

## Metacognitive ability and autonomous learning strategy in improving learning outcomes

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### ABSTRACT

The purpose of this study is to analyze the relationship between metacognitive ability and learning autonomy as a strategy for improving student learning outcomes. Metacognition has a major contribution to the success of learners because it is mainly concerned with the process of thinking. For this reason, the classroom environment must be designed to allow learners the opportunity to autonomously determine their learning strategies. Autonomous learning itself has a close relationship with the ability of learners to express, be more creative, have self-esteem, and understand conceptual learning that is more challenging. The method used in this research is the descriptive correlational method, with a sample of 30 students from the Department of Language and Arts. The research sample was students from the first semester of 2018/2019, who were chosen randomly. Data were collected through questionnaires and tests. The results showed that there was a significant correlation between metacognitive ability, learner's autonomy, and learning outcomes in Indonesian language courses. These results indicate that there is an encouragement for students to increase their learning capacity for themselves. Also, they are encouraged to develop their learning strategies and have the opportunity to make decisions, especially in developing ideas.

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## 1. INTRODUCTION

Teaching and learning in the 21st century are focused on efforts to achieve three main skill categories, namely: learning and innovation (e.g., creativity, critical thinking, collaboration); information, media, and technology (e.g., digital literacy); and life and career skills [1]. Twenty-first-century learning has a shift in focus on the learning approach, which initially was more teacher-centered to student-centered learning. Teachers in this context must have the ability to choose the right strategy to create a dynamic learning process [2]. According to Tetzlaff, *et al.* [3], through a dynamic and effective learning strategy, students can develop their ideas to understand the lessons delivered. Therefore, students must have the knowledge to choose learning strategies, where students can bring themselves to the learning task and help them modify their metacognitive knowledge if it has the potential to interfere with their learning and their potential for autonomous learning.

The intended learning strategy must be able to provide opportunities for students to explore information so that they can build their knowledge based on new information independently. For that reason,

Karademir and Akgul [4] recommended that teachers should consider the approach, including carrying out activities that will make students become more responsible, creating a positive classroom environment that will encourage students to take academic risks and provide feedback which increases students' passion for learning. Thus, teachers must help students to realize and develop skills that allow them to have control over their learning methods and be able to use what they have learned outside the classroom [5]. In this context, students are accustomed to autonomously determine their learning strategies under the objectives to be achieved and their abilities.

The facts prove that the current learning process, including learning the Indonesian Language as a native language, is still more oriented towards mastering knowledge of cognition. As a result, students lack good literacy skills, especially in communicating and expressing their opinions, both oral and written. A problem that often occurs in the learning process, which can affect student achievement, is the tendency to ignore the optimization of metacognitive abilities. Teachers are focus more on cognitive abilities to pursue high target learning outcomes rather than the metacognitive abilities. The importance of metacognitive abilities arises in its role in student's thought processes. Whereas metacognitive abilities can help develop students' thinking abilities, which then also affect their learning outcomes [6].

Anderson [7], in *The Role of Metacognition in Second Language Teaching and Learning*, emphasized that metacognition can be understood as thinking about thinking. That means students who have metacognition abilities will know what to do, and conversely, those who don't have metacognition abilities automatically don't know what to do. Therefore, students are expected to have learning strategies that will help them to understand what they need to do to get started. The application of metacognitive strategies will improve one's thinking and lead to more effective learning and better performance, especially among peers who have learning difficulties. Understanding and controlling cognitive processes is perhaps one of the essential skills teachers must develop to help students understand learning material. So, teaching metacognitive skills is very important for students.

Metacognition is a known theory in cognitive psychology that mainly focuses on the dynamic thinking process of an individual [8]. According to Efklides [9], metacognitive ability plays a vital role in self-regulated learning through three different aspects; metacognitive knowledge, which acts as a 'database' from which learning can be regulated; metacognitive experience, the affective aspect whereby we know or monitor how well we are learning in order to facilitate future learning; and metacognitive skill – the strategies we use to apply our learning. The knowledge of metacognitive consists of knowledge of an established approach that used for various assignments, knowledge of the circumstances which these approaches might apply, knowledge of the scope to which the approaches are effectual and helpful, and knowledge of self [10]. Wenden [11] also explained that metacognitive knowledge is the information obtained by learners about their learning outcomes, both the process and the accomplishment. In contrast, metacognitive strategies are the capability and the whole system that students use to manage, direct, organize, and guide their learning, through careful planning, supervising of the process, and evaluating the learning outcomes. In cognitive psychology, the disposition of these three strategies in learning refers to self-regulation and self-direction in adult education. Metacognitive knowledge plays an important role in the problem solving process, by encouraging the planning, regulating, and monitoring the process [12]. Teachers play an essential role in metacognition strategy as they must try to develop students' metacognition and teach them how to use effective strategies for the types of tasks they need for the language learning process [13].

Many studies have proven the effectiveness and role of metacognitive abilities in the process and learning outcomes. Studies [14, 15] have shown that learners who are able to use self-regulated strategies are proven to have a better learning outcomes because they used autonomous learning strategies to face learning challenges and are motivated by themselves, they relied on planned learning and used more goal setting, planning, organizing, memorizing, and self-monitoring in their learning strategy. It can be said that metacognitive has a vital role in regulating and controlling one's cognitive processes in learning and thinking, so the whole process becomes more effective and efficient. Indarini, Sadono, and Onate [16] also agreed on the studies mentioned before. Metacognitive strategies help students to be more efficient and have strength in the learning process because it helps them to find information, determine the source of material needed, and determine the right approach to be applied in overcoming problems that arise in research.

Students need supportive learning conditions, for example, autonomous learning, in order to determine their learning strategies independently. Little [17], in his paper, states that the principal basis of student autonomy is that students themselves must be able to accept responsibility for the entire learning process and that the teacher or instructor must emphasize it. The ability to take responsibility has social-affective and cognitive implications, it requires a positive attitude towards learning and also develops their capacity to reflect the whole learning process, both the materials and strategies used, to bring their thinking as far as possible consciously

Some researchers also proposed that in achieving autonomy of learning, one must have their language learning strategy because it is a key factor [18, 19] and that metacognitive knowledge will lead to increased student autonomy and direction towards more individual teaching [20]. Vandergrift [21] found that motivation at three levels (motivation, extrinsic motivation, and intrinsic motivation) had a very high correlation with the metacognitive strategies reportedly used in his research on the relationship between metacognition, motivation, and listening ability. He further argues that these patterns of correlation provide some evidence for a causal relationship between theories of self-determination, independent learning, metacognition, and student autonomy.

In addition to what was explained earlier, Balcikanli [22] also showed that student autonomy refers to the role of teachers in encouraging or motivating students to set goals independently, to determine the content and development of their learning and by choosing methods and techniques which will be used. Therefore, to evaluate what has been obtained through this process, in the end, autonomous students should set a “personal agenda for learning”, in this case, setting strategies or steps in planning and monitoring, and evaluating the learning process. Through autonomous learners, educated participants have the opportunity to develop the basic idea that if they are involved in the decision-making process regarding their own language competence, they are more likely to be more excited about the whole process of learning and learning that can progressively involve them.

Benson [23] described autonomy as the capacity to control one’s learning when one builds spaces where differences in emphasis can coexist. He also believes that three essential factors that need to be considered as a control function carried out by students, including learning management, cognitive processes, and learning content. To be more independent, students must develop their capacity to plan learning, monitor learning progress, and evaluate learning outcomes. Evaluation and self-assessment are critical for both teacher and learner in order to reflect and regulate this whole learning process [24]. Masouleh [25] emphasized that student autonomy and teacher autonomy are interdependent, and being autonomous learners, in an initial state, involves being scaffolded by teachers in order to enhance the process of learning. The teacher who wants to promote greater student autonomy must begin by developing autonomy from themselves and need to be committed to self-development.

Empirical arguments emphasized by some of the researchers above show that when students are allowed to develop themselves independently, through optimizing metacognitive abilities, they will be able to help them to know how to learn through the selection of appropriate learning strategies. The question is about the language learning process, which trains students to improve their linguistic knowledge and communication skills. How should students manage the independent learning process that can maximize the role of their metacognitive abilities? The answer to this question depends on understanding the relationship between metacognitive and autonomous learning and its contribution to learning outcomes.

Thus, this study aims to find the relationship between metacognitive knowledge and independent learning strategies with student learning outcomes. The results of the study of the intended relationship will clarify the extent of the contribution of autonomy learning to students’ metacognitive abilities, especially in learning German as a foreign language.

## 2. RESEARCH METHOD

The principal of this research is to analyze the relationship between Metacognitive Ability, Learning Autonomy, and Indonesian Language learning result. Therefore the most suitable method used in this research is the Correlation Descriptive Method. This research has three variables which consist of two independent variables, which are the metacognitive ability and the learning autonomy, and the other dependent variable is the Indonesian Language learning result. In general, the Indonesian language course is assigned to all study programs under the Faculty of Teacher Training and Education of Pattimura University, Ambon, Indonesia. The Faculty of Teacher Training and Education has four majors under the faculty including the Language and Arts major. Hence, this research was conducted on the Language and Art major at the faculty which consist of three language study program; English Education Study Program, Indonesian Education Study Program, and German Education Study Program.

The sampling technique in this study was purposive sampling technique. The use of this technique is based on certain criteria according to research objectives, following the results of discussions with the lecturer in charge of this course. The selected sample should be students who are active and creative in the learning process, have strong learning motivation, and commit to involved in this research. With this technique, a sample of 34 people was obtained with the following details, ten students of the Indonesian Education Study Program, 13 students of the English Education Study Program, and 11 students of the German Education Study Program. To facilitate statistical data analysis, we decided to take ten people from each study program randomly.

The data collected for each independent variable was done through questionnaires. The related questionnaires are adapted by Tassinari [26], which consists of five aspects, namely, motivation, planning, performance, evaluation, and performance with 22 items of questions in total. Each statement consists of three alternative answers namely I can do that, I will learn it and not important.

On the other notes, the questionnaire used to measure the data on metacognitive ability was adapted from Scraw and Denison cited by Paidi [27] including some aspects; 1) Metacognitive knowledge with the indicators including declarative knowledge, procedural knowledge, and conditional knowledge; 2). Metacognitive regulations with indicators such as (planning, information, management strategies, comprehension monitoring, debugging strategies, and evaluation). This questionnaire consists of 30 items while the data collected for the Indonesian Language learning result, are gathered through tests.

The instrument used to measure the two variables has passed the validity and reliability test stages, in order to ensure the validity and consistency of the instruments used for data collection. The validity test is done using content validity through expert judgment. The expert judgment results illustrate that the two instruments of autonomy learning and metacognitive ability in the content have been compiled based on concepts relevant to the two variables as mentioned in the previous paragraph. Meanwhile, the instrument reliability test was performed using the Cronbach Alpha reliability test. The results of calculations using the excel formula on the Cronbach Alpha reliability coefficient illustrate that the two instruments have a good standard of the coefficient. The reliability coefficient of metacognitive ability is  $\alpha=0.884$  (very high), and the reliability coefficient of Autonomy learning is  $\alpha=0.734$  (high). These results illustrate that the two instruments are feasible to measure the consistency of the instrument.

There are several confounding variables that need to be controlled to prevent any bias on the data obtained. These variables include student learning motivation and activeness in the learning process. Control of these variables is done by including them as the sampling criteria. Meanwhile, the students' willingness variable to provide information through filling out the questionnaire was well done by giving the opportunity to fill out the instrument at the same time and place and giving clear instructions for filling in the questionnaire.

The data that obtained through the questionnaire and tests then are analyzed with the Pearson analysis technique to determine the relationship between the metacognitive ability, the learning autonomy, and the Indonesian Language learning result of the students at Language and Arts major under the Faculty of Teacher Training and Education of Pattimura University, Ambon.

The results collected are analyzed in three stages. The first stage is to analyze the correlation between learning autonomy and the Indonesian Language learning result. The second stage is to analyze the correlation between the metacognitive ability and the Indonesian Language learning result and the third stage is to analyze the correlation between both of the independent and dependent variables (the metacognitive ability, the learning autonomy, and the Indonesian Language learning result).

### 3. RESULTS AND DISCUSSION

This study was intended to analyze the relationship between metacognitive abilities, learner autonomy, and learning outcomes of students majoring in Language and Arts education at the Teacher Training and Education of Pattimura University. Data was collected through a questionnaire, and the result of the Indonesian language test for 30 samples of respondents. The collected data then is analyzed using the formula  $\text{excel}=\text{PEARSON}(\text{array1}; \text{array2})$ . The results obtained can be explained as follows.

The data in Table 1 describes the partial relationship between learning autonomy and learning outcomes. The average result obtained through the questionnaire and the test for each variable, such as the learner autonomy is 99.96, while the average Indonesian Language Learning outcome is 72.62. These result then was analyzed statistically by using partial correlation techniques explains that there is a significant relationship between the learner's autonomy strategy and Indonesian learning outcomes within the students of the university. It is seen from the results obtained where the  $r$  count is higher than the  $r$  table, which is  $0.734 \geq 0.361$  with a significance level  $\alpha=0.5\%$ . These results indicate that the learner autonomy strategy contributes to the learning outcomes of the student. A similar result can also be found with the metacognitive variable, as shown in Table 2.

Table 1. The correlation between learner's autonomy and Indonesian language learning outcomes

Respondent	Learner's autonomy learning outcomes (X1)	Indonesian language learning outcomes (Y)
N	30	30
Total	2891	2106
Average	99.69	72.62
Deviation	14.15	13.68
Variants	193.39	180.72
Median	103	70
Modus	100	85
Correlation of X1 and Y	0.734235	

The same results also appear in the partial correlation analysis between metacognitive abilities and students' learning outcomes. The data in Table 2 explains that there is a significant relationship between metacognitive abilities and Indonesian language learning outcomes. Statically the average score for the metacognitive abilities is 99.79, and the Indonesian language learning outcomes are 72.62, these outcomes were obtained from 30 sample respondents. It is seen from the results obtained where the r count is higher than the r table, which is  $0.699 \geq 0.361$  with a significance level  $\alpha=0.5\%$ . That means that metacognitive abilities contribute to the learning outcomes of Indonesian students. These results can hypothetically explain that the higher the metacognitive abilities students have, the better impact they will have on the learning outcomes.

Table 2. The correlation between metacognition and Indonesian language learning outcomes

Respondent	Metacognition outcome (X2)	Indonesian language learning outcome (Y)
N	30	30
Total	2894	2106
Average	99.79	72.62
Deviation	16.03	13.68
Variants	248.16	180.72
Median	99	70
Modus	105	85
Correlation of X2 and Y	0.699957	

The data in Table 3 explains the relationship of multiple correlations between metacognitive abilities, and autonomous learning with learning outcomes of the students in the Language and art majors in the Faculty of Teacher Training and Education of the Pattimura University. The calculation results illustrate that there is a significant relationship between learner autonomy, metacognition, and Indonesian language learning outcomes. This is seen from the results obtained by r count higher than the r table that is  $0.808 \geq 0.361$ . That means that there is a very significant relationship between autonomous learning, Metacognitive abilities, and Indonesian language learning outcomes. These results indicate that if students have high metacognitive abilities and are supported by the willingness to learn autonomously, then they will achieve better results.

Table 3. The correlation between learner's autonomy, metacognition and Indonesian language learning outcomes

Respondent	Learner's autonomy learning outcomes (X1)	Metacognition outcome (X2)	Indonesian language learning outcomes (Y)
N	30	30	30
Total	2891	2894	2106
Average	99.69	99.79	72.62
Deviation	14.15	16.03	13.68
Variance	193.39	248.16	180.72
Median	103	99	70
Modus	100	105	85
Correlation of, X1, X2 with Y	0.808461		

Therefore, based on the result of the research, it was discovered that in this modern teaching and learning process besides the cognitive aspect as one of the parts of the education taxonomy which in general also served as intellectual potential, which includes knowledge, understanding, implementation, synthetic

analysis, and evaluation. The metacognitive aspect also plays an essential role in controlling the cognitive part stated earlier. Besides that, the students will also be able to control the learning strategy; therefore, they would be able to have self-realization due to the metacognitive style, which allows the control and creativity. The function of the teacher is to assist and guide the students to independence. Hence it was established that the fusion of the metacognitive ability and autonomic learning heavily contributes to producing a maximal result in learning.

There are three stages of metacognitive which can be developed to maximize the outcome of the learning for the students, such as; 1) The learning awareness stage, including the process to determine the purpose of the study, determining the accessible learning source (textbook, internet access, library access or to study at quiet environment), determining the measurement of the best performance for the student, determining the level of learning motivation and determining the difficulty level of the learning; 2) The learning planning stage, include the process of setting the deadline and determine the time needed to finish the learning task, plan the learning time in the form of schedule and determine the priority in the learning process, organizing the learning material, deciding the appropriate steps for the learning process and using different learning strategy; 3) The monitoring and evaluation stage, including the reflection of the learning process, observing the learning process through the questions and self-evaluation (such as; “Why do I find this learning material difficult to understand?”, “What is the benefit from this material for me?”, “How could I master this material?”), maintain the concentration and high level of motivation throughout the learning process.

This is aligned with Yamin [28], in which the metacognitive strategy can maximize the reasoning ability and meaningful deeper knowledge. To develop a meaningful metacognitive is actually to develop a thinking process of an individual and to have full control of the process, the action, in relation to the task assigned whether or not the individual has reached the goal or not.

The results of the data analysis concluded that there are significant partial and multiple relationships between metacognitive abilities and autonomous learning with Indonesian language learning outcomes in the Faculty of Teacher Training and Education of Pattimura University. According to Salimi and Ansari [5], learner autonomy is a very important factor and is a benchmark in the learning process, especially language learning, because it allows learners to act more effectively. This indicates that both individually and together, metacognitive abilities and autonomous learning contribute positively to the learning outcomes of the Indonesian Language on students with majoring in Language and Arts.

It should be added that practicing metacognitive skills and allowing students to learn autonomously can make them aware of learning, plan their learning, control the learning process, and evaluate the extent of their own abilities as learners and reflect on their learning, including assessing their weaknesses and strengths, or in other words through metacognitive abilities and autonomous learning, and students can understand and control their own cognitive performance, responsible for their own learning. So they have an awareness of how they learn, evaluate their learning needs, produce strategies to meet these needs, and then implement those strategies. This method can certainly increase student confidence, to be able to build metacognitive skills. Self-efficacy increases motivation and learning success. It should also be added that the metacognitive ability itself is a combination of various thoughts and decisions that are consciously given to the development of the learning process [7]. Besides, the workings of metacognitive skills are able to use more than one strategy. The function of the teacher, in this case, is being able to facilitate students for them to become aware of the various strategies available.

The results of this study are in line with the research reported by Broadbent and Poon [29], which found a significant positive correlation between academic achievement and the use of self-regulated strategies for learning. Students could obtain a better achievement academically when they are given opportunities to self-regulate and explicitly taught of self-regulated learning strategies. As mentioned before, metacognitive abilities play an important role in self-regulated learning [9]. In line with the opinion, Feryal Cubukcu [30] and Zimmerman [31], adding that students' self-control refers to the level of individual metacognitive mindset, active participants will be motivated in their own learning processes. The common cause of failure in the learning process caused by a lack of self-regulation. Less accomplished people are more impulsive, have lower academic achievement, and are less effective about their performance and tend to give up more easily than high achievers [30], and they are more influenced by extrinsic factors. Thus it can be concluded that metacognitive abilities have an important role in regulating and controlling one's cognitive processes in learning and thinking so that learning and thinking carried out by someone becomes more effective and efficient.

According to Miedijensky and Tal [32], one of the best methods to develop metacognition ability is through reflection. Reflection is a significance making process that moves the student from one experience into the following with a more profound comprehension of connections and associations with different encounters and thoughts. However, in our study, we see reflection as a metacognitive activity. To be precise,

as a construct of knowledge of cognition. Reflection as the basis of knowledge about cognition is a complex practice that only starts with individuals who are aware of their cognitive strategies. Reflection provides not only a better understanding of what a person knows but also a way to improve their cognitive state. Good cognitive regulation consists of more than just 'knowing' and expressing one's thoughts about how the process works; it is a dynamic process that occurs when individuals are involved in activities [32].

The positive relationship between metacognitive knowledge and learning outcomes is closely related to the role of autonomous learning that enables students to develop themselves creatively. Autonomous learning gives students the possibility to utilize their learning styles and choose strategies that are appropriate for completing assignments given. Therefore language learning, especially Indonesian as a *lingua franca*, is not only focused on exercises to master the language elements provided by lecturers, but also gives students the opportunity to independently determine their communication needs, plan strategies to practice mastering and use them in the context of communication and evaluating their achievements. In addition, Karlen [33] also found that each student has different patterns of learning strategies, metacognitive knowledge, and learning motivation and is individualistic in their learning styles. Therefore, teachers are expected to provide different assistance to each student, especially in improving their metacognition skills and autonomous learning.

There are several implications of the relationship between metacognitive knowledge, autonomous learning, and learning outcomes. In the teaching and learning process in the classroom, efforts are needed to explicitly teach metacognitive abilities to students. This is important considering that not all students have equal ability about this matter. The results of the studies of several experts on students illustrate the tendency to increase the number of students who have little metacognitive knowledge, especially knowledge of different strategies, different cognitive tasks, and, in particular, accurate knowledge of themselves. Pintrich [10] further explained that it is more important that metacognitive knowledge is embedded within the usual content-driven lessons in different subject areas. The strategies for thinking and problem solving can be taught in the context of language learning. Further explained that it is more important that metacognitive knowledge is embedded within the usual content-driven lessons in different subject areas. Some courses, such as English, Mathematics, Science, Social studies, Art, Music, and Physical education, can be taught with general strategies for thinking and problem-solving. To illustrate, a science teacher can explain scientific methods and procedures in general, but to learn the methods in depth will be more effective when it is linked to specific science content, not in the abstract. Of course, the teaching of metacognitive knowledge about different general strategies for some skills, such as reading comprehension or writing, is more desirable.

Autonomy not only applies to students but also to teachers, according to Benson [23], there are three fundamental things related to that matter. These fundamental things are 1) There is a shift in the field of teacher education from a focus on the teacher as a conduit for methods devised by experts to a focus on the teacher as a self-directed learner and practitioner; 2) There is a growing awareness among teachers (involved with learner autonomy) of the importance of their own role in the process of helping learners take greater control over their learning; 3) In order to foster autonomy among learners, teachers must be both free and able to assert their own autonomy in the practice of teaching. So, teacher autonomy is the capacity of a teacher to take control of his own effort to accomplish his job as a teacher and to develop his teaching professionalism. Westwood [34] also added that the effectiveness of teachers' performance is not related to any particular teaching method. Yet, it is more related to general sense with how they work in their classrooms, such as the decision they make, the actions they take, their interaction with students, how they present their lecture, and the way they handle the group as a whole.

#### 4. CONCLUSION

Based on the results of the study, it was concluded that the metacognitive ability and autonomous learning gives an awareness of the learning process and strategies that lead to success in students majoring in Language and Arts at the Faculty of Teacher Training and Education of Pattimura University, Ambon. This can happen because students are able to manage their own learning styles and can control their emotional awareness in learning. When students are equipped with this knowledge, they will understand their own thoughts and learning processes and hence, they are more likely to supervise the choice and implementation of learning strategies, plan ways to continue learning tasks, monitor their own performance on an ongoing basis, be made a basis, find solutions for the problem at hand, and evaluate themselves after completing the task. Developing student metacognitive ability in the learning process means that the teacher can help the students to can improve the performance of the students and help them to solve problems more effectively. It should be underlined that besides preparation, which is an important indicator of metacognitive skills, the other important indicator is planning, both indicators are recognized to be able to improve student learning outcomes. In the observations found that preparation and planning are highly correlated with learning

objectives, where students behave about what they must achieve and how they are achieved, it is a way of working metacognition skills. By controlling the use of correct strategies, it is believed that learning will be on track to achieve learning objectives.

Developing metacognitive in the learning process also allowed the teacher to assist the student in improving the performance and assist them in solving problems effectively as different learning strategies are applicable to a unique learning situation. In relationship to this fact, there are two highlighted areas to be considered; 1) The learner has to be aware of their own limit in each specific situation; 2) They can observe themselves through the learning strategy and such as mapping the concept. Therefore the teacher has to be able to act as the director to direct the learner, so the center of the learning process is focused on the student, who is given the empowerment to control their own learning method through their metacognitive ability.

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