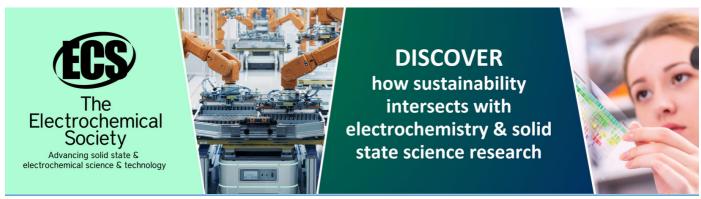**PAPER • OPEN ACCESS**

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The relationship between self-regulated learning and academic achievement of undergraduate medical students

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Abstract. Academic achievement is one indicator success in student learning. Good academic achievement is supported by the ability of self-regulated learning included the medical students. The purpose of this study was to investigate the relationship between self-regulated learning and academic achievement undergraduated medical students of Universitas Warmadewa. This study is a cross-sectional non-experimental descriptive analytic research. All undergraduate medical student (n=219) invite to participate. This study used Motivated Strategies for Learning Questionnaire (MSLQ) to measured self-regulated learning and grade point average (GPA) to measured academic achievement of undergraduate medical students. The result of MSLQ is correlated with GPA of medical students. Pearson correlation was conducted to determine the relationship between MSLQ and GPA. One hundred and ninety students complete the questionnaire (86.76% response rate). There was weak positive association between self-regulated learning and academic achievement (r=0.256, p>0.05). This study shows that a students who has good self-regulated learning has good academic achievement.

1. Introduction

Academic achievement is one indicator of success in learning that shows students learning performance. Academic achievement as an outcome that capture the quality of student. Academic achievement was also called as academic success, student success or student learning. At college, academic achievement is represented as grade point average (GPA) [1]. The learning process proposed is consist of input, process and output. Students need to have good self-regulated learning to have good academic achievement. Self-regulated learning are internal factor within the students, therefore must be understood as a process of learning an active, constructive and internal process. Self-regulated learning is not a reactive process in the student achievement. This process is proactive of students in setting goals, selecting and using appropriate situation learning strategies and monitor learning process [2,3,4]. To achieve successful self-regulation learning, student must have intrinsic and extrinsic motivation [5]. At the other hand, learning strategies are essential for effective and efficient leaning to achieve the learning objectives.

Self-regulated learning in health professions is important to improving academic and clinical performance in medical education. Self-regulated learning can improve academic achievement in medical education [6]. Self-regulated learning can be evaluated by using Motivated Strategies for Learning Questionnaire (MSLQ) developed by Pintrich et al [3]. MSLQ is self-report instrument design

to assess student's motivation and it can uses different learning strategies. MSLQ is applicable from elementary classrooms to college course and is known to have reasonable predictive validity in students' academic achievement [7]. Medical school in Indonesia has significant curriculum changes since 2005. One of standards that should be used in curriculum is SPICES (student-centered learning, problem based, integrated, community based, elective and systematic). The changes of curriculum that focuses on the student as a learner that provide space for the student to organize their own learning. The learning processes is based on self-regulated learning is an important process for studying in medical school. Medical school aim to graduate medical doctor who are able to self-regulate their learning [8]. The aim this study is to analyse relationship between self-regulated learning and academic achievement undergraduate medical students of Universitas Warmadewa.

2. Methods

2.1. Participants
The study participants were all undergraduate medical students at Universitas Warmadewa in Bali, Indonesia. This study was carry out with first, second and third-year students. There were 219 students admitted. There were 54, 85 and 80 students in first, second and third-year. The curriculum is three and half-year for academic program, followed by two-year clinical clerkships. The response rate was 190 (86.76%) medical students. These are consist of 51 (27.0%) medical students academic year 2012, 70 (37.0%) medical students academic year 2013 and 68 (36.0%) medical students academic year 2014. There are 84(44.2%) males and 106 (55.8%) females follow this study. Participant ages ranged from 18 to 21 (M=19.57±1.06) in this study there were 25 students who did not complete questionnaire.

2.2. Instrument
The measurement self-regulated learning of participants using MSLQ that consist 81 item on motivation and learning strategies, 31 item on motivation and 51 item on learning strategies. This questionnaire that have been translated into Indonesian. Students were asks to fill out each item with seven point Likert scale from "not all true of me" to "very true of me". This questionnaire was administered to the students by recommendation and permission of Block Team. Block team is the team who prepare and coordinate the learning process in the block which has of 2-6 credits.

Academic achievement is the value of the achievement of students in each semester, expressed in scale intervals. Each value is converted as follows: ≥ 80 is a A with an index value of 4, 70-79 is a B with an index value of 3, 60-69 is a C with an index value of 2 and <60 is a D with the index 1. The result of each block multiplied by the corresponding value with a load of semester credit units (SCU) each block and then averaged for each half as the semester GPA and averaged for all semester as a cumulative GPA.

2.3. Analysis
Bivariable analysis was used to examine the relationship between the value MSLQ and academic achievement. The relationship between the value MSLQ and years of learning with academic achievement performed by Pearson correlation. The result are interpreted as correlation coefficient as follows: $0 - \pm 1$ (very weak); $\pm 0.1 - \pm 0.3$ (weak); $\pm 0.3 - \pm 0.5$ (moderate); $\pm 0.5 - \pm 0.8$ (strong) and $\geq \pm 0.8$ (very strong) [9].

2.4. Ethical consideration
This research had approved by Medical and Health Research Ethics Committee (MHREC), Faculty of Medicine Gadjah Mada University. Participation was voluntary with written informed consent.

3. Results and discussion
In this study there were 25 students who did not follow the study. The students who follow the study shows that the average value of GPA in students who participate (2.82) is higher than the average

students who not participated in the study (2.56) but from different test results mean single sample, this difference not significant (p > 0.05). Thus, there is no difference between the students who participated in the study who did not participated. The relationship of sub dimension of self-regulated learning (MSLQ) and academic achievement (GPA) are summarized in Table 1. The relationship all sub dimensions of MSLQ and GPA show positive correlation, except test anxiety. The highest positive correlation is task value. Other sub dimension are lower than task value relationship with GPA. It means that student whose lower GPA had higher anxiety. Test anxiety has negative correlation with academic achievement. It means that student who has higher test anxiety has lower academic achievement. Other research showed that it had an impact on students' GPA, lowered the level of test anxiety and increased self-efficacy beliefs [10].

Table 1. Relationship of subdimension of MSLQ and GPA.

Subdimension (n=190)	Mean(SD)	SD	r
Intrinsic goal orientation	6,03	0,74	0,123
Task value	5,75	0,63	0,321
Control of learning beliefs	5,86	0,65	0,154
Self-efficacy	5,11	0,69	0,150
Test anxiety	5,18	0,91	-
Rehearsal	5,38	0,73	0,030
Elaboration	5,32	0,71	0,220
Organization	5,27	0,88	0,084
Critical thinking	5,07	0,74	0,113
Metacognitive self-regulation	5,21	0,66	0,144
Time/study environmental management	4,83	0,63	0,115 0,256

Table 2. shows the relationship between self-regulated learning and academic achievement based on academic year admission. Students academic year 2012 had highest correlation between motivation and academic achievement (r = 0.277), but this is weak correlation. This also showed in dimension of learning strategies. Student entering year 2012 had highest correlation, but this is weak correlation. Correlation of motivation and learning strategies with academic achievement of all participant were 0.277 and 0.231 (p>0.05). There was weak positive association between MSLQ and GPA (r=0.256, p>0.05) for all participants.

Table 2. Relationship between self-regulated learning and academic achievement based on academic year.

Academic Year	2012 (n=51)	2013 (n=71)	2014 (n=68)
Motivation	0.07	0.28	0.08
Learning strategies	0.26	0.16	0.24
Self-regulation learning	0.17	0.24	0.20

The result of this study shows that self-regulated learning has weak positive relationship with academic achievement in medical student. This finding may be attributable to pedagogy system influence student's motivation and learning strategies [7]. Cheng states that motivation, learning objectives, control measures and strategies of learning has an important role in academic achievement [11]. Research of Valle et al. shows a positive relationship between self-regulated learning and academic achievement. Students who have self-regulation of higher learning will have high academic achievement, while students with lower self-regulation have lower academic achievement [12]. Other

research shows that students have a strategy in self-regulation has a good academic achievement compared to students who do not have a strategy in self-regulation (ΔR2 = 0:15, p <0.01) [13].

Motivation and learning strategies are dimension of self-regulated learning. Two dimension show that have positive correlation with academic achievement. This finding means that student who has higher motivation and higher learning strategies has higher academic achievement. Failure in self-regulated learning has two pattern, failure of cognition-regulation and failure of the motivation-regulation system. Disorganization and procrastination have negative impact on academic achievement [14].

Use of motivational regulation strategies improved academic achievement [14]. Medical students that use self-regulated learning skills have beneficial for cognitive achievement [15]. Self-concept and motivation may affect student learning process and achievement [16]. Students' self-regulated learning skills do not change between the first and third year of medical school. Effort remain related to academic performance throughout medical school [8]. Encouraging participation and strengthening self-efficacy may help to improve medical student performance [17].

Some of the limitations in this study were: 1) only done on students in one of the faculty; 2) subjects the students are used only at the undergraduate stage; 3) not explain the causal relationship because of cross-sectional research; 4) This study used a questionnaire that has a lot of item to answer that can cause fatigue and bore subject in filling out questionnaires. It is recommended for further research can identify the factors that influence students' academic achievement, using other methods in the study such as interviews, and the use of measuring instruments other than MSLQ

4. Conclusion

Based on the results of research and discussion above, it can be concluded that self-regulated learning-related weak and not significant with academic achievement of undergraduate medical students. A weak correlation between self-regulated learning with academic achievement can be attributed to other factors that affect, for example, learning environment, faculty, learning and learning situations. Measuring instruments used in the measure of self-regulated learning may also be considered in future studies. Therefore, further research on self-regulated learning and academic achievement is still needed.

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