

The effectiveness of Biology Integrated Learning (BIL) program with local wisdom in area of TNGR Lombok to improve students' self-efficacy

S D Utami¹, I N Dewi¹, I Effendi¹, A Ramdani² and I S Rohyani³

¹Biology Education, IKIP Mataram, Mataram, Indonesia

²Science Education, Universitas Mataram, Mataram, Indonesia

³Biology Education, Universitas Mataram, Mataram, Indonesia

Corresponding author: septianadwiutami@ikipmataram.ac.id

Abstract. Self-efficacy is one of the factors driving the success of student learning. This study aims at analyzing the effectiveness Biology Integrated Learning (BIL) program with local wisdom in area of TNGR (Mt. Rinjani National Park) Lombok to improve students' self-efficacy. The participants of this study were 140 students consisting of students on Biology Education and Biology Program in Mataram University and IKIP Mataram. The study uses a pre-experimental type with one-group pretest and posttest design. The effectiveness of BIL Program was measured by using self-efficacy scale. Self-efficacy data was converted into interval data and analyzed using paired t-test/wilcoxon test and n-gain calculations. The result of this research showed that BIL Program was effective to improve students' self-efficacy in terms of (1) there are increase score of self-efficacy at $\alpha = 5\%$, (2) n-gain mean was in moderate category of .22 to .38. Thus, BIL program can be used as an alternative approach for improve students' self-efficacy in biology learning.

Keywords: *Biology Integrated Learning (BIL) program, local wisdom, self-efficacy*

1. Introduction

Success in learning is influenced by the confidence of the students ability to successfully perform certain tasks. The beliefs in question include self-confidence, adaptability, cognitive intelligence, and the ability to act on situations requiring students to accomplish certain tasks [1] explained that self-efficacy is a person's belief in being able to master a situation and provide favorable results. In other words, self-efficacy is required in the implementation of generic skills development. Bandura explained that self-efficacy is very important for students because it can affect cognition [2], motivation, affective process and ultimately refer to student behavior [3].

Communication skills and interpersonal problem-solving skills were significantly correlated positively with social self-efficacy [4]. Another finding suggested that significant positive relationships were also found between social self-efficacy with constructive problem solving through an insistent-persistent approach [5], [3] supported the importance of self-efficacy concepts concerning performance. Self-efficacy has a positive influence on the scientific stance [6]. Besides, self-efficacy is also significantly related to learning achievements. This indicates the importance of self-efficacy



influence on academic achievement in the field of science [7]. PISA 2015 considered that incorporating science self-efficacy in assessment is important. This is because self-efficacy is closely related to motivation, learning behavior, future expectations and student performance [8]. Self-efficacy not only influences the student's thought process but also deals with teacher motivation and performance. Indirectly, a teacher with good self-efficacy can help students in applying new ideas to accomplish specific goals and motivation to complete tasks [4], [6] concluded that teachers having high self-efficacy tend to demonstrate better abilities in terms of planning and organizing, are more open to new ideas, and more actively conducting experiments using new methods based on students' needs.

Preliminary study results with 68 students of the Bachelor of Biology Education Program of IKIP Mataram showed that only about 47.38% of students who were convinced by their ability in biology learning. 66.17% were quick to surrender and tend to avoid when it gets a difficult task and full of challenges, the other 36.76% were still doubtful of their abilities. According to student recognition, sometimes they felt nervous and often anxious during discussions at the lecture, so they could not make a decision well when they were asked to express their opinions. These results show the distrust of students completing assignments in studying biology. In other words, the students' self-efficacy is still in the low category. Self-efficacy not only affects students' diligence in lecturing but also perseverance to advanced courses and competing in the workforce [9], [10] added a high self-efficacy teacher affects student achievement. Based on the empirical study, it is needed learning that can improve the self-efficacy of prospective teachers, so that it will improve student achievement in the future.

One of the efforts to increase student confidence through cognitive processes is by choosing the right and innovative learning strategy in college. One of the learnings that can improve students confidence is problem-based learning [11]-[13] showed that problem-based learning can improve students' attitudes toward science, positive views of the learning environment, and facilitate the development of a sense of community in the classroom. Problem-based learning is also chosen as an effective method to help students in learning biochemistry and physiological processes. By monitoring students attendance using informal and formal surveys it is known that the learning has a significant positive impact on students' motivation to attend and participate in lecturing Activities [14]. Besides, problem-based learning can increase the number of students working together in groups and independence learning [15]. The results of the study [16] showed that students are motivated to learn and successfully develop various skills through problem-based learning. The results are in line with the research [12] which concluded that self-efficacy was successfully trained with problem-based learning with an increase in self-efficacy behavior seen from the n-gain score gained by enough criteria.

Nevertheless, in the implementation of learning based on the problem there are several weaknesses, namely, the lecturer has difficulty implementing self-efficacy [12]. Changing the student habit of learning by listening and receiving information from lecturers to learn by solving many problems is difficult for students. This will give consequences of the lack of opportunities given to students to develop self-efficacy. There are also difficulties in preparing heterogeneous groups and facing a competition between students [15]. Competition causes students to be under the average feeling inferiority. Therefore, self-efficacy implementation in learning requires lecturers who understand the process. However, a knowledge that can improve the use of self-efficacy to teach science is still limited [4].

This research offers an effort to practice students' self-efficacy through BIL programs. This learning program is a development of program-based learning using scientific learning (scientific approach) which consists of 5 steps namely exploration, collaboration, articulation, and confirmation [17]. The local wisdom integration learning program was developed based on the characteristics of self-efficacy, Piaget's cognitive learning theory, Bruner, Vygotsky, the development of program based-learning and the integration of local wisdom. Culture as a form of Lombok's local wisdom especially the area of Mount Rinjani in preserving ecosystems implicates the belief in self-efficacy

society. Culture affects self-efficacy through trust and self-regulation processes [18]. By understanding the characteristics of local culture, community participation in maintaining the environment will be understood into the form of interpersonal relationships, so that it will create confidence in individuals. In line with the opinion [19] ethnic and cultural diversity has a remarkable potential for scientific knowledge to explore and enrich learning resources. However, the good value of local wisdom is still a lot that has not been integrated into the learning process [20] added teachers in Indonesia still have limitations in applying the wisdom of integrating locally in learning. Therefore, a biology learning program is developed which integrates local wisdom with self-efficacy sources. This innovation is expected to be an alternative solution to develop self-efficacy that can indirectly enhance students' personality.

The research objective is to analyze the effectiveness of a local wisdom integration learning program to improve self-efficacy of IKIP Mataram students and Mataram University study program; Biology education, Biology in ecology and environmental science learning. The main problem of this study is analyzing the effectiveness of local wisdom integration learning program to improve self-efficacy students. The focus of the problem in this study that wants to be researched includes: (1) is there a significant improve (statistically) self-efficacy students before and after the local wisdom integration biology learning (BIL) program implemented, (2) How much level of improvements in self-efficacy students before and after BIL program is applied.

2. Research method

The research problem was how to analyze the practicality (applicable in teaching) and effectiveness of the BIL program towards students' self-efficacy in ecology teaching. The program design has actualized in the form of the BIL Program Book which was validated by experts through a Focus Group Discussion (FGD) on the prototyping stage. The program validity was determined based on the components of content and construct validity [21], consist of 5 steps of learning activities namely: 1) exploration, 2) orientation, 3) elaboration, 4) articulation, and 5) confirmation [17]. This study included pre-experimental research using pre-test and post-test (O1 X O2) designs [22]. Before the implementation of learning using BIL program, students' self-efficacy beliefs were first observed (O1). The student groups were then given learning related to ecology and environmental sciences material using BIL program (X). It was equipped with learning tools such as syllabus, lesson plan, and valid and reliable student worksheets. The resultant [21] showed the acquisition of learning tool validity is syllabus and lesson plan (3.21: valid; 92.86%: reliable). During the process to the end of the study (posttest), all student groups are observed self-efficacy (O2).

2.1 Sample

This study was conducted in biology studies on ecology and environmental sciences courses using the BIL program. The number of the research samples is 140 students out of total of 211 students joining lectures on ecology in several study program in University of Mataram and the IKIP Mataram including Biology and Biology education study program. The sample were selected using cluster a random sampling technique. Students at the University of Mataram and IKIP Mataram were each divided into 2 groups, namely: Group 1 students at the University of Mataram in the 4th semester biology education study program (U. 4BE consisting of 42 students), group 2 students at the University of Mataram in the 4th semester of biology study program (U 4.B consists of 47 students), group 3 students of the biology education program IKIP Mataram in the 2nd semester (I. 2BE consists of 32 students), and group 4 students in the 4th semester (I. 4BE consists of 19 students).

2.2 Instrument and Procedures

Data collection of students self-efficacy using valid and reliable instruments [21], namely self-efficacy observation sheet (3.21: valid; 97.03%: reliability). The self-efficacy instruments scale used is a modification of the self-efficacy scale developed by [23], consisting of 30 items of a statement with four options performance level, namely almost always (score 4), often (score 3), seldom (score 2), and

almost never (score 1). The self-efficacy in this study using Bandura for each indicator namely of mastery experience, vicarious experience, verbal persuasion, psychological affective [24].

2.3 Data Analysis

Analysis of the effectiveness of using BIL program uses: (a) t-test or non-parametric analysis of the paired t-test/wilcoxon test, (b) calculation of n-gain rate with the formula: $n\text{-gain} = (\text{posttest score} - \text{pretest score}) / (\text{maximum score} - \text{pretest score})$, with the following categories (1) high, if $n\text{-gain} \geq .70$; (2) Moderate, if $.70 > N\text{-gain} \geq .30$; and (3) low, if $n\text{-Gain}$ is $< .30$ [25].

3. Results and Discussion

Figure 1 shows a self-efficacy student based on observations performed before and after learning to implement BIL program for all groups. The blue column shows the average self-efficacy score before learning to apply for BIL program, and the orange colored column shows the mean self-efficacy score after applying for the BIL program.

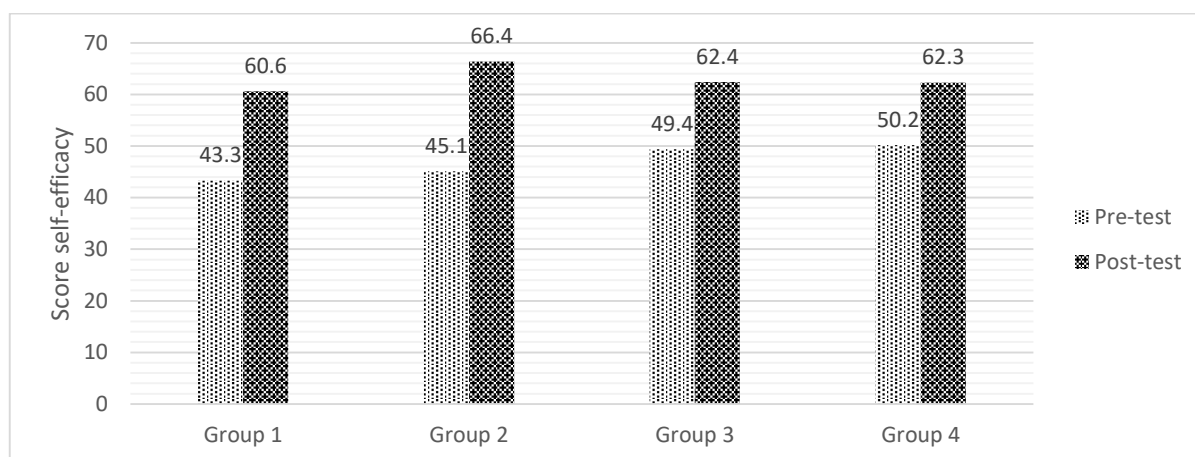


Figure 1. The mean of self-efficacy scores of students before and after implementing the BIL program.

The mean of self-efficacy score of students before and after the BIL program was set up as shown in figure 1, indicating that there is an improvement in self-efficacy for all groups. To find out whether there is a significant improvement in the analysis of the self-efficacy scores before and after the implementation of the BIL program as seen in table 1, table 2, table 3, and table 4.

Table 1. The normality test and homogeneity of the pretest score and the posttest self-efficacy students.

| Group | Score | The number of students | Average | Std. Dev | Normality, $\alpha = .05$ | | Homogeneity, $\alpha = .05$ | |
|------------|----------|------------------------|---------|----------|---------------------------|----------------------|-----------------------------|-------------|
| | | | | | Asymp. Sig (2-tailed) | Normally distributed | Asymp. Sig (2-tailed) | Homogeneous |
| 1 (U. 4BE) | Pretest | 42 | 43.3 | 15.17 | .101 | Yes | .021 | No |
| | Posttest | 42 | 60.6 | 11.98 | .692 | Yes | | |
| 2 (U. 4B) | Pretest | 47 | 45.1 | 12.78 | .211 | Yes | .002 | No |
| | Posttest | 47 | 66.4 | 8.34 | .764 | Yes | | |
| 3 (I. 2BE) | Pretest | 32 | 49.4 | 10.44 | .119 | Yes | .583 | Yes |
| | Posttest | 32 | 62.4 | 11.56 | .843 | Yes | | |
| 4 (I. 4BE) | Pretest | 19 | 50.2 | 11.18 | .252 | Yes | .804 | Yes |
| | Posttest | 19 | 62.3 | 11.32 | .625 | Yes | | |

Table 2. The results of paired t-test data analysis on the mean score of student self-efficacy pretest and posttest.

| Group | Score | The number of students | Average | Paired t-test, $\alpha = .05$ | | |
|------------|----------|------------------------|---------|-------------------------------|------------------|----------------|
| | | | | t | Sig . (2-tailed) | Decision |
| 3 (I. 2BE) | Pretest | 32 | 49.4 | -10.08 | .000 | Ho is rejected |
| | Posttest | 32 | 62.4 | | | |
| 4 (I. 4BE) | Pretest | 19 | 50.2 | -8.92 | .000 | Ho is rejected |
| | Posttest | 19 | 62.3 | | | |

Table 1 presents the results of a test analysis of normality and homogeneity tests of the data on students' average self-efficacy scores. The test results were then used to determine whether there is a difference between pretest and posttest scores between four groups such as the data analysis results shown in table 2. The results of the paired t-test on the mean pretest and posttest scores showed p values $< .05$ for group 3 (I. 2BE) and group 4 (I. 4BE).

Table 3. Results of analysis of Wilcoxon test on the mean scores of students' self-efficacy pretest and posttest.

| Group | Score | The number of students | Average | Wilcoxon test, $\alpha = .05$ | | |
|------------|-----------|------------------------|---------|-------------------------------|------------------|----------------|
| | | | | z | Sig . (2-tailed) | Decision |
| 1 (U. 4BE) | Pre-test | 42 | 43,3 | - 5.512 | .000 | Ho is rejected |
| | Post-test | 42 | 60,6 | | | |
| 2 (U. 4B) | Pre-test | 47 | 45,1 | - 5.969 | .000 | Ho is rejected |
| | Post-test | 47 | 66,4 | | | |

Table 3 shows the results analysis of the Wilcoxon test on the mean scores of pretest and posttest students' self-efficacy. Wilcoxon test results for the pretest score and posttest showed $p < .05$ for group 1 (U. 4BE) and group 2 (U. 4B). These results prove that there are significant differences between the pre-test score and post-test score or H_0 is rejected. The mean post-test score is greater than the pre-test score, meaning that there is an increase in student self-efficacy after the BIL program implementation with a significant level of $\alpha = 5\%$. Next, an analysis of the results of increasing students' self-efficacy was performed on each indicator using n gain scores. The average value of the gain in student self-efficacy for all groups is shown in table 4.

Table 4. The mean of students' self-efficacy scores before and after the BIL program implementation, n-gain for each self-efficacy indicator in all groups.

| Group | Score | Indicators of <i>self efficacy</i> | | | | The average of n-gain |
|---------------|----------|------------------------------------|------|------|------|-----------------------|
| | | (1) | (2) | (3) | (4) | |
| 1 (U. 4BE) | Pretest | 49.3 | 41.7 | 43.1 | 47.7 | 0.32 |
| | Posttest | 65.4 | 63.1 | 64.4 | 61.7 | |
| | n-gain | 0.31 | 0.36 | 0.37 | 0.26 | |
| 2 (U. 4B) | Pretest | 48.7 | 41.8 | 41.4 | 48.2 | 0.38 |
| | Posttest | 68.1 | 66.0 | 64.7 | 67.3 | |
| | n-gain | 0.37 | 0.41 | 0.39 | 0.36 | |
| 3 (I. 2BE) | Pretest | 50.7 | 40.2 | 44.5 | 50.6 | 0.22 |
| | Posttest | 60.7 | 58.2 | 57.9 | 58.2 | |
| | n-gain | 0.20 | 0.29 | 0.24 | 0.15 | |
| 4 (I. 4BE) | Pretest | 57.5 | 55.1 | 47.2 | 64.6 | 0.28 |
| | Posttest | 70.0 | 70.1 | 69.6 | 68.8 | |
| | n-gain | 0.29 | 0.33 | 0.42 | 0.11 | |
| Rerata n-gain | | 0.29 | 0.34 | 0.34 | 0.22 | |

Annotation: (1) = mastery experience, (2) = vicarious experience, (3) = verbal persuasion, (4) = psychological affective

Table 4 presents the result of increased self-efficacy (n-gain) calculations for all groups. Each self-efficacy indicator shows an increase in the n-gain score for all successive groups of .32; .38; .22; and .28. group 1 (U. 4BE) and group 2 (U. 4B) had the n-gain score in the medium category, while group 3 (I. 2BE) and group 4 (I. 4BE) had n-gain scores in the low category. This means that the increase in self efficacy of Universitas Mataram students is higher than that of IKIP Mataram students. The indicators vicarious experience and verbal persuasion show increases with medium category, while the indicators of mastery experience and psychological affective show increased with low categories.

The effectiveness of the BIL program in terms based on the learning process and outcomes. The improvement of students self-efficacy based on the calculation of scores of pre-test and post-test. Based on the results of self-efficacy observation during the implementation of learning using BIL program as shown in figure 1 showed that the improvement in self-efficacy students for all groups. The mean self-efficacy score for group 1 (U. 4BE), group 2 (U. 4B), and Group 3 (I. 2BE) before the implementation of the local wisdom integration learning program in the lower category, while group 4 (I. 4BE) was in the medium category. After the implementation of learning using BIL program, there was an increase in self-efficacy. Students in group 1 (U. 4BE), group 2 (U. 4B), and group 3 (I. 2BE) had self-efficacy in the medium category, and students in group 4 (I. 4BE) had self-efficacy in the high category.

The implementation of BIL program on self-efficacy students was conducted by analyzing n-gain self-efficacy for each indicator, namely: success experience, other people's experience, verbal persuasion, and psychological affective. Based on data from observations of self-efficacy as shown in table 4, it can be seen that there was an increase in self-efficacy after the implementation of the BIL program. The criteria of self-efficacy before using the BIL program was mostly in the low criteria, although some fall into the very low and moderate categories. After learning with the BIL program there has been a varied increase in self- efficacy. Classically the main n-gain self-efficacy in the IKIP Mataram student group showed an increase in the low category, while the University of Mataram student group showed an increase in the medium category. These results indicated that the BIL program developed self-efficacy effectively.

The learning program that is implemented, namely the BIL program affects the increase in efficiency of student efficacy. The implementation of the BIL program trains students to raise confidence in their abilities to carry out certain biology tasks in ecological learning or environmental sciences, as well as concerning local wisdom. Student beliefs are actuated by referring to the sources of mastery experiences, vicarious experiences, verbal persuasion, as well as physiological and affective states. Self-efficacy refers to his belief and ability to drive motivation, cognitive sources and a series of actions required to confront the demands of the situation [26]. Often, performance achievement becomes an influential source for enhancing self-efficacy students [27]. In the BIL program, students are motivated to bring up self-efficacy through mastery experiences with their success explaining the objectives of the activities performed and completing the tasks contained in the student activity sheet that given. Success and failure can greatly affect one's success [28]. Lecturers foster self-efficacy (vicarious experiences) by providing environmental phenomena related to the value of local wisdom. Students were asked to conduct exploration activities to find the form of local wisdom through interviews with the community of Mount Rinjani area [3], [29] who stated that interventions in the form of experience of success and modeling (providing examples) were effective in increasing self-efficacy. In the BIL program, students conducted exploratory activities together with the group collaboratively (the source of others experiences). Investigative activities can serve as a stimulus to the change of self-efficacy and learning process [29]. In this case, a direct exploration is local wisdom form.

Lecturers foster self-efficacy (source of verbal persuasion) by guiding students in communicating their explorations. Lecturers need to provide positive feedback and encourage students to improve self-efficacy in oral communication [30]. In the BIL program, students wrote simple reports from the results of exploration, orientation, and elaboration activities. This is done so that students can individually evaluate the validity of the arguments that have been made using their knowledge (source

of success experience) and the source of reference that supports their argument [3] stated that strong self-efficacy belief relates to an individual's writing ability. The BIL program also allows students to confirm the results during learning accompanied by giving feedback (verbal persuasion source) by the lecturer as an indicator of student progress in learning. Giving specific and regular feedback in terms of student achievement in the learning process can lead to student self-efficacy beliefs and ultimately improve academic achievement [31]. Learning Environment of the BIL program emphasizes involvement in a task to reduce anxiety (psychological and affective state) students lack confidence. The results showed that by helping students to control the anxiety related to learning biology can facilitate the development of positive self-efficacy, which in turn will develop a positive attitude [7].

Data from the research results presented in table 4 shown-gain for all self-efficacy indicators getting improved. After learning with BIL program for other people's experience indicators and verbal persuasion in moderate criteria, while for authentic experience indicators and affective psychology were in the low criteria. Score improvements and criteria for all self-efficacy indicators after the implementation of BIL program can be described as follows.

Data table 4 shows that the self-efficacy enhancement for an authentic experience indicator in group 1 (U. 4BE) and group 2 (U. 4B) is in the moderate criteria, while in group 3 (I. 2BE) and group 4 (I. 4BE) increases in low criteria. It was supported by the result of a questionnaire after the implementation of BIL program which showed that 62.98% of students felt that they were able to complete the task. The tasks which have been completed by students are: 1) Being able to identify the form of local wisdom of the community of Mount Rinjani area through exploration activities, 2) Being able to propose the latest environmental problems through orientation activities, 3) Being able to explore information from various sources of learning about the current environmental issues and their relation to local wisdom of community through elaboration, 4) Being able to share Information (articulation) that has been obtained with other groups, and 5) Being able to provide confirmation of what students produce through learning experience. This success is supported by the knowledge of previous students and the understanding of the concept is quite good. Students who have been aware of the environmental concept of ecological lectures and environmental sciences will make them feel more confident in their ability to learn biology and be associated with local wisdom. An authentic experience gives the most direct influence on the formation of self-efficacy because the experience provides the most concrete and objective evidence to achieve success [6], [21]. Success and failure greatly affect a person's beliefs, but with ongoing efforts toward a specific goal will help produce a resilient sense of efficacy [29]. The experience of success is the source of the greatest influence on self-efficacy individuals because it is based on authentic experiences.

The mean n-gain for indicators of others' experience in group 1 (U. 4BE), group 2 (U. 4B) and group 4 (I. 4BE) indicates an improvement in self-efficacy in the moderate category, while group 3 (I. 2BE) was in a low category. The results were supported by the results of the questionnaire after the implementation of the BIL program showing as many as 65% of students stated that self-efficacy obtained was influenced by the experience of others. The improvement was due to students paying attention to the lecturer in explaining and imitating the action (modeling) by expressing opinions through articulation activities. These findings are supported by empirical data that reveals that activity of communicating results is a form of discourse whose needs are tailored to students and explicitly taught through appropriate instruction, structured tasks and modeling [32]. Interventions in the form of success experience and modeling were effective in enhancing the self-efficacy students [3], [27], [33] stated that other people's experiences illustrate the needs of inexperienced students to observe the process and outcome of lecturers or peers. Students work together with their group friends conducting research activities to compose arguments and answer tasks contained in student activity sheets. Students will be more confident with their ability to learn difficult concepts if they see and connect the way the model works [34] in this case lecturers or peers. Individual observation of the success of another individual will increase the self-efficacy of the individual in the same field.

Data on table 4 shows that the improvement of self-efficacy for the verbal persuasion indicator in group 1 (U. 4BE), group 2 (U. 4B) and Group 4 (I. 4BE) shows the improvement in the moderate

category, while group 3 (I. 2BE) is in a low category. These results were supported by the results of the questionnaire after the implementation of the program showing as much as 55.67% of students felt that they had verbal persuasion skills. A verbal persuasion is an approach that is done through speech to believe someone that he or she has the ability or not to do something, respect and respond to behavior both individually and in groups during the learning process [26]. The role of the lecturer is very important to provide support and encourage students in completing the tasks given. The result of observation showed that students can communicate well with lecturers during the learning process. This can be seen from the way the lecturer responds well to the questions and opinions that the student has addressed, providing guidance for students in need, giving appreciation when students can give their arguments, and give attention when the student's answer is wrong and corrects the wrong answer. Appreciation and feedback given by lecturers will influence the confidence of and motivation to learn. Students who believe verbally that they have abilities to master the task given will most likely exert greater effort and will maintain their efforts.

This finding is in line with the opinion of [7] stating that lecturers have the most important role in giving influence on self-efficacy students through verbal persuasion. Providing support and encouragement to students to complete assignments can also come from peers. Observations during the learning process show students interacting with their group friends, working in a collaborative group conducting research activities and discussing organizing arguments and answering assignments. In this process students who better understand the material will give support and encouragement to their group friends. Interactions with peers during the learning process can also be seen from student activities to communicate the results of their investigation and responding to presentations from other groups. This activity will make students learn more from the ideas or ideas that their peers have expressed. This is in line with the research results of [34] stating that the opinions or statements of peers can be characterized as a form of verbal persuasion and influence on self-efficacy. The literature review on the self-efficacy sources of [32] noted the influence of verbal persuasion especially focusing on the positive statements students receive from peers, lecturers, and parents. Verbal persuasion may slightly affect self-efficacy, but it has an additional effect as positive feedback when combined with the parable experience.

The mean n-gain for affective cognitive psychological indicators in group 2 (U. 4B) showed an improvement in the medium category, while in group 1 (U. 4BE), group 3 (I. 2BE) and group 4 (I. 4BE) showed an improvement in the low category. It is supported by the results of questionnaire data that shows as much as 68.12% of students feel confident having self-efficacy psychological cognitive. Physical and emotional circumstances affect self-efficacy, usually, failures or successes will elicit psychological reactions, either pleasant or otherwise [26]. The results of self-efficacy observation show that students can follow the learning process well, this can be seen from the enthusiasm of students follow the ongoing learning process. Besides, students can make conclusions and pay attention to the feedback given by the lecturer. Lecturers should provide specific feedback regularly immediately in terms of achievement because it can give rise to self-efficacy beliefs and ultimately improve academic achievement [31]. This proves the lecturer has been able to create a conducive learning environment to develop self-efficacy [29] stated that creating a positive learning environment can help relieve emotional and psychological responses for students who are unsure of their abilities. In assessing their ability, students can rely on the physiological and emotional that they faced which will ultimately affect self-efficacy.

The results of the questionnaire also showed that some students felt anxious and nervous when they follow the learning process because they do not understand the material presented. Therefore, lecturers need to respond immediately and feedback on questions and opinions and give guidance to the students in need. Helping students to control anxiety and fears related to biology learning can facilitate the development of positive self-efficacy beliefs. Students with strong self-efficacy beliefs have a better view and can cope with the situation of emotional instability, whereas students with weak self-efficacy beliefs require a more supportive emotional environment [32].

4. Conclusion

The results of the research and discussion that have been described can be concluded that ecological and environmental sciences study by applying local wisdom integration biology learning (BIL) program to improve the self efficacy students shown: 1) There is a significant improvement in the value of self-efficacy at p value of $< .05$, (b) The mean n-gain is categorized as moderate of .22 to .38. The development of self-efficacy students through the teaching of BIL program is expected to support students to achieve success in the future. Students need guidance and support from lecturers to have confidence in their beliefs. This study implies that BIL program can be used as an alternative to overcome the low self-efficacy of students. To strengthen the results of this study, it needs to be implemented BIL program for students in other study programs.

References

- [1] Santrock J W 2011 *Educational psychology (5th ed)* (New York: McGraw Hill Companies, Inc) pp 286
- [2] Prat-Sala M and Redford P 2012 *Educational Psychology* **32** 9-20
<https://doi.org/10.1080/01443410.2011.621411>
- [3] Ogan-Bekiroglu F and Aydeniz M 2013 *Eurasia Jurnal of Mathematics, Science & Technology Education* **9** 233-245 <https://doi.org/10.12973/eurasia.2013.932a>
- [4] Erozkan A 2013 *Educational Sciences: Theory & practice* **13** 739-745
- [5] Erozkan A 2014 *Educational Sciences: Theory & practice* **14** 447-455
<https://doi.org/10.12738/estp.2014.2.2014>
- [6] Kurbanoglu N I and Akin A 2012 *Journal of Baltic Science Education* **12** 1989-1998
- [7] Tenaw Y A 2013 *Asean Journal Community Engagement* **3** 3-28
- [8] OECD 2015 PISA 2015 Draft questionnaire framework (Paris: OECD Publishing) pp 9
<http://www.oecd.org/pisa/pisaproducts/PISA-2015-draft-questionnaire-framework.pdf>
- [9] Villafane S M, Garcia C A and Lewis J E 2014 *Chemistry Education Research Practice* **15** 114-127 <https://doi.org/10.1039/c3rp00141e>
- [10] Tanel R 2013 *Journal of Baltic Science Education* **12** 5-20
- [11] Eggen P and Kauchak D 2012 *Strategies and Models for Teachers: Teaching Content and Thinking Skills (6th ed.)* (Boston: Pearson) pp 307
- [12] Islahul N and Utiya A 2015 *UNESA Journal of Chemical Education* **4** 62-68
- [13] Ferreira, Maria M, Trudel and Anthony R 2012 *Journal of Classroom Interaction* **47** 23-30
- [14] Klegeris A and Hurren H 2011 *Advances in Physiology Education* **35** 408-415
<https://doi.org/10.1152/Adam.00046.2011>
- [15] Tosun C and Taskesenligil Y 2013 *Chemistry Education Research and Practice* **14** 36-50
<https://doi.org/10.1039/C2RP20060K>
- [16] Overton, Tina L, Randles and Christopher A 2015 *Chemistry Education Research and Practice* **16** 251-259 <https://doi.org/10.1039/C4RP00248B>
- [17] Utami S D, Effendi I, Dewi I N, Ramdani A and Rohyani I 2018 *Mathematics, Informatics, Science, and Education International Conference* (Surabaya) vol 157 (Paris: Atlantis Press) p 114-116
- [18] Usher E L and Panjares F 2008 *Review of Educational Research* **78** 751-796
<http://dx.doi.org/10.3102/0034654308321456>
- [19] Parmin, Sajidan, Ashadi, Sutikno and Fibriana F 2017 *Jurnal Pendidikan IPA Indonesia* **6** 365-372 <https://doi.org/10.15294/jpii.v6i2.11276>
- [20] Dwianto A Wilujeng I Prasetyo Z K and Suryadarma I G P 2017 *Jurnal Pendidikan IPA Indonesia* **6** 23-31 <https://doi.org/10.15294/jpii.v6i1.7205>
- [21] Utami S D, Effendi I, Dewi I N, Ramdani A and Rohyani I 2019 *Jurnal Penelitian Pendidikan IPA* **5** 240-247 <https://doi.org/10.29303/jppipa.v5i2.291>
- [22] Fraenkel J R, Wallen N E and Hyun H 2012 *How To Design and Evaluate Research In Education. 8th* (New York: The Mc Graw-Hil Companies) pp 264

- [23] Hairida 2017 *Edusains* **9** 54-59 <http://dx.doi.org/10.15408/es.v9i1.4000>
- [24] Erika F 2017 *Proc. of chemistry Conference (Purwokerto)* vol 2 (Purwokerto: Universitas Jenderal Soedirman) p 6-11.
- [25] Hake R R 1998 *American Journal of Physics* **66** 64-74 <http://dx.doi.org/10.1119/1.18809>
- [26] Yusuf M 2011 *Proc. WCES (Istanbul)* vol 15 (Amsterdam: Elsevier) p 2623-2626 <https://doi.org/10.1016/j.sbspro.2011.04.158>
- [27] Kiran D and Sungur S 2012 *Journal of Science Education and Technology* **21** 619-630
- [28] Gunning A M and Mensah F M 2011 *Design research for in a learning design perspective* (London: Routledge) pp 17-51.
- [29] Ernawati, Heryanti E and Mentari N T 2017 *Biosfer: Jurnal Pendidikan Biologi* **10** 50-57 <https://doi.org/10.21009/biosferjpb.10-1.7>
- [30] Khatib F M M and Maarof N 2015 *Proc. WoCTVET (Malacca)* vol 204 (Amsterdam: Elsevier Ltd) 98-104 <https://doi.org/10.1016/j.sbspro.2015.08.121>
- [31] Haddoune A S 2009 *Reflection on students self efficacy expectancies: Paving the Path to better achievement in higher Education* (Algeria: University Badji Mokhtar) pp 11 <http://www.oecd.org/edu/imhe/43977414.pdf>
- [32] Erduran S, Ardac D and Yakmaci-Guzel B 2006 *Eurasia Journal of Mathematics, Science and Technology Education* **2** 1-14 <https://doi.org/10.12973/ejmste/75442>
- [33] Sawtelle V, Brewster E, Goertzen R M and Kramer L H 2012 *Physical Review Special Topics Physics Education Research* **8** 1-18 <https://doi.org/10.1103/PhysRevSTPER.8.02011>
- [34] Bozdogan E A 2018 *Journal of Baltic Science Education* **17** 446-461

Acknowledgements

Researchers expressed gratitude to the Rector of the Mataram University and IKIP Mataram, Indonesia, for support through infrastructure, Institute of Research and Community Service (IRCS) of IKIP Mataram for motivation, advice, and facilities that been given. Thank you also addressed to the Ministry of Research, Technology and Higher Education has been providing grant assistance to the college cooperation research, so that this research can be carried out well.