ELEMENTARY SCHOOL TEACHERS' PERSONALITY IN STUDENTS' LEARNING MOTIVATION TO UNDERSTAND CONCEPT OF SCIENCE

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Abstrak: Kepribadian Guru Sekolah Dasar dan Motivasi Belajar Siswa untuk Memahami Konsep Sains. Penelitian ini ditujukan untuk menggali informasi faktor-faktor yang mempengaruhi motivasi belajar anak usia sekolah dasar untuk pemahaman konsep sains. Subjek penelitian adalah 26 anak SD kelas VI di SD RSBI Banten dan guru yang membelajarkannya. Metode pengumpulan data dengan angket tentang strategi motivasi belajar anak (*MSLQ=Motivated Strategies for Learning Questionaires*), observasi kelas, dan wawancara terstruktur. Analisis data dilakukan untuk mendapatkan gambaran tentang faktor-faktor yang mempengaruhi motivasi belajar, dan *cross-case analysis* untuk setiap anak. Hasil penelitian menunjukkan bahwa setiap anak mempunyai faktor motivasi yang berbeda dalam belajar sains. Kepribadian guru yang unik, seperti kedekatan serta berusaha untuk memahami dan menghargai potensi anak didik dapat meningkatkan motivasi anak belajar sains. Dapat disimpulkan bahwa di dalam proses pembelajaran sains untuk perubahan konseptual, seorang guru sekolah dasar harus memahami pentingnya faktor-faktor yang mempengaruhi motivasi anak untuk belajar, termasuk kepribadian yang dapat diterima, sehingga mereka dapat mengikuti proses pembelajaran dengan lebih bermakna.

Katakunci: motivasi, pembelajaran konseptual, perubahan konseptual, pembelajaran sains, kepribadian guru

INTRODUCTION

Research on students' learning in science has been conducted for several decades. From this research, a model of student learning, the Conceptual Change Model, was proposed by Posner et al., (1982). This learning model has been the focus of much attention and research in science education community (Beeth, 1998; Beeth & Hewson, in press; Pintrich, Marx, & Boyle, 1993). The authors of the Conceptual Change Model (hereafter referred to as the CCM) view an analogy between students' conceptual learning in the classroom and the process of conceptual change in the science community. The CCM views student learning as a rational process analogous to the way in which many contemporary interpretations in history and philosophy of science picture change in the knowledge of scientific communities. Thus, scientific knowledge is constructed based on the learners' current understanding of a phenomenon and the impact of new information or new ways of thinking about

existing information that bear on a phenomenon.

Despite the fact that the CCM is widely accepted and has had considerable influence in science education research and curriculum development, science educators are still confronted with students who are unmotivated to work toward achieving scientific understanding. Many students spend their time and effort focusing on less important learning outcomes such as memorizing science vocabulary or factual information, rather than trying to achieve conceptual understanding (Anderson & Roth, 1989; Blumenfeld & Meece, 1988). In addition, they also rely on inadequate explanations for science concepts by distorting scientific knowledge to fit their existing knowledge, mindlessly answering questions, or copying answers from the texts or peers (Anderson & Roth,1989; Blumenfeld & Meece, 1988). In addition, drilling of the item tests preparing for the national final examination greatly contributed to getting worst of students' conceptual understanding in science. This raises a concern among science educators about how to stimulate student motivation to learn science when the teacher teaches for conceptual understanding.

A number of criticisms have been directed at the model. One specific criticism of the CCM is that it lacks attention to affective aspects of learning, including motivational constructs (Pintrich, Marx, & Boyle, 1993). They argue that the CCM presents a highly rational view of learning (being driven solely by logic and scientific thinking) with little or no reference to motivational constructs such as goals, value beliefs, or self-efficacy beliefs. Indeed, Strike and Posner (1992) in a recent response to Pintrich, Marx, and Boyle's criticism of the CCM indicated that the affective factors are an important area that should be investigated.

Pintrich, Marx, and Boyle (1993) and Boyle, Magnusson, and Young (1993) believe that student motivation is an important factor that can lead to raising or lowering the status of a conception. For instance, accepting the fruitfulness of a new conception implies a role for students' value judgments about the applicability of a conception as well as his or her goals for learning, such as how new information might help in attaining a desired end. On the other hand, learning portrayed by the current CCM focuses only on student cognition without considering students' motivational beliefs about themselves as learners and their roles in the classroom community. This limited view of learning does not offer a complete picture of the process of conceptual change learning. Thus, the importance of considering student motivational beliefs in the process of student learning is essential to engaging students in conceptual change learning. This is to say that the process of conceptual change is influenced by personal, motivational, social, and historical processes (Cobb, 1994; Driver, Asoko, Leach, Mortimer, & Scott, 1994; Pintrich, Marx, & Boyle, 1993).

METHOD

This study attempted to bring together research on students' motivation with research on conceptual change

learning in science with a specific goal to investigate the relationships between motivation factors profile and students' engagement in conceptual change learning in science. One of the research questions examined in this study is: How did the teacher's personality promote students' motivation when learning science?

The study was conducted for two weeks (14 days) in the first semester during the 2008/2009 academic school year on a sixth grade of the elementary school prepared for international standard (RSBI = *Rintisan Sekolah Berstandar Internasional*) located in Banten, where the teacher (Mrs. ED) implemented principles of conceptual change instruction through her daily classroom activities. Twenty students were selected for this study, represented three academic achievement levels (i.e., high, middle, and low), and both genders. Data collection for this study included: (1) Student's self-reported responses to the translation of the Motivated Strategies for Learning Questionnaire (MSLQ), (2) classroom observation of students and the teacher, and (3) structured interviews. The Motivated Strategies for Learning Questionnaire (MSLQ) is a self-report instrument. It has been under the development formally since 1986 when NCRIPTL (National Center for Research to Improve Post-secondary Teaching and Learning) was founded. The Motivated Strategies for Learning Questionnaire (MSLQ) that was used in this study is the version in which the Cronbach's alphas are robust, ranging from .52 to .93 (Pintrich et. al. 1991). These indicate that data obtained on the MSLQ show reasonable factors of validity.

Direct classroom observation of teaching strategies and student's behavioral engagement in learning science was focused on (1) the sequence of events that the teacher presented to students, the strategies that the teacher uses, and the materials presented during a science lesson, (2) students' responses to the teacher instruction, and (3) instances when the motivational behaviors were presents.

Interviews were guided by a structured format. Each interview was conducted for the selected individual once a week lasting between 10 and 15 minutes focused on (1) obtaining information on motivational factors that are not elicited through the self-report questionnaire (i.e., a student's specific goals orientation of learning science as well as other factors influenced to his/her motivation to learn), and (2) validating findings that were resulted from a student's self-report and observations.

The data analysis procedures are intended to analyze information related to the research questions. Three general steps of data analysis are used: (a) analysis based on intuitive reasoning from a complete reading of data, (b) analysis using a rating or frequency counts, and (c) developing case studies. Analysis of these data resulted in the motivational factor profile for each student and cross-case analysis for entire of the study participants.

TEACHER'S PERSONALITY AND STUDENTS' MOTIVATION

The findings generally can be described that the Instructional strategies and students' motivational factors contributed to their engagement in learning for understanding. Instructional strategies that were implemented based on conceptual change teaching and students' motivational factors such as goals, values, self-efficacy, and control beliefs provided crucial effect on the quality of student engagement in learning activities. The findings suggest that both of traditions, students' motivation and conceptual change approaches to learning science have the important implications for those who wish to improve science teaching/learning.

The teacher's interaction with the individual students in ways that would help students to more motivated strategies to engage in learning within social contexts of the classroom seemed to be the important factor to be considered by the teacher in daily teaching-learning activities. In other words, it is crucial to bring together issues of student motivation and conceptual change learning as suggested by Barlia and Beeth (2002), Boyle, Magnusson, and Young (1993). In summary, student motivation can be a crucial factor that should be considered to maximize student engagement in learning for conceptual change. The followings are the examples of how the elementary school teacher's personality contribute students' motivation to engage in conceptual change learning in science, especially for students categorized in the middle and lower level on academic performance.

RZ is one of the students who placed in the low academic achievement level of Mrs. ED's class. He sometimes got difficulty to understand science concepts offered by the teacher. In the following statement, RZ explained what he does when he encounters difficulty in learning a science concept.

> Before asking to the teacher, I do asking to my very closely friends who understand the material. I seem to understand things better when a group of us get together and work out things we don't understand as a group efforts. After that, I would ask my teacher if I really don't understand difficult concepts or materials (RZ).

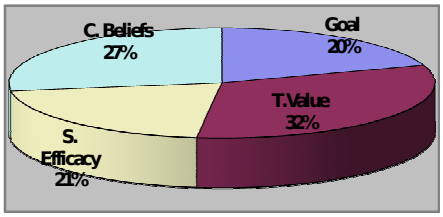

Figure 1. RZ's Motivational Factor Profile

RZ's motivation to learn science consists of 27% control beliefs, 20% goal orientation, 32% task value, and 21% self-efficacy. Task value comprises the largest portion of RZ's motivational factor profile (see Figure 1). It indicates that he has positive perception of hard effort in learning will lead him to get a good grade. Compared to the overall mean of the class, RZ's motivation score is slightly below that of the class (5.3 for RZ compared to 5.6 for the class).

In his explanation, RZ indicated several strategies of learning science such as discussing with her friends and asking the teacher. The researcher probed RZ's response by asking what he

does outside of the classroom to help him learn science better. RZ responded with comments about a study party, doing homework, and asking for extra explanation from the teacher including asking some strategies he undertook to learn science.

In Mrs. ED's classroom, ST is one of the students categorized in the lowest academic achievement level. She frequently faced difficulty understanding the science materials that the teacher offered. From several responses of my questions, I concluded that she is one of the students who less motivated to learn science. The following statement reflects ST's efforts outside of the class in order to help her learn science better. She did not hesitate to ask the teacher when she had difficulty understanding the science contents. This implied that the teacher was very open and always ready to help students as they need.

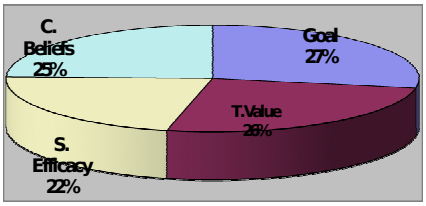

Figure 2. ST's Motivational Factor Profile

ST's motivation to learn science consists of 25% control beliefs, 27% goal orientation, 26% task value, and 22% self-efficacy. The percentage of her motivation factors (control beliefs, goal orientation, task value, and self-efficacy) to learn science almost the same (see Figure 2). It means that her motivation to learn science is the lowest among that of her classmates. In other side, because of Mrs. ED openness to her, she developed own learning strategies to get better understood science materials.

> I and two other students of my closely friends frequently had a study group!! I also do the homework assigned and I study for the tests. If I am having problems to understand the science materials offered, Mrs. ED is there for some extra explaining before or after school. She really patient to have me understood (ST).

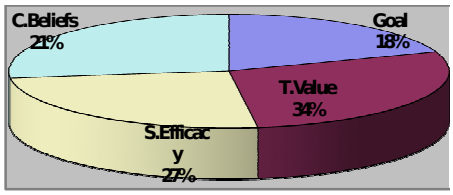

Figure 3. AK's Motivational Factor Profile

AK's motivation factor to learn science consists of 21 % control beliefs, 18 % goal orientation, 34% task value, and 27% self-efficacy. He put very low in goal orientation as his motivation factor to learn science (see Figure 3). It indicates, he does not really know the goals he wants to reach by learning science. Compared to the overall mean of the class, AK's score is slightly above that of the class (6.1 for AK compared to 5.6 for the class).

In his class, AK is categorized as a middle academic level student. He believes that his succeed in learning science is due to the ways of Mrs. ED's teaching that encourages him to learn science for understanding:

> Sometimes, I got discouraged with some new science ideas. I always try to focus my thought to the problems. I relate them to my everyday life. Mrs. ED will try hard to explain them and she will help me understand and encourage me. I am not giving up until I understand. Also, my motivations are myself and always trying to do the best I can do. In fact, science is one of the courses that will be offered in the national examination. So, I am motivated to get a better grade this semester. (AK).

From AK's statement, indicates that he can control his academic performance by putting forth what he needed strategically to affect on the desired outcomes— understanding science concepts and getting a better grade. In other words, AK is motivated to learn science, because he believes that his efforts will lead to his successful in the national examination (*Ujian Nasional*).

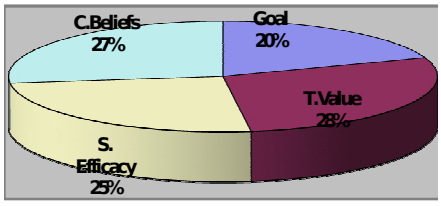

Figure 4. FN's Motivational Factor Profile

Mrs. ED's teaching strategies has also affected FN's learning of science. FN is categorized as a low level of academic performance student in the class. FN feels that the ways of Mrs. ED's teaching that always presents examples and notes, as well as her thorough explanations, help her learn more science ideas. This was indicated by FN in the following statement:

> Mrs. ED is one of the best teachers I have ever had! She is such a good teacher because she does examples in front of the class and she explains things thoroughly. She always tries to explain the science materials as clearly as possible. She makes sure we know what we are doing by giving us good notes and examples (FN).

Figure 4, shows that FN's motivational factor profile consists of 27% control beliefs, 20% goal orientation, 28% task value, and 25% self-efficacy. FN's motivational factor profile is quite the same as ST's motivational factor profile. The percentage of her motivation factors (control beliefs, goal orientation, task value, and self-efficacy) to learn science almost the same. It indicates that her motivation to learn science is quite low.

Compared to the overall mean of the class, FN's score is slightly below that of the class. In daily classroom activities, FN spent most of her time copying everything Mrs. ED wrote on the white board, although she sometimes asked questions for clarification as well. Mrs. ED frequently came to FN's desk to help her focusing attention on the science materials being offered and to make sure that she understood these materials. From the description above it can be summarized that FN motivation to get involved in learning science was greatly influenced by Mrs. ED's teaching strategies and her personal attention to FN.

The importance of the science course to RN may lead her to get involved

in conceptual change learning activities. RN's active involvement in learning is supported by her response about what she does to learn science better. In learning science, she developed learning strategies that support her learning effectively.

Like other students, sometimes I do get discouraged, but I know I have to keep going. My classmates encourage me, as well as Mrs. ED, to stick with it and think thorough it. In case, I particularly encounter difficult ideas in science I always either ask my classmates to explain the concepts to me, or ask my teacher to help me more fully understand the ideas (RN).

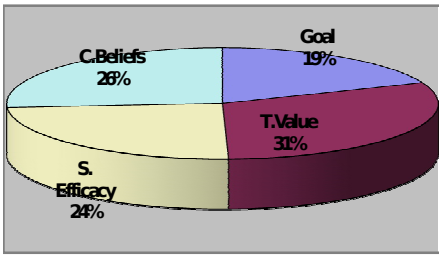

Figure 5. RN's Motivational Factor Profile

RN's motivation factors to learn science consist of 26 % control beliefs, 19 % goal orientation, 31% task value, and 24% self-efficacy. She put very low in goal orientation as her motivation factor to learn science (see Figure 5). It indicates, she does not really know the goals she wants to reach by learning science.

Compared to the overall mean of the class, RN's score is in the middle that of the class. RN perceives that reviewing notes, doing projects, discussing with classmates, and asking the teacher questions for clarification helped her understand science ideas more fully. She believes that all effort dealing with learning science may lead her to a better understanding of science concepts and that will affect her understanding.

The role of the teacher is very crucial to RK's learning in science. He is categorized as the highest level of academic performance in Mrs. ED's class. RK found that the way a teacher teaches, such as bringing everyday situations to the science concept, and the availability of the simple science equipments. These factors motivate him to get involved in Mrs. ED's science class.

> Mrs. ED's explanations and experiments really help to clarity ideas we have learned. Simple science equipments that Mrs. ED-made showed us everyday situations combined with science concepts. She also keeps pushing us to try to explain things for ourselves and think through the problems. In addition, she makes class fun for us so it's not so bored. (RK)

For RK, task value is the most crucial motivational factor to learn science. He perceives that valuing task is very important to bring him succeed in the next of the national examination.

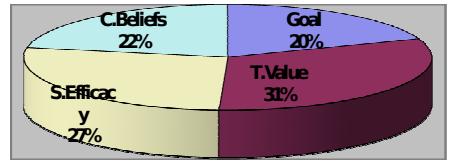

Figure 6. RK's Motivational Factor Profile

RK's motivation factors to learn science consist of 22% control beliefs,