WCES 2011

Personal constructs: novice and expert science teachers concerning teacher function

Nurfaradilla Mohamad Nasri, Zakiah Mohd Yusof, Shanti a/p Ramasamy, Lilia Halim, Lim Wei Ming

Faculty of Education, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia

Abstract

Teachers are transmitter of knowledge, skills and values to the mass population, therefore they are considered as nation’s valuable asset. Regardless of teaching experiences, teachers are required to play their roles to their utmost capabilities. However, research clearly showed that, teaching experience shaped teachers’ perceptual, thinking and behavior capabilities. A set of questionnaire was developed aimed to identify personal constructs between novice and expert Science teacher concerning teacher function. Two groups of Science teacher with different level of experience in teaching are formed. One of the groups is of teachers with high level of practical teaching experience and the other group is formed by inexperienced Science teachers. The results revealed a greater number of similarities than differences in personal constructs. Some of the differences observed were mainly related to teaching strategies. Based from this finding, it is suggested that more customize professional development programs especially on teaching aspects are conducted for specific groups of teachers.

Keywords: personal construct; novice science teacher; expert science teacher; teaching experience

1. Introduction

Primary goal for Science education is to develop scientific literacy for all students. According to US National Science Education Standards (NRC, 1996), scientific literacy enables people to use scientific principles and processes in making personal decisions and to participate in discussions of scientific issues that affect society. To achieve this goal, many nations have called for reform in Science and the reformation mostly focus on teacher education by promoting social constructivist teaching approaches (Garm and Karlsen, 2004) and development of standards for teaching (National Research Council, 1996). Traditionally, Science has been presented as a rigid body of facts to memorize and nowadays, Science is described as a way of knowing about the natural phenomenon. The change in view of Science required the Science teacher to teach contemporary views of Science and help the students to think critically in developing deeper understanding of scientific concepts through inquiry.

However, to meet the required standard in teaching is very challenging. This is because most of the Science teachers are the products of traditional Science education and as a result they have their own belief in Science teaching. Windschitl and Andre (1998) stated that there are numerous links between students’ personal beliefs and their connection to learning approaches and outcomes. Unfortunately, teachers’ epistemological beliefs and their connection to teaching practices are understudied. According to Westerman (1990), there are differences between the thinking and decision making of the expert and novice teacher.
Berliner (1988) proposed a model to explain the development of expertise in teaching. According to his model, there are five stages in the acquisition of expertise; beginning with the novice stage where the novice teachers seek for help to guide their actions, to the proficiency and expert stage in which the teacher own actions are more holistic; where the teacher and the task are integrated and the teacher is fully adapted to the situation. The way teacher think will serve as their construct and the construct then will act as guidance in their action.

According to George Kelly (1955), the psychologist and creator of personal construct theory state that, personal construct theory was an attempt to set in order the facts of human experience so that we can make good predictions about what people will do when confronted by new situations. People develop constructs as internal ideas of reality in order to understand the world around them. Kelly believed that anticipation and prediction are the main drivers of our mind. Personal construct applied to anything we put our attention to, including ourselves, and also strongly influence what we fix our attention on. Hence, determining a person’s system of constructs would go a long way towards understanding him.

2. Scenario of Science Education in Malaysia

Malaysia main national agenda is to create a scientific and progressive society that not only user of technology, but also contributes to the scientific and technological civilization of the future. Therefore, mastery in Science and technology among the young generation is very important in producing technocrats who have the capacities and creativity to take lead in the various technology-related activities.

Science education in Malaysia is not only recognized in Malaysia, but it is also accepted in the international arena (Lee, 1992). However, the curriculum which is planned to suit the national and global needs regularly faced continuous modification compared to other subjects (Kamisah, Lilia and Subahan, 2006). Rapid changes in Science curriculum are a significant impact created by Science and technology advancement of human civilization. Therefore, Science teachers must be well equipped for the profession since in the beginning and at the same time maintaining and improving their skills through lifelong career learning.

Odden, Borman and Fermanich (2004) indicated that teachers have a significant influence on student learning and they are the single largest factor affecting academic growth of populations of student. This claim is supported by Vandevoot et al. (2004) research findings. According to Vandevoot et al. (2004), students whose teachers hold prestigious credential that indicates as quality teachers have higher results compared to those students whose teachers do not hold the prestigious credential. So, can be concluded that, by having highly qualified teachers, students achievement will increase.

Kamisah, Lilia and Subahan (2006) added, even though the role of quality Science teacher has been realized, but like many countries (e.g. Pakistan, Australia, New Zealand, United States of America and Britain), Malaysia is facing the problem of inadequate trained Science teachers especially in the teaching of Physics, Chemistry and Mathematics. As a result, teacher which are not trained in teaching Science subjects are often required to teach Science. To overcome this situation, Ministry of Education had developed in-service training course to help them teaching Science effectively. Besides non-Science teacher teaching Science, issue of novice Science teacher also must be review in depth. They are Science teacher who have the knowledge but lack of practical experience. If nothing is done to help this group of teachers, they probably unable to implement Science curriculum perfectly.

Common issues revolving around Science teachers in Malaysia are they are using traditional teaching techniques for example lecturing (Sulaiman et al., 1990), focus on rote learning where students are forced to memorized facts (Anuar Zaini et al., 2003) and lack of content knowledge of Science subject (Samsuddin Jalil, 1996 where 43.8% out of n=347 Science teachers did not understand what Science process skills mean. Aside from identifying Science teacher problems, their personal construct should be look too as the way they think (personal construct) will influence their action. So, by knowing teacher’s personal construct, we are able to understand them better and prepare safety net to improper Science teacher behaviour.
3. Objective of the study

The purpose of this paper is to identify personal constructs between novice and expert Science teacher concerning teacher function. The understanding of these problems is deemed crucial because teachers’ beliefs on their function will be reflected on their action that is teaching approaches used and goals of teaching. Therefore, by identifying their beliefs, Science education educators can help in changing those traditional beliefs into more comprehensive belief.

4. Methodology

This study uses the quantitative approach whereby a set of questionnaire was developed aimed to identify personal constructs between novice and expert Science teacher concerning teacher function. Two groups of Science teacher consist of n=3 in one group was formed. One of the groups is of teachers with high level of practical teaching experience and the other group is formed by inexperienced Science teachers. The questionnaire was in national language, Bahasa Melayu. This is because respondents felt more comfortable using the language. Respondents are required to state their opinion based on 5 scales; HDA= Highly Disagreed, DA= Disagree, A= Agree and, HA= Highly Agree. Example of translated questionnaire item prepared for respondent are:

Construct:
1. Personal characteristics:
   Effective Science teacher is.....
   a) Fair to all student regardless of ethnicity and gender.
   b) Willing to admit offence in front of the students.
   c) Having high expectation for students’ success in learning.
   d) Strict in upholding classroom discipline

2. Teaching strategies:
   Effective Science teacher is.....
   a) Able to give relate lesson content with daily life.
   b) Using flexible teaching strategies that suit each students learning style.
   c) Concern of having conducive classroom environment.
   d) Willing to share their experience with students which act as their personal touch during the lesson.

5. Analysis of Data

This study focus on two main constructs that are personal characteristics and teaching strategies. Analysis of the questionnaire revealed that most novice and expert Science teachers share greater number of similarities than differences in personal construct.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Item</th>
<th>Experts Science Teacher (%)</th>
<th>Novice Science Teacher (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Personal characteristics</td>
<td>1.1 Fair</td>
<td>86.67</td>
<td>93.33</td>
</tr>
<tr>
<td></td>
<td>1.2 Positive attitude</td>
<td>93.33</td>
<td>93.33</td>
</tr>
<tr>
<td></td>
<td>1.3 Humorous</td>
<td>86.67</td>
<td>80.00</td>
</tr>
<tr>
<td></td>
<td>1.4 Creative</td>
<td>80.00</td>
<td>80.00</td>
</tr>
<tr>
<td></td>
<td>1.5 Willing to admit offence</td>
<td>80.00</td>
<td>86.67</td>
</tr>
<tr>
<td></td>
<td>1.6 High expectation</td>
<td>93.33</td>
<td>93.33</td>
</tr>
<tr>
<td></td>
<td>1.7 Strict</td>
<td>80.00</td>
<td>86.67</td>
</tr>
<tr>
<td></td>
<td>1.8 Arrogant</td>
<td>20.00</td>
<td>20.00</td>
</tr>
<tr>
<td>2. Teaching strategies</td>
<td>2.1 Personal touch</td>
<td>93.33</td>
<td>66.67</td>
</tr>
<tr>
<td></td>
<td>2.2 Lesson content and daily life</td>
<td>93.33</td>
<td>60.00</td>
</tr>
<tr>
<td>Construct</td>
<td>Expert</td>
<td>Novice</td>
<td></td>
</tr>
<tr>
<td>---------------------------------</td>
<td>--------</td>
<td>--------</td>
<td></td>
</tr>
<tr>
<td>Knowledge and pedagogical skill</td>
<td>93.33</td>
<td>93.33</td>
<td></td>
</tr>
<tr>
<td>Active learning environment</td>
<td>93.33</td>
<td>66.67</td>
<td></td>
</tr>
<tr>
<td>Flexible teaching strategies</td>
<td>93.33</td>
<td>60.00</td>
<td></td>
</tr>
<tr>
<td>Conducive classroom environment</td>
<td>93.33</td>
<td>93.33</td>
<td></td>
</tr>
</tbody>
</table>

For the first construct, that is Personal Characteristics, both group expert and novice Science teacher agree that being fair, having positive attitude, use humour in class, creative in delivering lesson, willing to admit offence, have high expectation on each student are important elements for Science teacher. But both groups agree that Science teacher should not be so strict and arrogant as this will developed negative perspective as an educator.

However, for second construct, that is Teaching Strategies, results show that expert and novice Science teacher have different opinion. Expert Science teacher seems very confident in using personal touch for each lesson, able to create active teaching and learning, use flexible teaching strategies that suit each student’s learning style and they are able to relate each lesson content to daily life activity. On the other hand, novice Science teacher only stressed on the importance of having in-depth knowledge in Science and latest Science pedagogical skills. This is because; they believe that only by being knowledgeable they can deliver the content efficiently.

6. Conclusion

Human resource development is very important for any nation to strives in a competitive world. Therefore, giving extra attention in rising the quality of education especially Science and technology will put Malaysia on the right track of becoming develop nation. Based from this research, can be conclude that, expert and novice Science teacher share similar personal construct especially on the personal characteristics of Science teacher. Differences observed were mainly related to teaching strategies where expert Science teacher seems very confident to use inductive teaching approach whereas novice Science teacher prefer to use deductive teaching approach as they are not comfortable in dealing with unstructured teaching style. Therefore, by identifying science teacher personal construct, Science teacher will be more aware of how their thinking affects behaviour and most importantly their teaching mode. Hopefully, Ministry of Education can use used this result as guidance in developing appropriate in-service course in helping the Science teacher to be quality science teacher.

References