



## Teachers' Attitude and Competencies in Teaching Physical Science

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### ABSTRACT

*Physical science is an essential part of the educational system and of an advanced society. Therefore, Teachers attitude towards physical science have been investigated in a range of scientific studies worldwide, but scientific progress in this field is slow due to several major theoretical and methodological issues. There described the lack of consistent definition and theoretical underpinning has led to a great variety of measurements aimed at investigating teachers' attitude towards physical science. The cognitive aspects of professional attitude will be discussed with relevance of physical science for pupils, gender differences in enjoyment of physical science and difficulty of teaching physical science. This paper focused on some set of competencies not significant to ensure good teaching –learning procedures for how to teach and what to teach. At last, it stressed that teaching should be directly involved in defining priorities about what are their real problems and able to select appropriate solutions.*

**KEYWORDS :** Attitude, Competencies, Physical Science, Appropriate Solutions

### INTRODUCTION

The word physics has its origin in a Greek word meaning 'nature'. Physics is the most basic science, which deals with the study of nature and natural phenomena. Physics –the study of matter, energy and their interactions– is an international enterprise which plays a key role in the future progress of mankind. The support of physics education is important because:

- i. Physics improves our quality of life by providing the basic understanding necessary for developing new instrumentation and techniques for medical applications.
- ii. Physics is an exciting intellectual adventure that inspires young people and expands the frontiers of our knowledge about nature.
- iii. Physics is an important element in the education of chemists, engineers and computer scientist as well as practitioners of the other physical and biomedical sciences.
- iv. Physics contributes to the technological infrastructure and provides trained personnel needed to take advantage of scientific advances and discoveries.
- v. Physics generates fundamental knowledge needed for the future technological advances that will continue to drive the economic engines of the world.

leads to changes in physical science towards adequate innovative competencies, both the training of future teachers and the in-service teacher education programmes.

### TEACHERS' ATTITUDE

Teachers' attitude towards physical science has been investigated in a range of scientific studies worldwide, but scientific progress in this field is slow due to several major theoretical and methodological issues (Bennett, Rollnick, Green, & White 2007; Jones & Bormby, 2009). Many studies do not or in components of attitude that they measured, or do not make a distinction between attitude towards physical science and related concepts, such as opinions or motivation. It is therefore, difficult to determine if it actually is attitude that was investigated in these studies (Blalock et al., 2011) Furthermore, most researchers do not offer explanation for the choices they have made as to what components of attitude they selected to measure. These choices often seem to be based on pragmatic or convenience arguments. These described lack of consistent definition and theoretical underpinning has led to a great variety of measurements aimed at investigating teachers' attitudes toward physical science. Most importantly, the teachers in our sample did not refer to any unexpected aspects of attitude that deviated from the attributes that we found in our large scale literature review. Furthermore, many of the attributes that we found in the literature were also spontaneously mentioned by the teachers during our focus group discussions. This implies that the attributes of the cognitive and affective components that we hypothesized based on our examination of the literature are indeed corroborated by the discussions that we had with the pre- and in – service teachers on their attitude towards physical science. The cognitive aspects of professional attitude that were discussed are in relevance with physical science for pupils, gender differences in enjoyment of

physical science and difficulty of teaching physical science. The cognitive remarks that related to personal attitude were scarce and focused mainly on difficulty.

### COMPETENCIES RELATED TO PHYSICAL SCIENCE

Teachers have a major role in any educational reform, they should be solicited to understand new proposals and to participate in their formulation, to analyze their performance and modify their behaviour, their personal conceptions on how to teach and what to teach. Most teachers, influenced by how they were taught tend to replicate the model as well as theory. The set of following competencies, necessary but not sufficient to ensure good teaching, learning procedures, is by no means complete, but there is high consensus about it within the community of scholars.

- i) The role of the physical science laboratory. In spite of much that has been said and the perception that practical work has a priority role for the teaching-learning process of physical science.
- ii) The understanding of the nature of physical science and the conceptual mastery of content in classical, modern physical science are the two aspects that cannot be separated,
- iii) The role of history of physical science, nowadays has become a global phenomena to introduce historical and philosophical insights into science education.
- iv) The present domination and the acceptance of constructions, is the only correct teaching paradigm, the scarce understanding of the true meaning of the world. Derek (1990) in discussing the relation between language, knowledge and psychological development that deal with shared building knowledge, knowledge and psychological development that deal with shared building. knowledge, Mentions Three Aspects:
  - a) Power and control of the teacher in the construction of knowledge of their students.
  - b) Contextualization of language in the school and
  - c) Relation between discourse in the classroom and knowledge.
- v) **Evaluation:** there is a need to understand and apply both qualitative and quantitative evaluation modes since many teachers do have not had formal studies on the subject, they mainly evaluate their students for promotion, little conceptual knowledge is verified. Poorly constructed and mainly validated instruments that mostly reflect the knowledge as placed by the teacher in factual forms are used.
- vi) **Critical use of new and old educational technologies** (Laboratory, printed, video, multimedia, software www, etc). This aspect belongs to actuality and because of the exponential growth of knowledge, the implementation in large scale should be based on careful research of the educational impact of new technologies.

### vii) Academic New Curricula

In the present world, dominated by a scientific and technological culture, the debate over informal and formal (academic) curricula should be thought in terms of

- a) The introduction of modern physical science and new ideas to deal with classical science.
- b) New approaches to contextualize old curricula via informal sources. Video, television and radio broadcast. Books and journals, software and multimedia, museums, exhibits, etc,
- viii) Knowledge of results obtained in the field of research in physical science. Probably this is the area that offers the richest of possibilities to modify current teaching practices.
- i) National programmes to improve physical science teaching at all levels of the educational system and training.
- ii) Building and maintaining strong departments in schools and other academic institutions with opportunities for grants to support research at school level.
- iii) Scholarships and fellowships for the school students studying physical science.
- iv) Adequate funding for national laboratories and the formation of new ones as appropriate.
- v) Funding and facilitating international activities and collaborations.

### ACTION PLAN FOR ATTITUDE CHANGE

We stress once more a teacher's profile as an active agent, constructing perspectives and taking action. He/she should be encouraged to strengthen his/her capabilities to make good educational decisions. The physical science teacher could not solely be responsible for the significant learning of physical science that goes on in many schools. Teachers' styles, and mainly their attitude, are strong context outcomes, rooted in experience and do not become automatic routine conducts, in the sense that they are developed via very slow interactions (action/reaction) and become well established constructs for each individual only after some time. In that sense attitude can be modified only by each individual, when she/he becomes aware, via elements and evidence that new postures would be better to deal with the world around, hence, we could argue about the possibility to modify teaching attitudes by means of teaching programmes, as we believe to be true when we teach specific competencies in the pre-service courses. On the other hand, we need to worry about teachers' negative attitudes since they affect a large number of the student population.

### DISCUSSION

Effective actions to solve the problems of teachers' inadequacies are relative to given contexts and begin by the professional recognition of the teacher. One basic aspect to improve class room practice is simple to allow the teacher to identify and reflect the aspect in their practice that needs change. Teachers should be directly involved in defining priorities about what their real problems are and able to select appropriate solutions, (Saravana Kumar,AR 2014). It is easy to establish objectives and policies in education but the implementation of real change of teaching strategies. In order to put into practice, a contemporary school reforms involves high risks for the teachers and financial costs for the schools. It is also important to analyze the consequences of teachers' attitude. Pre-service courses can benefit from that knowledge and guide the selection of courses and methodologies to ensure a good foundation for the future teachers. One possible way to permit a critical evaluation could be putting together the two groups (Teacher and students) during the training period of the prospective teachers.

### CONCLUSION

In summary, for all these reasons, physical science is an essential part of the educational system and of an advanced society. We therefore urge all governments to seek advice from physicists, scientists and other educationist on matters of framing science policy, and to be supportive to physical science. This support can be taken in many forms such as

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