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A REVIEW OF THE STUDY ON INTEREST IN LEARNING CHEMISTRY IN HIGHER SECONDARY SCHOOLS

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ABSTRACT

Chemistry is a important subject in science. But , learning of chemistry in higher secondary school is difficult. Hence, this review tries to analyse the various studies on chemistry learning difficulties. From this reviews on chemistry, we can identify difficulties and learning ability of chemistry in higher secondary level. all the studies try to find out solution in chemistry learning difficulties of a student while teaching chemistry. so, we can improve our teaching-learning activities while teaching chemistry in a higher secondary school and improve our remedial measures for the diificulties in learning chemistry.

INTRODUCTION

Chemistry education (or chemical education) is the study of the teaching and learning of chemistry in all schools, colleges and universities. Topics in chemistry education might include understanding how students learn chemistry, how best to teach chemistry, and how to improve learning outcomes by changing teaching methods and appropriate training of chemistry instructors, within many modes, including classroom lecture, demonstrations, and laboratory activities. There is a constant need to update the skills of teachers engaged in teaching chemistry, and so chemistry education speaks to this need. A second perspective is defined by a self-identified group of *chemical educators*, faculty members and instructors who, as opposed to declaring their primary interest in a typical area of laboratory research (organic, inorganic, biochemistry, etc.), take on an interest in contributing suggestions, essays, observations, and other descriptive reports of practice into the public domain, through journal publications, books, and presentations. Dr. Robert L. Lichter, then-Executive Director of the Camille and Henry Dreyfus Foundation, speaking in a plenary session at the 16th Biennial Conference on Chemical Education (recent BCCE meetings: (Jump, 2007;39)posed the question "why do terms like 'chemical educator' even exist in higher education, when there is a perfectly respectable term for this activity, namely, 'chemistry professor.' One criticism of this view is that few professors bring any formal preparation in or background about education to their jobs, and so lack any professional perspective on the teaching and learning enterprise, particularly discoveries made about effective teaching and how students learn.

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Review of Literatures on Chemistry Learining

High-school students' attitudes toward and interest in learning chemistry

Developing positive attitudes toward and interest in science in general and learning science in particular is one of the key goals for teaching and learning the sciences. Thus, over the years, this area fuelled many research studies, these being focused on: content, pedagogical, and curricular issues. In this paper we focused on the issue of enhancing attitude and interests in the context of chemistry learning mainly at the upper secondary level of schooling. The authors of this manuscript suggest that the three key factors that should be considered for enhancing attitudes and interests are the methods used to present the content (e.g. relevance, and historical approach), instructional techniques that are implanted, and gender issues. Although throughout the years we have learned a lot regarding teaching and learning of chemistry we are unable to provide conclusive recommendations regarding how in the context of chemistry education affective constrains could be enhanced. However,

areas (see above) that should be considered by science (chemistry) educators, curriculum developers, and chemistry teachers who believe that developing positive attitudes one of central goals (Avi Hofstein *et al*., 2011). Different approaches to enhance students' attitudes toward and interest in studying chemistry Making school chemistry more relevant to the learner Research has shown that often chemistry teaching:

- Is seen as unpopular and irrelevant in the eyes of students (Kracjik *et al*., 2001; Osborne and Collins, 2001; Pak, 1997; Sjoberg, 2001).
- Does not promote higher order cognitive skills (Anderson *et al*., 1992; Zoller, 1993).
- Leads to gaps between students' wishes and teachers' teaching (Hofstein *et al*., 2000; Yager and Weld, 2000; Holbrook and Rannikmae, 2002).
- Does not change, because teachers are afraid of change and need guidance (Aikenhead, 1997; Rannikmae, 2001a).

Gender issues related to attitude towards and interest in chemistry General discussion Surveys conducted in Europe (Osborne and Dillon, 2008) among large groups of young students clearly showed that girls and boys differ in their interest in science-related topics. For example, boys showed interest in topics such as Explosive chemicals, how it feels to be weightless in space, how the atom bomb functions, biological and chemical weapons and what they do to the human body. In contrast, girls showed interest in Why we dream when we are sleeping and what the dreams might mean, cancer – what we know and how we can treat it, how to perform first aid and use basic medical equipment, and how to exercise the body to keep fit and strong. Although problematic, this and similar information should not be overlooked by curriculum developers in their attempt to design science curricula catered to all students' needs and interests.

Cheung (2009) conducted a thorough and comprehensive review of the literature and found that over the years, only nine studies examined secondary school students' attitudes towards chemistry taught in secondary schools. He wrote that although these studies were informative, they produced mixed and inconsistent results. For example, Hofstein *et al*. (1977) conducted one of the studies among 11 and 12th grade students in Israel. Interestingly, they found that there was a significant decline in students' attitudes towards learning chemistry when they progressed from grade 11 to grade 12. On the other hand, in the USA, Menis (1989) found the opposite, namely, that 12th grade students exhibited a more positive attitude than 11th grade students. One should note, however, that Hofstein *et al*. (1977) and Menis (1989) used different attitudinal measures. Cheung (2009) suggested that one possible explanation for the inconclusive results could be that gender (and its interaction with grade) was not assessed or considered in these studies. In addition, there are instructional techniques that are more effective in chemistry, for example, certain laboratory activities and approaches (Erduran *et al*., 2001; Fairbrother *et al*., 2000; Frailich *et al*., 2007; Fraser, 1982; Fraser, 1998; Fraser *et al*., 1993; Fraser *et al*., 1993; Freedman *et al*., 1997; Gardner, 1975; Gilbert, 2006; Glenn, 2000; Hoffmann, 1998; Gräber, ?; Aachen, 2002; Brisbane, 1983). We decided to discuss "attitudes towards chemistry" in the context of the following three topics:

- The content of chemistry taught including organizational approaches.
- Use of various instructional techniques (pedagogy) often used in chemistry.
- Gender issues

Students attitude towards learning chemistry

Chemistry is an important branch of science taught in the Senior Secondary Schools; it enables students to understand what happens in the world they live in and how it contributes to the quality of life on our planet (Ware, 2001). Chemistry curricula commonly incorporate many abstract concepts, which are central to further learning in both chemistry and other sciences (Taber, 2002). Chemistry topics are generally related to or based on the structure of matter, and proved to be a difficult subject for many students) Sirhan, 2007). Attitude, motivation, and genuine interest are the most important student characteristics associated with successful studies (Dalgety *et al*., 2003), (Berg, 2005b). Attitude towards chemistry is essential; it denotes interests or feelings towards studying chemistry. Attitude and academic achievement are important outcomes of science education in secondary schools. Students' attitude and interest could play substantial role in students decision to study science (Abulude, 2009).

Salta and Koulougliotis (2011) identified the factors that could positively influence students' attitude to learn chemistry; these factors could be organized into three main categories: Teaching approaches,• Educational tools,• Non-formal educational material and activities.• Hence, For enhancing attitudes to learning chemistry (Hofstein & Naaman , 2001) suggested three key factors that should be considered : (

- the methods used to present the content (e.g. relevance, and historical approach),
- (ii) instructional techniques that are implanted, and
- (iii) gender issues.

In Palestine there has been, so far, no systematic study which aimed directly at measuring students' attitude towards learning chemistry. The focus of this paper is to study factors such as teacher influence, non-formal educational materials, and gender that might be affecting the attitudes of 10th grade students towards learning chemistry, and before that, is to measure the students appreciation of chemistry. Sirhan's study (2007) revealed that there is a negative attitude regarding the usefulness of the chemistry courses for the students future career, and a neutral attitude regarding the interest in the chemistry course it self. Salta and Koulougliotis (2011) identified the factors that could positively influence students' attitude to learn chemistry; these factors could be organized into three main categories: Teaching approaches,• Educational tools,• Non-formal educational material and activities.• Hence, For enhancing attitudes to learning chemistry (Hofstein & Naaman , 2001) suggested three key factors that should be considered :

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Students' motivation to learn chemistry: the greek case

Students' motivation to learn chemistry (Katerina Salta, 2011) and science in general is a complex construct that it can be conceptualized and assessed in at least five different dimensions. Research shows that motivation interacts closely with cognition and subsequently influences science learning and the level of scientific literacy. In this work, we make an attempt to identify factors that could positively influence students' motivation to learn chemistry by focusing on research findings that are relevant to the Greek student population. Our analysis of the existing literature shows that these factors could be organized into three main categories: teaching approaches, educational tools, and non-formal educational material and activities. In addition, recent studies related to probing Greek students' attitudes toward chemistry, indicate a low level of student motivation to engage in chemistry learning, a fact which could be related to the following issues: difficulty of the chemistry course, demanding curriculum in combination with little allocated teaching time, use of unattractive teaching methods, and lack of career opportunities. More in depth research is needed in order to directly assess students' motivation to learn chemistry and quantify the relative importance as well as interrelation of the influencing factors proposed in this work.

Motivation to learn chemistry benefits all young students by fostering their chemical literacy, which is the capability to recognize chemical concepts as such, define some key-concepts, identify important scientific questions, use their understanding of chemical concepts to explain phenomena, use their knowledge in chemistry to read a short article, or analyze information provided in commercial ads or internet resources (Shwartz, 2006). Chemical literacy is considered as a component of scientific literacy and the importance of all students becoming scientifically literate is advocated internationally (Roberts, 2007; Feinstein, 2011). In general, motivation is the internal state that arouses, directs, and sustains goal-oriented behaviour. In particular, motivation to learn refers to the disposition of students to find academic activities relevant and worthwhile and to try and derive from them the intended benefits (Glynn, 2009). Motivated students achieve academically by strategically engaging in behaviours such as class attendance, class participation, question asking, advice seeking, studying, and participating in study groups (Pajares, 2001). Motivation is a complex, multidimensional construct that interacts with cognition to influence learning (Taasoobshirazi, 2011). In the context of conceptual change theory of learning, Dole and Sinatra (Bandura, 2011) describe how both cognitive and motivational learner characteristics interact within a specific learning environment to support or hinder conceptual change. Social cognitive theory explains human learning and motivation in terms of reciprocal interactions involving personal characteristics (e.g., intrinsic motivation, self-efficacy, and self-determination), environmental contexts (e.g., high school), and behaviour (e.g., enrolling in advanced science courses) (Pintrich, 2003; Sanfeliz, 2006). In studying the motivation to learn science, researchers examine why students strive to learn science, how intensively they strive, and what beliefs, feelings, and emotions characterize them in this process.

Conclusion

It has been established by various studies show that teacher-related factors and school environment such as attitude, time, remuneration, laboratory adequacy and others, exert remarkable influence on students' positive achievement in chemistry. These factors directly and indirectly points to areas which have to be addressed in order to enhance the learning outcomes of students in chemistry. If the government and other stakeholders in education industry could improve on the learning environment of students and motivate teachers who are the curriculum implementers, students performance will definitely improve (39)

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