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# Self-Concept and Academic Performance of Secondary School Students in Chemistry

**By**

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## Abstract

*The study investigated the correlation between self concept and academic performance in chemistry among secondary school students in Ile-Ife. The study adopted descriptive survey research design. 202 SSII students were used for the study. The results revealed that there was a positive correlation between students' self-concept and their academic performance in chemistry and that chemistry students attending private school have higher level self-concept compared to those attending public schools. The paper therefore concluded that having good self-concept is an important psychological factor that is relevant it achieving success in science subject, therefore teachers and school counsellors should encourage students in developing good self-concept towards their chosen subject.*

**Keywords:** Self concept, Performance

## 1. Introduction

Self-concept has been defined by different people in different perspectives. Lewis (1990) defined self-concept as the accumulation of knowledge about self, such as beliefs regarding personality traits, physical characteristics, abilities, values, goals and roles. According to Markus and Nurius (1986) self-concept also called self-identity refers to the global understanding a sentient being has of him or herself. It presupposes but can be distinguished from self-consciousness, which simply is an awareness of one's self. It is more general than self-esteem, which is the purely evaluative element of the self-concept. They explained further that the self-concept is composed of relatively permanent self-assessments, such as personality attributes, knowledge of one's skills and abilities, one's occupation and hobbies, and awareness of one's physical attributes. They say for example, the statement "I am lazy" is a self-assessment that contributes to the self-concept. In contrast, the statement "I am tired" would not normally be considered part of someone's self-concept, since being tired is a temporary state.

Self-concept according to Stedman's medical Dictionary is an individual's sense of self, including self-definition in the various social roles one enacts, including assessment of one's own status with respect to a single trait or to many human dimensions, using societal or personal norms as criteria. Rathus and Nevid (2003) described self-concept as your impression or concept of you. It includes your own listing of personal traits that you deem important, and your evaluation of how you rate according to these traits. It has much to do with whether you like yourself and how much. The Gale Encyclopedia of psychology defines self-concept as the way in which one perceives oneself. According to their definition, self-concept can be divided into categories such as: *Personal self-concept* – This refers to facts or one's own pinions about oneself, such as " I have blue eyes" or " I am attractive"; *Social self-concept* – This refers to one's perceptions about how one is regarded by others, such as "people think I am funny" or "people think I am sweet"; *self- Ideals* – refer to what or how one would like to be, such as "I want to be a doctor." ( wik.ed.uiue.edu/index. Php/self-concepts.)

However, Lewis (1990) suggests that development of a concept of self has two aspects: *The Existential self* – This is the most basic part of the self-scheme or self-concept; the sense of being separate and distinct from others and the awareness of the constancy of the self. The child realizes that they exist as a separate entity from others and that continue to exist overtime and space; *The Categorical self* – Having realized that he/she exists as a separate experiencing being, the child next becomes aware that he/she is also an object in the world. Just as other objects including people have properties that can be experienced (big, small, red smooth etc) so the child is becoming aware of him or herself as an object which can be experienced and which has properties. The self too can put into categories such as age, gender, size or skill.

Rogers (1947) (in psychology wiki) explained that the self is the central ingredient in human personality and personal adjustment. Rogers described the self as a social product, developing out of interpersonal relationships and striving for consistency. Rogers believed that self-concept has three different components: *Self image* – The view you have of yourself; *Self-worth* or self esteem – How much value you place on yourself; *Ideal self* – What you wish you were really like;

Self-Image –This does not necessarily have to reflect reality. Indeed a person with anorexia who is thin may have a self-image in which the person believes they are fat. A person's self image is affected by many factors, such as parental influences, friends, the media etc. Self-worth or self-esteem – refer to the extent to which we like, accept or approve of ourselves or how much we value ourselves. Self-esteem always involves a degree of evaluation and we either have a positive or a negative view of ourselves. High self esteem- here we have a positive view of ourselves. This tends to lead to: confidence in out own abilities, self acceptance, not worrying about what others think and optimum. Low self-esteem – here we have a negative view of ourselves. This tends to lead: lack of confidence, want to be/look like someone else, and always worrying what others might think and pessimism.

In ideals self, If there is a mismatch between how you see yourself (self-image) and what you'd like to be (i.e. your ideal self) then this is likely to affect how much you value yourself. Therefore, there is an intimate relationship between self-image, ego ideal and self-esteem. A person's ideal self may not be consistent with what actually happens in life and experiences of the person. Hence, a difference may exist between a parson's ideal self and actual experience. This is called *incongruence*. Where a person's ideals self and actual experience are consistent or very similar, a state of *congruence* exists. Rogers believed that for a person to achieve self-actualization they must be in a state of congruence. (www.questia.com/cad-Rogers)

Many of the successes and failures that people experience in many areas of life and especially academic achievements are closely related to the ways that they have learned to view themselves and their relationships with others, Research studies have shown that academic achievement and Self- concept were interrelated which has an input on academic effort (Muijs, 1997; House, 1992, Gottlieb and Rogers, 2002; Mboya, 1988; Marsh et al, 1999; Marsh, 2003; Sanchez & Roda, 2005; Popoola, 2002) it has also been found out that academic self-concept and academic achievement are strong predictors of each other (Muijs, 1997, Hope et al. 1995; Gottereb & Rogers, 2002 and Sanchez & Roda, 2005). Individuals with a low self-concept have low commitment to school (Hay et al 1998; Maruscsak, 2008).

Chemistry is the bedrock of science and technology which every nation strive to attain and advance in. Chemistry is one of the basic subjects for the physical science, agriculture, biochemistry, microbiology, pharmacy, medicine, metallurgy and all the fields of engineering. The study of chemistry entails the learning of concepts, established principles, laws and theories and also substantial activity-oriented laboratory works. Despite the important potentials embedded in learning Chemistry and its importance to mankind and the efforts of researchers to improve the quality of its teaching and learning especially at the secondary school level, the performance of students in the subject in recent times is not impressive.

However many studies have been carried out which established a strong relationship between study habits and academic performance of students (Ogunmakin, 2001: Kumar, 2002: Gbore 2006; Derek, 2007). Relatedly, educational psychologists have also been concerned with analyzing different types of relationships, both associative and predictive, that exist between self-concept and academic performance but little have been done on the area of achievement in specific science subjects, especially chemistry in relation to students self-concept. Thus the present study examines the relationship between self -concepts and students' achievement in chemistry. An important reason for this is based on the assertion made by Craven & Marsh (2008), 'that self concept is an important mediating factor that facilitates the attainment of behavioural and educational outcomes that support human potential'. These researchers had earlier established that academic self-concept and academic achievement have being extensively studied over the years (Craven & Marsh, 1997), but research in this part of the world has not being specifically devoted to how students describe themselves and their academic achievement. By logical reasoning, experience of failure or success may significantly affect one's self-concept because of the evaluation of significant others or by the theory of social comparison. Parent and teachers become more informed on how to relate with students on the basis of academic outcomes when they understand this connection.

Chemistry is one subject that interfaces to practically all of the other science subjects. It is therefore a universal, dynamic and practical oriented subject that could arouse interest of students who like working in laboratory environment. Derek (2007) suggests that laboratory activities have potential to enhance cognitive growth, positive attitude as well as social relationship among peers. But is this consistent with one's personal 'belief' to excel in this subject? Self estimation of one's ability in Chemistry may be somehow be influenced by the level of one's self-concept which requires an empirical proof. Do students with high level of self-perception of doing well in chemistry often achieve this expectation or otherwise. The researchers as teacher educators have observed that some secondary school students offering chemistry often fail even when they performed well in related science subjects. It is possible that such failure may not be connected to their mental ability or other academic reasons, probably that of psychological reason such as self-concept. Thus the following research question and hypotheses were raised for the study.

- What is the level of self concept of Chemistry students in Ife?
- Is there any relationship between students' self-concept and academic performance in Chemistry?
- What is the gender difference in students offering Chemistry and their self-concept?
- Is there any difference in the self-concept of chemistry students in both private and public schools?

## 2. Methodology

The design of the study was survey. It involves the process of obtaining information from a representative sample of a particular population. In this study, the researchers did not manipulate or control any variable. Information was only collected from the respondents with regard to the two variables. An academic achievement in chemistry was the dependent variable while self-concept was the independent variable. The study population consisted of all secondary school Chemistry students in class two in Ile-Ife. Ten schools were selected by Stratified random technique on the basis of ownership (5 Private and 5 Public schools). All the Chemistry students in SSII class in the schools selected were used for the study because SSII students were busy with their final examination at the time of data collection and so were not accessible. Also SSI students were not considered for the study because they were just being introduced to the subject and because cumulative achievement record in chemistry was needed for each student in the study. A total of 202 Chemistry students were used as sample for the study (comprising 75 from private and 127 from public schools students). A research instrument adapted from Tennessee Self-concept Scale (TSS) was used for the study. The instrument was titled 'Chemistry Self-concept Scale' (CSS) Individual attributions and attitudes toward chemistry was added to the original scale (TSS), with

statements such as *'I feel confident in writing chemistry examination', 'I think anyone can learn Chemistry'* etc. A test-retest coefficient of 0.76 was obtained after two weeks interval to ascertain its suitability for use in the study. Data collected were analyzed using descriptive, Pearson correlation and t-test statistical analysis.

## 3. Results

The results obtained from the data analyses are presented accordingly,

**Question 1**

What is the level the level of self concept of Chemistry students In Ile-Ife? Table 1 presents the results to this research question.

**Table 1: Students' Level of Self-Concept.**

| Levels | Frequency | Percentage (%) |
|---|---|---|
| Low | 41 | 20.3 |
| Moderate | 81 | 40.1 |
| High | 80 | 39.6 |
| Total | 202 | 100 |

Table 1 shows the levels of self-concept of students offering chemistry.41(20.3%) students had low level self-concept, 81(40.1%) students had moderate level of self-concept and 80(39.6%) had a high level of self concept. Generally the students tend to have moderate level of self-concept.

**Question 2**

Is there any relationship between students' self-concept and academic performance in Chemistry?

**Table 2: Relationship between Self-concept and Academic Achievement**

| | N | Mean | Standard deviation | Pearson correlation | Sig. |
|---|---|---|---|---|---|
| Self-concept | 202 | 51.79 | 4.67 | 0.163 | < 0.05 |
| Academic Performance | 202 | 57.68 | 13.74 | | |

Table 2 shows the relationship between students' self-concept and their academic performance. The self-concept mean value is 51.79 with standard deviation of 4.67 while the mean value for academic achievement in chemistry is 57.68 with a standard deviation of 13.74. The correlation coefficient was 0.163 which was significant at 0.05 level of significant. This is to say that there is a relationship between students' self-concept their academic achievement in Chemistry.

**Question 3**

What is the gender difference among students offering Chemistry and their self-concept.

**Table 3: Gender Difference in Self-concept of Chemistry Students**

| Sex | N | Mean | Standard Deviation | Standard error Mean | t-value | df | Sig. |
|---|---|---|---|---|---|---|---|
| Male | 94 | 74.36 | 6.33 | | -1.066 | 148 | >0.05 |
| Female | 108 | 75.41 | 5.79 | | | | |

Table 3 shows the t-test analysis of difference in self-concept of students according to their sex. The males had a mean value of 74.36 with a standard deviation of 6.33 while the females had a mean value of

75.41 with the standard deviation of 5.79, a t-value of -1.066 indicates that the difference is not significant at 0.05.

**Question 4**
Is there any difference in the self-concept of chemistry students in both private and public schools?

**Table 4 Difference in Self–concept of Students in Private and Public Schools**

| Type of school | N | Mean | Standard deviation | Std error Mean | t-value | sig. |
|---|---|---|---|---|---|---|
| Private school | 75 | 61.51 | 11.84 | 1.37 | 3.027 | < 0.05 |
| Public school | 127 | 55.92 | 13.96 | 1.24 | | |

Table 4 shows the difference in the self-concept of chemistry students attending private and public schools. The comparison indicates that students in private schools had mean value of 61.51 and a standard deviation of 11.84 while students attending public schools had a mean value of 55.92 with standard deviation of 13.96. The t-test value is 3.027 which is significant at the level of 0.05.

## 4. Discussion and Conclusion

The results on the levels of chemistry students' self-concept revealed that many of the students offering chemistry had moderate and high self-concept of themselves. It was also seen from the results that there was a correlation between self concept and academic achievement in chemistry. This is to say that students offering this subject belief in themselves that they could do well in it. Thus inability to perform well in the subject may not be associated with their perception of any difficulty in the subject but could be related to pedagogical factors. It is important for science teachers to always verify the entry behaviour of their students and compliment the students' self confidence with appropriate teaching and learning strategies that would produce expected performance. Also if students have good self-concept of their ability to perform in chemistry it is an indication that such students would be motivated to strive for success in the face of any difficulty. A student with low self-concept would like give up easily in time of stressful scientific task. This corroborates the assertion made by Marsh (1993) and Hamachek (1995).
Another finding of this study indicated that there is positive correlation between students' self-concept and their performance in chemistry even though there was no significant difference across gender. This information is relevant for counsellor and teachers in encouraging and promoting the development of good self-concept in student so as to situate their career ambition in science bias subject. It is evident from this study that female students are not inferior to their colleague in chemistry, the difference in performance only resides in one's self perception of ability to succeed in the task.

Other finding of this study that should be mentioned is the difference in students' self-concept in relation to type of school. The type of school one attends has effect on one's self-concept as revealed by the study. School environment and facilities may enhance one's confidence in ability to do well in any academic task especially science subjects that depend so much on laboratory works. Where these facilities are available, student might be optimistic and feel secured in anticipation that success is possible. Public schools are usually patronized by children of low income people unlike private schools which in most cases enjoy the patronage of children mostly from enlightened or at least average income earners who can afford the required learning materials for their wards. Awareness of this by the students could enhance good self-image for achieving success in anticipated academic tasks. Parents who send their wards to private schools ostensibly believe that children do well in private schools than in public schools. This notion also might have boosted the ego of their children attending such schools.

Conclusively, it can be inferred from the outcome of this study that self-concept of student has positive influence on student's academic performance in chemistry, therefore enhancing student's self-concept

would likely lead to good performance in chemistry regardless of gender difference. It is however necessary for science teachers and school counsellors to assist students in developing positive self-concept towards their subjects especially chemistry as a subject.

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