University students’ ability in setting own learning goals on heat conductivity concept

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Abstract. This research used qualitative method to investigate the students’ ability to set their own learning goals on the heat conductivity concept. Setting their learning goals ability is needed to probe because it requires students to work harder, they become more aware of the areas that need developing, and they understand their role during the learning process. In this study, students’ worksheet was distributed to 20 pre-service physics students who have registered in Introductory Physics I. The test has exactly analyzed qualitatively. An analysis of collected data has primarily directed on students’ learning goal-setting ability on heat conductivity problem. The result indicated that students’ ability to set their own learning goals on heat conductivity concept is still in the least related goals (LR) category.

1. Introduction
Setting own learning goals contribute to student tenure of learning is one method to increase student performance [1,2,3]. Promoting student goal setting can benefit students and take students to have an alive part in their study. While students turn into importantly involved in their learning, they increase a better recognition of learning objectives and elucidate learning units, foremost to the goal of a successful student reaching. Locke and Latham[4] stated that aims relate to prospect results, the setting of goals is first a discrepancy-creating process. Students’ initiative of managing their own learning goals was positively related to their achievement. A learning purposedirection drives to higher achievement than an achievement goal direction [5,6].

Students’ performance was related to their believed in one’s competences to attain a target or a result [7]. Students with a robustlogic of believing to achieve a goal are most prospective to dare themselves with hardassignments and be essentially driven. These students will placeonward a great grade of work in order to satisfy their promises and connects default to stuff which are in their dominate, rather than condemnouterulelement. These students also restorerapidly from decline, and finally are likely to reach their privateobjectives.

University students in an introductory physics course were uncovered to distribute much substantial adversity related to learning crucial topics in thermal physics [8]. Students’ written feedback have some familiar particular misconceptions and various grades of understandings on heat concept [9]. The main difficulty was from the students’ misunderstanding of heat transfer [10].

Heat transfer is a primary science that deals with the rate of transfer of thermal energy [11]. Heat is lifted from the hot water to the cold water although expecting for both parts have an identical temperature. In this instance, conduction refers to the transfer of heat from the hot water through the
Conductive heat flow involves the transfer of heat from one location to another in the non-appearance of any steady flow. The thermal conductivity formula has been stated below.

\[ k = \frac{Ql}{A\Delta T} \]  (1)

Conduction temperature is a possession that stand for the kinetic energy obtained by the molecules of a material; the higher the temperature the greater the kinetic energy or molecular activity of the substance[13]. Molecular conduction of heat is commonly the transmission of energy due to a temperature dissimilarity between abutting molecules in a solid, liquid or gas.

University students in an introductory physics course were uncovered to distribute much substantial adversity related to learning crucial topics in thermal physics. Students should be consciously involved in their learning, they obtain a preferable knowledge of learning objectives and explain learning necessity, contribute to the ending goal of increasing student accomplishment. To the best of our knowledge, there is no available profile by setting own learning goals ability of university students on heat conductivity concept. Propose of this research is to probe pre-service physics students’ setting own learning goals ability on heat conductivity theory.

2. Methods

The undergraduate students participating in the study were aged around 20 years old and were registered in Introductory Physics I course. There was a total of 20 participants (4 male and 16 female). The research was attended in the early semester of the academic year 2017/2018 at the Program of Physics Education in Universitas Tadulako. The participants are recognized using worksheet that consist how students set their own leaning on heat conductivity concept. Heat conductivity concept was selected because there were many substantial difficulties related to learning fundamental topics in this topic[8]. A question that identifies students’ setting own learning goals ability on heat conductivity concept is shown in Figure 1.

![Figure 1. An example of instruction in worksheet](image)

This research has been using an analysis of portfolio method. Calculate the frequency of each student responses has conducted to capture the difference of goals in each category. The formula has been stated below:

\[ f = \frac{\text{total students each goal statement}}{\text{total students}} \]  (2)

Calculate the percentage of total students has conducted to capture the difference in each category. The formula has been stated below:

\[ \% = \frac{\text{total students each category}}{\text{total students in all category}} \times 100\% \]  (3)
3. Result and Discussion
In words of probing students’ setting own learning goals ability on heat conductivity concept, we present in Table 1. The outcomes have already shown most related and least related to students’ setting own learning goals on heat conductivity concept.

Table 1. The responses of students’ learning goals

| Goals                                                                 | Students | Frequency (f) |
|-----------------------------------------------------------------------|----------|---------------|
| **Most Related (MR)**                                                 |          |               |
| 1. knowing the effect of specific heat on thermal comfort             | S4, S12  | 2/20          |
| 2. knowing the effect of heat transmittance on thermal comfort        | S13      | 1/20          |
| **Least Related (LR)**                                               |          |               |
| 1. knowing the factors that can affect thermal comfort in building    | S1, S7   | 2/20          |
| 2. knowing the characteristics of an ideal house that has thermal comfort | S8, S17, S18, S19, S20 | 4/20 |
| 3. identify what the concept of thermal comfort is                    | S10, S11, S14, S15, S20 | 5/20 |
| 4. understand the physics concepts related to home design with thermal comfort | S9, S16, S5, S6, S20 | 4/20 |
| 5. find out why the room temperature is hot                           | S2, S3   | 2/20          |

_Note: S1, S2, S3... represent to the specific participants in the research_

Table 1 has been shown that most of the participants have precisely been restricted in the least related categories. This indicates that the students have rather problems to set their own learning goals. The result has been revealed that all students in LR categories had similar answers. Average of students stated they want to know about factors that can affect thermal comfort in a building, characteristics of an ideal house that has thermal comfort, the concept of thermal comfort, home design, and why room temperature related to thermal comfort. The percentage of students’ responses in setting their learning goals are shown in Figure 2.

Data in Figure 2 have been indicated that overall 15% of students (n = 3) have mainly been classified as most related goals (MR) level. In contrast, 17 students (85%) have been categorized as least related goals (LR) category. The results have been established that a few capabilities are effective to increase organized plan of learning in the future. The students in most related goal level have set that their goals know the effect of specific heat on thermal comfort (10%) and knowing the effect of heat transmittance on thermal comfort (5%). Response in worksheet has been shown that three students who have better to set their own learning goals than others possess the best performance in critical thinking skills [14]. The results support the prior research students who reached better in setting their learning goals and believe to complete the goals, then displaying more likely to challenge themselves with hard assignment, be intrinsically motivated and retrieve rapidly from obstacle, and finally are likely to reach their private target[7].
Contrarily, students’ response have already been displayed that mainly 85% of students classified as the least related goal categories. Many reasons may describe why the answer did not provide gratifying outcomes. Firstly, students have abortive to clarify their learning needs. They have focused only on one aspect, and they have failed to relate their own learning needs. For instance, S8 has been stated that he wants to know the characteristics of an ideal house that has thermal comfort. His goals were not clear and not specifically related to heat conductivity concept. It makes the students will confuse to achieve the goals. Most students could not set the goals about a certain concept that they need to solve the problems. Secondly, the deficiency of students’ setting own learning goals has especially induced by the students are not accustomed to set their own learning goals. The student usually accepts learning goals from the lecturer and did not know what they need to learn. For the third reason, many students were not believed to achieve a goal. For example, five students have been stated that they identify what the concept of thermal comfort is. This fact is in tune with the finding that students with low in believing to achieve a goal, they cannot be successful and have low aspiration [7]. Lastly, students have declined to set their learning goals because they have a poor understanding of heat concept in accordance with the study result stated that students were found many substantial difficulties in thermal physics [8,9,10].

Based on the results, teaching enhancing students’ setting own learning goals ability spend much time to ready and hard to design. Commitment is required to make students develop into deliberately engaged in their learning, better meaning of learning objectives, and elucidate their own learning needs [4]. This prior investigation is able to a great evidence where to direct our instruction[15]. Students are very conscious of the significance of their own learning goal setting. They spotlighted appeal learning performance or learning objectives which are: a comprehensive outlook of recognition, the capability to obtain knowledge, the capacity to shift knowledge, the capability to apply concept into the real world, great knowledge of methodology and the competence to perform in groups and communicate[16]. Students set their own learning goals as a way to compensate for their individual differences in learning [17].

4. Conclusion
Three of twenty students have already been categorized as most related goal level and set their own learning goals clearly. Studies students who achieved better in setting own learning goals and believe to achieve the goals, therefore showing more likely to defiance themselves with hard assignments, be intrinsically motivated and rejuvenate immediately from declines, and finally are likely to reach their individual targets. In contrast, seventeen students in LR category lacked decide specific their own
learning goals. An amount of arguments might clarify why the worksheet did not present splendid findings, exist of students have abortive to clarify their learning needs, students are not accustomed to setting their own learning goals, many students were not believed to achieve a goal, they have a poor understanding on heat concept. Analysis of data has been concluded that students’ setting own learning goals ability on heat conductivity concept is still in the least category. Teaching enhancing students’ setting own learning goals ability spend much time to set up and hard to design. The constructivist model that concerned to the implementation of student-centered learning ought to be applied to encourage students’ setting own learning goals ability.

5. References
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