or accessing relevant data, using technology to test conjectures, discussing the results obtained, and reflecting on their actions and thoughts. The second activity is based on cooperative learning. The students are divided into group consisting of two or more students for each group. Then, the group is given questions to discuss or problems to solve.

Recently, there are many various technologies that support development of students' statistical understanding and reasoning, such as computers, graphing calculators, internet and statistical software. Students are no longer supposed to spend time doing complicated and monotonous calculations. Students can focus more on the important task of how to choose suitable analytical method and to interpret the results. The use of activity and technology makes it possible to form new class conversations. It is a challenge to create SRLE with a classroom conversation that allows students to engage in discussions of significant statistical issues. The presented arguments can be negotiated openly and meaningfully by the students. There are several forms of alternative assessments that can be used in statistics class. in addition to quiz, homework, and test, many teachers also use authentic assessment. Other forms of alternative assessment are also used to assess statistical literacy (eg, criticizing the graphics of the media), assessing statistical reasoning (eg, writing meaningful short essays), or giving feedback to teachers (eg, short papers). Assessment should be in line with the learning objectives focusing on understanding key ideas and not just on calculated skills, procedures, and answers. This can be carried out through formative assessment during the course (for example, quiz, small project, or observing and listening the students in the class) and summative assessment. The useful and timely feedback is very important to assess the learning process.

2 METHOD

The research method used was descriptive method with survey technique. The instrument used was questionnaire to measure the level of self-esteem of sports students in statistical learning. The instrument consisted of 24 statements that could describe the four aspects of self-esteem namely capability, successfulness, significance, and worthiness. This instrument used was adapted from Pujiastuti which conducted a research to measure the level of student's mathematical self-esteem SMP. The instrument was firstly tested to the 16 students who had passed the

statistics course and the result showed the validity and reliability for all items.

43 students of sport science taking statistics course were selected as the research sample and the statistical processing used was percentage.

3 RESULTS

Based on the results of the research, the overall student had low self-esteem level with the percentage of 34.9%, medium 58.1%, and high self-esteem 7%. From the gender view obtained for 28 men, 25% of the male students had low self-esteem, medium 64,3% and high 10.7%. and of 15 women, 53% female had low self-esteem level, medium 46,7% and high self-esteem level 0%. While viewed from the profession perspective between athletes and non-athletes, 29 athletes were included to have low self-esteem with the percentage of 34.5%, moderate self-esteem 58.6%, and high self-esteem 6.9%. In the other hand, 14 non-athletes had low self-esteem 34.5%, moderate 58.6%, and high self-esteem 7%.

4 DISCUSSION

The results above shows that the percentage of sport students who have high self-esteem level is still small compared to medium self-esteem level which has the highest percentage, and low level of self-esteem percentage is still high enough. From the gender view, no one has high level of self-esteem. Instead, most female student had low level of self-esteem. For the male students, the percentage of high level of self-esteem is small (10.7%) and the most percentage is for medium level of self-esteem (64.3%). Furthermore, viewed from the professions as athletes and non-athletes, most of them have moderate level of self-esteem (58%) and the least percentage is for high self-esteem (7%).

5 CONCLUSIONS

Self-esteem in statistical learning for sports students is necessary, but the results show that the level of self-esteem of sports students in statistical learning through the learning model of SRLE still needs to be improved in terms of overall aspects, gender or professions as athlete or non athlete.

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