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Gender Study: Implementation of Peer Assessment of Women's Scientific Attitudes in Supporting Academic Achievement on Female Students in Indonesia (Case Study at the Indonesian State Islamic University in Palembang)

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Abstract Assessment by peers has a practical impact on academic attainment. Furthermore, peer-review gives a powerful assessment of the usefulness of scientific attitudes in a wide range of circumstances. However, concerned research that focuses solely on women's scientific attitudes has not been frequently addressed. The purpose of this study is to examine the scientific attitudes of women who are determined by their colleagues, as well as the consequences of analyzing women's scientific attitudes toward learning outcomes. The quantitative research design was applied, along with descriptive methodologies. The subjects of this critical study are 115 female Islamic Religious Education class of 2018 students who actively attended lectures on Islamic Education courses. The full set of data was examined statistically by obtaining the average value of the data. The consistent findings revealed that 14 respondents' peer appraisal of scientific attitudes fell into the medium category, while 101 respondents fell into the high category. Thus, this assessment of women's scientific attitudes has an average value of 3.20, indicating that it is among the highest criteria. Meanwhile, women's strong curiosity about facts or data, the ability to criticize and uncover innovation, the ability to collaborate and think openly, the character of being more meticulous and thorough in exploring things and being environmentally conscious are all essential factors in the assessment process. As a result of the research, it is possible to conclude that female students adopt an essential scientific attitude, since scientific attitudes influence the process and learning results.

Keywords: *Women's Scientific Attitude, Peer Assessment, Female Students, Students Learning Outcomes, Academic Grade, Gender Study.*

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1. Introduction

Peer assessment has quickly been the focus of highly intriguing research, with a generally beneficial influence [1,2].Peer assessment improves academic achievement significantly [3]. Because peer appraisal is primarily a cooperative appraisal process, interpersonal characteristics have a significant role in determining the type and quality of peer appraisal [4]. Furthermore, peer assessment can be efficiently implemented online and can simply be utilized to critically analyse scientific views [5,6,7].

Various research on the assessment of scientific attitudes reveals that peer assessment is highly effective across a wide range of circumstances [1], Because peer evaluations assist teacher assessments, they are substantially related to instructor ratings [3,8]. Peer assessment cognitive procedures such as evaluating, explaining, and suggesting can be performed in both online and offline situations. However, because the social processes involved in peer appraisal differ substantially between online and offline peers in critical assessment [5], precise appraisal of unfamiliar peers is also advantageous because ratters are more likely to be honest in providing feedback and social interactions cannot influence how ratters acquire feedback.

Peer evaluation is equally likely to be influenced by several variables, starting with the learning environment's characteristics, the students taking the assessment, and the examination itself [9]. Likewise, according to previous studies, students' opinions on peer evaluation aren't always

favourable [10]. Peer assessment may frequently be used to accurately assess scientific views, according to much of this research. However, there has not been a lot of research on the views of women towards science. According to a pilot that was conducted by Fadli in 2021, there is no conclusive evidence linking women's attitudes toward science to anything. Women and the scientific mindset dimension do, however, both significantly and directly correlate [11].

The scientific attitude is a cognitive construct that combines a variety of mental habits or propensities to regularly respond in a particular way to challenging circumstances. Accuracy, intellectual honesty, open-mindedness, postponed judgment, criticality, and the habit of attempting causal links are just a handful of these inclinations or habits [12]. Therefore, the purpose of this study is to examine women's attitudes toward science as seen by their peers. In keeping with it, this essay will address the following two questions: (a) How are the categories of women's scientific attitudes measured through colleagues; (b) What are the consequences for evaluating women's scientific attitudes toward typical potential learning outcomes.

This study concentrates on the defence of the significance of women's scientific attitudes, which are evaluated by peers and discussed. Peer evaluation is used in Islamic science education classes to measure students' attitudes towards science. A person who has a scientific mindset may interpret typical phenomena and human behaviour to help them live more easily in society. For the findings of this study to clearly show the precise category of student scientific attitudes that influence learning outcomes.

2. Literature Review

2.1. Women's Scientific Attitude

A student's attitude is how they communicate or react to what they are learning [13]. A person's attitude greatly affects whether they succeed or fail in any endeavour [14] A top-level attitude plays a crucial part in the total development of the person. An open mind, a thirst for precise knowledge, and the assurance to look for awareness, hope, and answers to challenges are all characteristics of a scientific mentality. In light of this, a person with an educated scientific mindset will exhibit critical thinking, impartiality, impartiality, curiosity, keen observation, objectivity, and an opposition to superstitions [15]. Conceptual understanding, observation, regulating factors, data interpretation, and drawing conclusions are further science process indicator competencies [16].

A scientific attitude looks at specific scientific behaviours or ideas [17]. Also, a scientist must have a scientific mindset [18]. A scientist is someone who tackles issues and successfully manages to carry out study and testing in an organized manner to produce new findings. Two categories of scientific attitudes comprise: 1) Attitudes toward science as a profession; and 2) Attitudes toward the things and occasions in the environment that are the subject of scientific investigations [19]. Students who adhere to the truth about science are more inclined to develop an enlightened perspective toward it. This can be accomplished by fostering a scientific mentality that values inquiry, deference to convictions, openness to concepts of change, and critical reflection.

A scientific mindset encompasses five characteristics: conscientiousness, responsibility, discipline, and honesty [20]. Interactive activities that foster flexibility, curiosity, and student enthusiasm in learning can improve students' attitudes toward science [21]. Further, a scientific mindset and scientific abilities are required for the application of the learning representation during its execution, such as with the research practice learning model. This is consistent with the assumptions and directives contained in the curriculum [22], dimensions and indicators of scientific attitude are described in Table 1. Below [23,24]

Table 1. Scientific Attitude Dimensions and Indicators

Dimensions	Indicators
Curiosity Attitude	Enthusiastically looking for answers to questions
	Attention to the task given
	Enthusiasm for the scientific process
	Ask each step of the activity
Respect for Data/Facts Attitude	Objective/honest
	Not manipulating data
	Not prejudiced
	Make decisions based on facts
Critical Thinking Attitude	Separate facts with opinions
	Doubt the other findings
	Inquire about any changes/new things
	Repeat activities
Discovery & Creativity Attitude	Doesn't ignore data even if it's small
	Using facts to base conclusions
	Shows different reports with classmates
	Changing opinions in response to facts
	Use tools not as usual
	Suggest new experiments
Open Minded & Cooperation Attitude	Outline the new conclusions of the observations
	Respect the opinions/findings of others
	Want to change opinion if the data is lacking
	Accept suggestions from friends
	Never always feel right
	Assume any conclusions are tentative
Persistence Attitude	Participate actively in groups
	Complete the assigned tasks seriously
	Continue researching after the "novelty" wears off
	Repeating the experiment even if it results in failure
	Completed an activity even though his classmate finished First-comer
Sensitive to the Surrounding Environment Attitude	Attention to surrounding events
	Participation in social activities
	Maintain the cleanliness of the classroom environment

A scientific mindset should be considered during learning, especially for women. Women adjust to men in a variety of ways. Women should be given more freedom because they're unable to directly adapt to environmental changes unlike men can [25]. However, a study found that women perform better in the areas of abstract knowledge and data interpretation. This occurs because of the concrete values that women hold. In this case, the instructor plays the most significant part in helping pupils establish positive attitudes towards science [16]. Therefore, one of education's objectives is to foster a scientific outlook or attitude toward every issue [26].

2.2. Peer Assessment

Peer assessment is an arrangement that allows students to evaluate and compare their performance to that of peers who are at the same academic level. This enables students to learn more by giving each other criticism and reviewing their assessments in order to improve their own performance. Both parties concur [27]. Peer reviews offer a wonderful amount of clarity regarding many areas of the evaluation of the subject. Peer reviews evaluate the value

of the feedback. Students appreciate peer assessment. Peer assessment is a formative approach that can be applied to enhance academic performance and learning strategies [1,28]. Peer assessment can consider both learning outcomes and actions that support learning [27].

An alternate method of evaluating students is peer assessment [29]. Individual traits, however, have an impact on the practice of peer appraisal [2]. Additionally, peer evaluations and instructor evaluations frequently correlate substantially [30]. Peer assessment can be formative or summative, quantitative (assigning a number based on grades), qualitative (providing rich verbal feedback about positive and negative aspects and opportunities for improvement), or both [27]. Peer assessment can also take on a variety of other forms and characteristics. Colleague assessments can boost the number of students taking the test [31]. Peer assessment serves to compare the formative effects of peer assessment with teacher assessment, triggering students' intrinsic motivation and fostering cooperation, awareness, and responsibility for their own learning [32]. These variables all contribute to fruitful learning.

3. Method

Descriptive research methods are employed in quantitative research design. It tries to describe, explain, forecast, or control the processes being learned that are connected to statistics or numerical data. This study's subject was the peer evaluation of women's attitudes toward science[33]. The 2018 Islamic Religious Education class of 115 female students who actively participated in class lectures served as the study's subjects. This scientific attitude evaluation involved comparing the responses of four students to those of one student.

The data collection tool for peer assessment of women's scientific attitudes includes 67 Likert-scale questions and 7 dimensions with 32 indicators. The test had four (4) answer options: 1 never did, 2 frequently did and occasionally didn't do, 3 occasionally did and frequently didn't do, and 4 always did. Two experts have validated the instrument, demonstrating its validity. Finding the average value of the data allowed for statistical examination of the complete data set. The formula that is executed is:

$$\bar{X} = \frac{\sum X_i}{n} \text{ with } \bar{X} = \text{average, X = total sum, dan n = amount of number.}$$

The criteria for high, medium, and low are based on average scores with a low score of 0.00-1.33, medium 1.34-2.66, and high 2.67-4.00.

4. Findings

In Islamic Education courses, this article focuses on peer evaluation of women's scientific attitudes. The research's findings are presented in the form of the importance of women's scientific attitudes and how they affect students' learning results. A graph illustrating the average peer evaluation results based on 67 statements together with the average and percentage for each dimension shows the assessment's models.

4.1. Peer Assessment of Women's Scientific Attitudes Observation Result

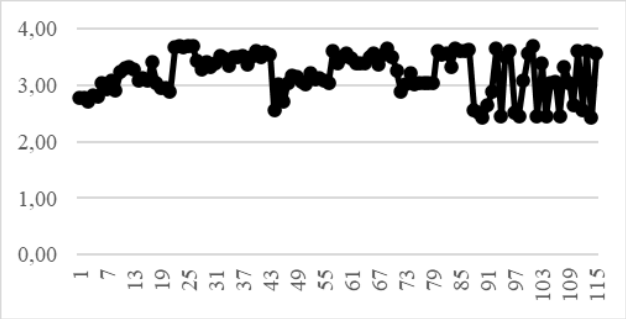

Figure 1. Women's Scientific Attitudes Average Calculation

Peer assessment of 115 respondents to the scientific attitude consists of 0 respondents in the low category, 14 respondents in the medium category and 101 respondents in the high category.

Table 2. The average value of Respondents' Scientific Attitudes based on dimensions.

Dimension	Average Result	Category
1	3,39	High
2	3,19	High
3	3,02	High
4	3,12	High
5	3,22	High
6	3,20	High
7	3,22	High
Scientific Attitude	3,20	High

The average score for a scientific attitude is 3.39 on the dimension of curiosity, 3.19 on the dimension of respect for data and facts, 3.02 on the dimension of critical thought, 3.12 on the dimension of discovery and creativity, 3.22 on the dimension of thinking openly and cooperating, 3.20 on the dimension of persistence, and 3.22 on the dimension of sensitivity to the environment. in order for the average value to be high overall. When considering attitudes toward science, women continue to score on average 3.20 in the high category.

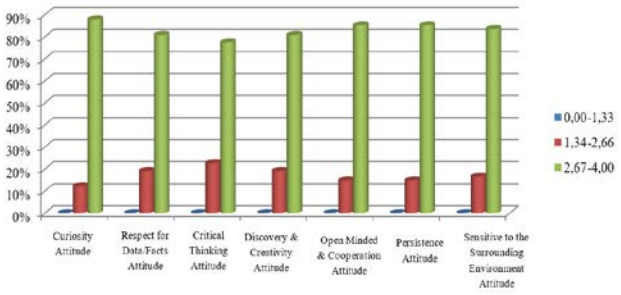

Figure 2. Percentage of Respondents' Scientific Attitudes in Each Dimension

According to the percentage of women who express a scientific attitude in each dimension of curiosity, the range for women is low at 0.0%, medium at 12.2%, and high at 87.8%. The percentages of low, medium, and high attitudes toward data and facts are 0.0%, 19.1%, and 80.9%, respectively. Critical thinking attitude falls into three categories: low (0.0%), medium (22.6%), and high (77.4%). The range of attitudes toward innovation and creativity is low (0.0%), medium (19.1%), and high

(80.9%). Cooperation rates fell into three categories: low 0.0%, medium 14.8%, and high 85.2%. A low attitude toward persistence is 0.0%, a medium attitude is 14.8%, and a high attitude is 85.2%. Attitudes that are responsive to the environment fall into three categories: low (0.0%), medium (16.5%), and high (83.5%). In this way, the percentage value of women's attitudes toward science falls between the high group at 87.8% and the medium category at 12.2%.

4.2. Implications of Scientific Attitudes on Student Learning Outcomes

The criteria for the average value of learning outcomes are 80-100 (very good), 75-79 (good), 70-74 (enough), 65-69 (poor), 0-64 (very poor).

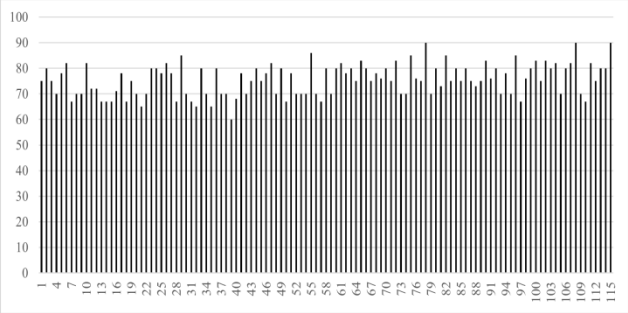

Figure 3. Students Learning Outcomes

According to graph 3, there are 42 students in the very good category, 29 students in the good category, 28 students in the moderate category, 15 students in the bad category, and 1 student in the very poor category for student learning outcomes in Islamic education courses. As a result, 37% of students fall into the very good category, 25% into the good category, 24% into the enough category, 13% into poor category, and 1% fall into the very poor category.

5. Discussion and Conclusion

Another colleague's research of women's attitudes toward science, the average score was 3.20, with 87.8% falling into the "high" category. This attitude ranks high in a peer-reviewed survey of women's attitudes toward science. Given how interested women are in facts and data, this is to be anticipated. Curiosity has a substantial impact on the process of achieving a goal. This inquisitive mentality might manifest as self-inquiry regarding one's efforts to experience internal cues and apply them to behaviour [34]. Women are better than men at interpreting data and applying abstract knowledge. Men are better at producing than women at judging, arranging, crediting, and checking [16]. Female brains are built to be better at learning tasks like memorizing and interpreting information, and female students are more thorough in taking tests [35].

Women are more critical of themselves than men [36]. Women can also express their creativity and provide feedback. It presents a contradictory picture of the association between female creativity and other qualities. Women's inventiveness and critical self-evaluation go hand in hand. Female creativity is significantly associated with optimism, joy, high expectations for interpersonal success, social sobriety, and comfort in interpersonal connections. Women have the same abilities as males to collaborate and think critically [37]. Other findings show women being encouraged to grow personally and be open-minded. In addition, women are more cautious and meticulous when digging and are more environmentally sensitive [38]. Conscientiousness entails performing things with attention, purpose, and thoroughness to avoid mistakes and achieve positive outcomes [39]. Otherwise, women are better problem solvers than men [21].

Concerning the effects of women's learning outcomes, the range is as follows: very good up to 37%, good up to 25%, moderate up to 24%, less up to 13%, and extremely poor up to 1%. Because scientific attitudes influence learning processes and outcomes, it is critical for students to develop a scientific mentality and high-level thinking. It is critical for students to adopt a scientific mentality because this attitude influences learning processes and outcomes [40]. A person's scientific attitude develops over time as a result of a mixture of numerous mental habits or a person's predisposition to respond consistently to an object. Peer-assessment is useful for students and can be utilized as formative procedures to improve academic performance and learning methodologies [1,41].

A strong scientific attitude will boost students' talents and problem-solving abilities by utilizing diverse learning strategies. STEAM learning approaches, guided inquiry, and discovery can increase students' attitudes toward science [42,43,44,45]. Furthermore, virtual labs for portfolio learning and evaluation can assist students in developing a more positive attitude toward science [46,47]. Studies found that scientific attitudes improved critical thinking skills, student self-confidence, and learning outcomes [48,49,50]. Islamic education must be learned in an active and planned manner [51].

Lecturer evaluations of learning procedures and outcomes have an impact on student attitudes. One of the tasks of educators is to prepare students to provide and accept feedback, as well as to provide assessments of their own and others' work, in order to improve professional competence [52]. The importance of assessment in the learning cycle cannot be emphasized. Assessment activities can yield at least two outcomes: feedback on the learning process and knowledge about students' level of subject mastery [53]. Assessment can be used to discover students' strengths and shortcomings, track their progress, determine if they can sort things out, and measure how well a teacher does his job [47].

Moreover, numerous measures of scientific attitudes are commonly utilized in scientific research [54,55]. Furthermore, in the development of project-based learning, investigating scientific attitudes through self-assessment [56,57]. However, self-assessment has less accuracy than other people's judgements [52]. On a broader scale, study how scientific attitudes evolve. In this study, colleagues who were interested in women's attitudes toward science assessed assessments of such attitudes [42]. According to the study's conclusions, women have a strong scientific attitude that their peers can judge, thus it is proper for them to engage in public activities. The findings of research showing patriarchal rules favour men more than

women and split the public and household worlds contradict this. Women continue to have a position in the home and confront gender discrimination in the job. Furthermore, another study found no association between gender and scores on the scientific attitude scale and other age groups [11].

The scientific mindset is critical in learning activities. Scientific attitude refers to students' ability to act in the form of a positive or negative attitude toward an object [58]. The application of a scientific perspective toward students has the potential to shape a positive character or attitude. Peer assessment can be used to examine scientific attitudes [57]. Peer evaluation is a method of comparing a student to other pupils. Students participate in the assessment process during peer assessment [59]. Students must be honest and objective when assessing their peers. This examination was helpful for assessing students' scientific performance and attitudes [60]. Criteria for very good scientific attitudes include critical thinking, accountability, environmental care, curiosity, perseverance, objectivity, and discipline [57].

In relation to this study, it is preferable to focus on the disparities in learning styles between male and female students to develop students' scientific thinking capacity. Lecturers must foster a progressive mindset through a problem-oriented learning environment and a collaborative learning environment to build a community that reflects the privileges of the gender hierarchy and scientific attitudes. Given the emergence of peer-reviewed research that can be used to make informed and meaningful judgments.

The findings of a study on women's attitudes toward science conducted by colleagues, there is an average score of 3.20 and an overall percentage of 87.8% in the high category. This is supported by women's high level of curiosity about facts and data, their capacity for criticism and the discovery of creativity, their capacity for collaboration and open-mindedness, their nature as more thorough and conscientious explorers, and their sensitivity to the environment. The implications of student learning outcomes with a very good category up to 37%, good category up to 25%, enough category up to 24%, less category up to 13%, and extremely less category up to 1%. Since attitudes have an impact on the process and results of learning, it is crucial for students to demonstrate a scientific attitude.

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