SELF-CONCEPT AND ACADEMIC ACHIEVEMENT: A CONSTRUCT VALIDATION STUDY OF THE MARSH/SHAVELSON'S MODEL AMONG SENIOR SECONDARY SCHOOL STUDENTS

BY

Muhammad Ibrahim Yakasai
PhD/EDUC/93-94/03888

Being a research dissertation submitted to the Department of Education, Ahmadu Bello University, Zaria in partial fulfillment for the requirements for the award of Doctor of Philosophy (Education Psychology)

September 2000

APPROVAL PAGE

The undersigned certify that they have read and accepted this research study in partial fulfillment for the requirement for the degree of Ph.D (Educational Psychology)

....11/10/2000.....
Dr. M. Balarabe — Date
Chairman Supervisory Committee.

....15/11/2000.....
Dr. Mrs. A.O. Okatahi — Date
Member, Supervisory Committee.

....16/11/2000.....
Dr. B. Yunusa — Date
Head of Department.

....06/08/01.....
Prof. S. B. Ojo — Date
Dean, Postgraduate School.

DECLARATION

This is to declare that this thesis is the original handwork of myself.

Further more, I declare that the work has not been written for any award of degree and/or published by any other person other than myself.



M.I. Yakasai 26/9/2000

DEDICATION

This research work is dedicated to:

Fatima,

Aisha,

Maryam,

Abubakar and

Hafsat.

ACKNOWLEDGEMENTS

Praise is to Allah, the Lord of the worlds. And Blessing is upon His Messenger, Muhammad (PBUH).

A number of people deserved my acknowledgement for their contributions immensely in one way or another to the initiation, development and completion of this study. Dr. Musa Balarabe of the Department of Education Ahmadu Bello University Zaria, my first Supervisor guided this study through many helpful suggestions and useful advises. His scholarly contributions helped greatly to the successful completion of this work. To him I am grateful. I also acknowledged the contributions of my second supervisor, Dr. G.A. Adeyanju, Dr. (Mrs.) A. O. Okatahi, Dr. Mamman Musa, Dr. (Mrs.) Adeniyi and Dr. A. B. Ayanniyi in the successful completion of this research

I acknowledged and express my gratitude to Mustapha Gwadabe of the Department of History ABU Zaria, who "land-lorded" the researcher in many occasions of his stay in Zaria. My sincere gratitude goes to AbdulRashid Garba, Sagir Adamu Abbas and Dr. A. U. Adamu, who allowed me to use his personal computer for the data analysis of this study.

My profound gratitude goes to Prof. G. D. Azare, Prof. D. A. Maiwada, Dr. M. Abdullahi, Prof. A.O. Fagbemi, Dr. I. A. Kolo, Dr. Y. Bello, Dr, A. Rashid both of Department of Education, BUK. My gratitude and best wishes also go to all my lecturers and colleagues not mention herein in the Department of Education, BUK.

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The researcher wishes to express his gratitude to all the colleagues in ABU Zaria. Specifically, mention must be made of Ibrahim Abubakar Mayanchi, Garba Shehu, Hassan Umar, Umar Gaya, Idris Ya'u, Aliyu Souley, Musa Kano, Sadiq Nayaya, Bala Madaki and Ibrahim Moriki. I am also expressing my gratitude to M. G. Yakasai (A.A.), and Alhaji Mahmoud Sanusi Dantata. Farrow Maxwell Fwa surely deserved my gratitude for typesetting the entire project. Finally, I am extending my gratitude and appreciation to Bayero University, Kano for giving me the fellowship chance to undergo the program. My sincere gratitude also goes to Islamic Education Trust (IET) for assistance it rendered me during the program.

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ABSTRACT

This research was intended to present a construct validation study of the academic self-concept structure posited in Marsh/Shavelson (1985) Model. Specifically, the study was designed to integrate Senior Secondary students' self-perceptions of specific academic subjects into the Marsh/Shavelson (1985) model; and to explore the relationship between students' academic self-concept and academic achievement. The sample of the study comprised of 384 (220 males and 164 females) students from 9 Senior Secondary Schools (level II) selected from 3 states: Jigawa, Kano and Katsina. Academic self-concept was measured using two different instruments: Academic Self-Description Questionnaire (ASDQ) and Success Expectation on Defined Problems (SHDP) all adopted from Marsh (1990a) and Skaalvik (1990), respectively. Correlational analysis was employed to test the hypotheses of the study. The major findings of the study are summarised as follows:

a) Students' self-perceptions were clearly integrated into the self-concept hierarchy as components of second order factors - Science - Academic, Arts - Academic, and Technical Academic;
b) Additional second order factor - Technical - Academic self-concept was revealed and accounted for the relationships among technical academic subjects;
c) A third order general academic self-concept was clearly defined and correlated significantly with second order factors - Science - Academic, Arts - Academic, and Technical Academic;

d) There is significant relationship between the academic self-description of the students and their success expectation on defined academic problems (tasks);

e) Significant relationship exist, between students academic self-concept and academic achievement — however, the relationship tend to be specific rather than general;

f) The academic self-concept structure and academic self-concept — Academic Achievement relationship are different for boys and girls; and

g) There is a significant difference between academic self-concept of students identified as having special education needs and those not so identified.

In view of these findings, recommendation for practice and further studies were suggested.

DEFINITION OF TERMS

- *Academic achievement*—Students' performance (scores) on the Success Expectations on Defined Problems (SEDPS) — from the cognitive dimension measures of students' academic self-concept.

- *Academic self-concept*—Students' self-conceptions (evaluative and/or cognitive) in particular academic subjects being studied.

- *Arts-academic self-concept*—Self-concept in foreign and local languages, History, Literature, etc. In other words, self-concept in verbal related academic subjects.

- *Cognitive dimension of self-concept*—Students' success expectations on defined tasks or their anticipations of being able or not able to master certain concrete and defined tasks.

- *Evaluative dimension of self-concept*—Students' perceived performance or ability in various academic subjects, i.e. their evaluation of "how well do I do" in various academic subjects.

- *First order factors*—Self-concept in specific academic content areas, e.g. Math, English, History, etc.

- *Non-academic self-concepts*—Self-perceptions in physical ability/appearance; peer/significant others relation; and stable/unstable emotions.

- *Science-academic self-concept*—Self-concepts in Math and the physical Sciences—Agricultural Science, Biology, Chemistry, Geography, and Physics. In other words, self-concept in Science related academic subjects.

- *Second-order factors*—Self-perceptions in academic domains that represent sub-divisions of the third order (General Academic factor) and which accounts for the relationships among the first order factors, e.g. Science-academic and Art/Academic.

- *Self-concept*—An individual's perception and interpretations of the self on various facets: academic, social, emotional, and physical.

- *Technical/Academic self-concept*—Self-concepts in technical academic subjects. In other words, self-concept in technical related academic subjects.

- *Third-order factor*—This is defined as a single order or General dimension of self-concept, i.e. General academic self-concept.

ABBREVIATIONS

AACH:	Academic Achievement.
AASC:	Arts-academic self-concept.
ACSC:	Academic self-concept.
ACSS:	Academic self-esteem Scale.
ASAGR	Academic self-concept Agriculture.
ASAUT	Academic self-concept Auto-Mechanics.
ASBIO	Academic self-concept Biology.
ASCHE	Academic self-concept Chemistry.
ASCOM	Academic self-concept Commerce.
ASDQ:	Academic Self-Description Questionnaire.
ASECO	Academic self-concept Economics.
ASELA	Academic self-concept English Language.
ASELE	Academic self-concept Electronics.
ASELT	Academic self-concept English Literature.
ASGEN	Academic self-concept General.
ASGEO	Academic self-concept Geography.
ASGOV	Academic self-concept Government.
ASHAU	Academic self-concept Hausa Language.
ASHIS	Academic self-concept History.
ASMATH	Academic self-concept Mathematics.
ASMET	Academic self-concept Metal Work.
ASPHY	Academic self-concept Physics.
ASTEC	Academic self-concept Technical Drawing.
ASWW	Academic self-concept Wood Work.
GAACH:	General Academic Achievement.
GASC:	General Academic self-concept.
GSS:	General School Scale.
SASC:	Science-academic self-concept.
SEAGR	Academic self-Expectation Agriculture.
SEAUT	Academic self-Expectation Auto-Mechanics.
SEBIO	Academic self-Expectation Biology.
SECHE	Academic self-Expectation Chemistry.
SECOM	Academic self-Expectation Commerce.
SEDPS:	Success Expectations on Defined Problems.
SEECO	Academic self-Expectation Economics.
SEELA	Academic self-Expectation English Language.
SEELE	Academic self-Expectation Electronics.
SEELT	Academic self-Expectation English Literature.
SEGEN	Academic self-Expectation General.
SEGEO	Academic self-Expectation Geography.
SEGOV	Academic self-Expectation Government.
SEHAU	Academic self-Expectation Hausa Language.
SEHIS	Academic self-Expectation History.
SEMATH	Academic self-Expectation Mathematics.
SEMET	Academic self-Expectation Metal Work.

SEPHY	Academic self-Expectation Physics.
SES	Students' Educational Status.
SETEC	Academic self-Expectation Technical Drawing.
SEWW	Academic self-Expectation Wood Work.
SWOSEN	Students without Special educational Needs.
SWISEN:	Students with Special Educational Needs.
TECSC:	Technical-Academic self-concept.

CHAPTER ONE

1.1. Introduction

Self-concept has been, for several decades, considered as an educationally significant variable. Positive self-concept, for instance, is valued as a goal of education and socialization and is frequently regarded as a potential facilitator of motivation and desired outcome such as academic achievement. Hence, self-concept has been the focus of countless empirical studies both in western and non-western educational/social settings.

Self-concept research in Nigeria (like in other western world) is clearly evidenced by plethora of studies concerned with a variety of educational issues and for a diversity of students. However, despite its importance, self-concept research in Nigeria like in the west has been plagued with conceptual and methodological problems (Adediran, 1985; Ezeilo, 1988; Biao, 1990; Bello, 1991). During the 1980s and early 1990s in the western world significant improvements were made with regards to the conceptual and methodological problems of self-concept. However, in Nigeria, little attempts were made towards such improvements. Olowu (1985) examined the practical significance of self-concept to education in a cross-cultural prospective and acknowledged the conceptual and methodological problems compounding it. Olowu (1985:136), thus, asserted: "in spite of the many conceptual and methodological problems involved with self-concept, it remains of considerable importance to all fields of life".

Therefore, the broad objective of this study is to present a construct validation study of self-concept in Nigerian educational setting. In other words, integrating secondary school students' self-perceptions of Science, Arts and

technically based subjects in the multi-faceted and hierarchical academic self-concept theory (i.e. the Marsh/Shavelson's 1985 Academic self-concept Model) is the focal area of this study.

Hence, this chapter dealt with the conceptual framework, statement of the problem, and the objectives of the study. In addition, research questions, assumptions and hypotheses of the study were considered.

1.2. Conceptual Framework

Self-concept research both in western and non-western settings (Schierer & Kraut, 1979; Winne et al, 1977; Whylie, 1974; Purkey, 1970; Bello, 1991; Biao, 1990; Ezeilo, 1988; Adediran, 1985) prior to 1980s focused on general or global self-concept and its relationship with other variables such as academic achievement/performance. This earlier conception of self-concept treated the construct as a unidimensional concept. That is, having only one facet or dimension. Despite their significance, earlier studies on self-concept were characterised by a lack of elaborate theoretical models and inadequate measurement instruments. Byrne & Worth Gavin (1996:215) observed that:

> Most of these early studies considered the structure of self-concept to be unidimensional and used assessment instruments designed to measure general (i.e. global) self-concept. Given that the bulk of this research (prior to 1976) addressed substantive issues related to students' perception of self within an academic context, it is not surprising that early findings were inconsistent, confounded, and ambiguous.

Modern research on self-concept, on the other hand, emphasises the multidimensionality of self-concept (Shavelson et al, 1976; Shavelson & Bolus, 1982; Byrne, 1984; Marsh & Shavelson, 1985). This was an attempt to make considerable improvement on the shortcomings of the early self-concept studies.

Shavelson et al (1976) defined self-concept as a person's perceptions of himself/herself, formed largely through his/her experiences with and interpretations of the environment. The perceptions and interpretations of the environment are influenced especially by reinforcements, evaluations by significant others and one's attributions for one's own behaviour. According to Shavelson & Bolus (1982:3), the construct, self-concept, can further be defined by seven critical features explained below:

> ...(1) It is organised or structured in that people categorise the vast amount of information they have about themselves and relate the categories to one another, (2) It is multifaceted, and the particular facets reflect the category system adopted by a particular individual and/or shared by a group, (3) It is hierarchical with perceptions of behaviour at the base moving to inferences about self in sub-areas (e.g. academic—English, History), then to inferences about self in academic and non-academic areas, and to inferences about self in general, (4) General self-concept is stable, but as one descends the hierarchy, self-concept becomes increasingly situation specific and as a consequence less stable, (5) Self-concept becomes increasingly multi-faceted as the individual develops from infancy to adulthood, (6) It has both a descriptive and an evaluative dimension such that individuals may describe themselves (e.g. I am happy) and evaluate themselves (e.g. I will do well in school), and (7) It can be differentiated from other constructs such as academic achievement.

Shavelson's (1976) model was judged as more complicated as originally anticipated; hence, it was validated further (Marsh & Shavelson, 1985; Shavelson & Marsh, 1986). In the validation studies, two important revelations were made. First, the assumption that self-concept is multi-faceted and hierarchically ordered was fully confirmed. Second, two higher order factors—Math-academic and Verbal-academic, instead of one single or General Academic self-concept, were discovered to explain perceptions of subject specific self-concepts (i.e. first order academic factors — e.g. Math, English, History, etc.).

Therefore, the academic portion of the original Shavelson's (1976) model of self-concept is one of the dimensions within the multidimensionality paradigm that has attracted the attention of modern self-concept researchers. In recent studies (Marsh, Byrne & Shavelson, 1988; Marsh, 1990a, 1990b, 1993; Marsh & Redmyne, 1994) more comprehensive reviews of the Marsh/Shavelson (1985) model revealed interesting findings and called for the extension and further validation studies of the new model. That is, these studies posited that the academic self-concept model was remarkably subject specific and that two higher order factors—Math-academic and Verbal-academic were only sufficient to explain relations among core academic subjects typical to particular educational settings. These studies further posited that additional higher order factors were needed to explain school subjects, e.g. Physical Education, Art, Music, etc. In addition, Marsh (1990a) cautioned that researchers and education practitioners interested in self-concept in particular sub-areas should use self-concept scales specific to those subject areas in addition to other measures of academic self-concept. Furthermore, Marsh (1990a) warned researchers and education practitioners not to infer subject area self-concept (e.g. Physical Education, Art, Music, etc.) from the two higher order self-concept factors—Math-academic and Verbal-academic.

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The studies of Vispoel (1995), Chapman & Tunmer (1995), Byrne & Worth Gavin (1996) tested the Marsh/Shavelson model in different educational settings. Self-perceptions of artistic domains (dance, dramatic art, visual art, and music) and reading self-concept, respectively, were best integrated as component of second order factors distinct from the Math-academic and Verbal-academic.

likely to persist when they encounter difficulties and more likely to use the abilities and strategies they possess (Harter, 1990; Pintrich & Schranben, 1992).

Researchers in Nigeria (Ezeilo, 1988; Adediran, 1985; Akinboye, 1976, 1982) for quite a long time have been concerned about the need to improve students' academic achievement via self-concept change. This self-concept research works in Nigeria covers a variety of educational subjects with diversity of students. However, despite its importance, self-concept research in Nigeria (like in the western world before the 1980s) has been plagued with conceptual and methodological problems. During the 1980s and early 1990s in the west, significant improvements were made in self-concept research, but little efforts were made in Nigeria. That is, a comprehensive review of literature in self-concept studies in Nigeria will indicate lack of improvement in self-concept theory, methodological issues, and most important, intervention programs based on presumed self-concept change. In other words, the following limitations characterised self-concept studies in Nigeria:

i. Absence of compelling theoretical model(s)

Most self-concept studies (Akinboye, 1976; Adediran, 1985; Biao, 1990; Bello, 1991) can be characterised as lacking compelling theoretical model. That is, the studies either failed to fully define self-concept or anchored the construct to traditional conception of self-concept. This is a typical shortcoming of self-concept studies world over prior to 1980s, as noted by reviewers of self-concept research (Shavelson et al, 1976; Byrne, 1984). Byrne (1984:428) made a claim on this when she clarified:

> An important pre-requisite for the use of self-concept in educational research is a through understanding of the construct itself. Conceptualisation of self-concept within a theoretical framework is the central issue.

Self-concept, for instance, has been conceptualised as multi-faceted, hierarchical and differentiable — meaning that self-concept is in facets, which form a hierarchy of an individual's experiences in particular, situations (at the base of the hierarchy) to general self-concept at the apex. Based on this conception, a growing body of literature (Byrne, 1984; Hansford & Hattie, 1982; Marsh, 1988; Shavelson & Bolus, 1982) revealed that academic self-concept is more highly correlated with academic achievement and other academic behaviours than is general self-concept.

Shavelson et al (1976) observed that the imprecision of self-concept definition may lead to difficulty in interpreting measures of self-concept and render result invalid. Shavelson et al (1976:415), thus, claimed:

> ...the more closely self-concept is linked with specific situations, the closer is the relationship between self-concept and behaviour in the situation. If one were to focus on the academic side of the hierarchy..., one could hypothesise that: (1) self-concept of mental ability should be more closely related to academic achievement than to ability in social and physical situations, and (2) self-concept of academic ability in science should be more closely related to achievement in science than to achievement in say, English or overall grade-point average.

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ii. ***Inadequate measuring instruments***

Lack of clear and precise conceptual framework in most Nigerian self-concept studies led to the problem of measurement. The problem of measurement implies here, the difficulty in interpreting measures of self-concept. In other words, self-concept interpretations of measurements in most Nigerian self-concept studies might not be valid. Most of the studies employed either the

counseling fashion of the Tennessee self-concept scale (or its contemporary) — a scale, which reflected the general (i.e. global) conception of self-concept and which, had been criticised in many ways. That is, the traditional self-concept studies lack the focus that would result from an agreed upon definition of self-concept; lack adequate validation of interpretation of self-concept measures; and lack empirical data on the equivalence of the many self-concept measures currently in use (Shavelson et al, 1976).

iii. ***Inadequate research designs***

The two problems observed above made the designs of most Nigerian self-concept studies unclear and ambiguous. Self-concept research within an educational framework entails studying the "nomological network" of the construct (Shavelson et al, 1976; Byrne, 1984). Nomological research of self-concept involves internal and external examinations of the construct. Internal examination of the construct involves analysis of the relationships among the differentiable facets of self-concept (e.g. general self-concept and academic self-concept) or inter-relationships between facets (e.g. academic self-concept and non-academic self-concept). External examination of the self-concept construct on the other hand, focuses on the relationship between the facet under study and other constructs presumed to be "mutually exclusive", e.g. academic achievement. Therefore, a study on self-concept within an educational framework is pre-supposed to focus its design on this nomological network.

iv. ***Absence of within network aspect of self-concept construct validation studies***

As posited by Byrne (1984), construct validation studies seek empirical evidence to prove or disprove hypothesised relationships associated with the nomological network of a construct. Using Cronbach's (1971) terminologies, construct validation studies fall into two categories: "Within-network studies" and "between-network studies". The former involves an examination of the internal structure of the construct, whereas the latter involves the examination of the relationships between the construct and other variables (i.e. external) that are presumed to be "mutually exclusive". In this respect, Shavelson et al (1976) posited that within network self-concept research should precede between-network research.

With regards to the review of self-concept research in Nigeria, it can be noted that the number of between-network studies has far exceeded the number of within-network studies. Therefore, further research is needed to sharpen the aspects of the within portion of the nomological network self-concept.

Taken together, these limitations of self-concept research in Nigeria addresses the critical issue of the self-concept constructs validation research in Nigerian educational settings. Hence, this study's main objective can be inferred from this brief rationale for the study. In other words, a study that integrates students' academic self-concept in to the Marsh/Shavelson's (1985) model of academic self-concept in Nigeria educational settings is pertinent. Equally important is an examination of how student's academic self-concepts relates with their academic

achievement with the hope for assisting them (i.e. students) to adjust effectively to their personal and interpersonal functioning in the emergent society.

1.4. Assumptions of the Study

On the bases of the conceptual framework and the objectives of this study, the following assumptions are put forward:

a) Students' self-perceptions of academic subjects would be best integrated into the academic self-concept hierarchy as components of second order factors—Science-academic and Arts-academic.

b) Separate second order factor—Technical-Academic self-concept in addition to Science-academic and Arts-academic factors might be revealed to account for relations among specific facets of academic self-concept.

c) First order factors representing specific facets of Science-academic, Arts-academic, and Technical-Academic self-concept might be clearly defined and moderately correlated.

d) A third order General-Academic self-concept would be clearly defined and it would be significantly correlated with second-order Academic self-concept factors—Science-academic, Arts-academic, and Technical-Academic.

e) The evaluative and cognitive dimension measures of academic self-concept are two, but separate measures of the academic self-concept. Hence, the two dimension measures would be significantly correlated.

f) That the self-concept structure is invariant across gender in all relationships examined in the study.

1.5. Research Questions

On the basis of the purpose and assumptions of this study, the following research questions were posed:

a) Are Science-academic self-concept facets significantly related with each other and with General academic self-concept?
b) Are Arts-academic self-concept facets significantly related with each other and with General academic self-concept?
c) Can separate second order factor (i.e. Technical/Academic self-concept factors) be revealed? And can this factor (if revealed) relate significantly with the General academic self-concept?

d) Can there be inter-relationships between Science-academic; Arts-academic; and Technical-academic self-concept facets?
e) Is there any significant relationship between the evaluative and cognitive dimensional measures of Academic self-concept?
f) Is there any significant relationship between Academic self-concept and Academic achievement?
g) Is there any significant difference in Academic self-concept between students identified as having special educational needs and those who are not so identified?
h) Is academic self-concept—academic achievement relationship explored invariant across dimension of gender?

1.6. Hypotheses

On the basis of the assumptions and the research questions, this study was intended to test the following hypotheses.

a) There are no significant interrelationships between science-academic self-concept facets and general academic self-concept using the cognitive and evaluative dimension measures of self-concept.

b) There are no significant interrelationships between arts-academic self-concept facets, and general academic self-concept using the cognitive and evaluative dimension measures of self-concept;

c) There are no significant interrelationships between technical-academic self-concepts facets and general academic self-concept using the cognitive and evaluative dimension measures of self-concept; and

d) There are no significant relationships between science-academic, arts-academic, and technical-academic self-concepts facets using the cognitive and evaluative dimension measures of self-concept.

e) There is no significant relationship between the students' academic self-Description measures and their Success Expectations measures on defined Problems.

f) There is no significant relationship between students' academic self-concept measures and academic achievement measures.

The following sub-hypotheses were generated from hypothesis **f** above:

1) There are no significant interrelationships between science-academic self-concept measures and academic achievement measures in science subjects.
2) There are no significant interrelationships between arts-academic self-concept measures and academic achievement measures in arts subjects.
3) There are no significant interrelationships between technical-academic self-concept measures and academic achievement measures in technical subjects.

g) There are no significant interrelationships between sex, academic self-concept measures and academic achievement measures.

h) There is no significant difference in the means of academic self-concept measures of those students identified as having special educational needs and those not so identified.

1.7. Objectives of the Study

The broad objective of this study was to present a construct validation study of self-concept model within Nigerian educational framework. The aim here was to provide a theoretical background for educational intervention programs on self-concept change as it relates to students' academic achievement. This became pertinent at the current trend of students' poor academic achievement more especially in the senior secondary school level. Specifically, the objectives of this study included:

a) to integrate students' self-perceptions of academic subjects into the Marsh/Shavelson's (1985) model;
b) to find out the relationship between students' academic self-perceptions and academic achievement;
c) to test the prediction that the relationships explored in the study would be invariant across dimension of gender; and
d) to explore if there is significant difference in academic self-concept of those students identified as having special educational needs and those not so identified.

1.8. Significance of the Study

It is through a construct validation of the western models of self-concept structure that the practical significance of self-concept to education in Nigerian settings can be realised. Therefore, this study is expected to reveal findings that are presumed would have far reaching implications for educational practices and empirical studies.

The following considerations justify the benefits of this study. First, given that most studies on self-concept structure have been based on western data (e.g. Marsh, 1990a; Vispoel, 1995; Byrne & Worth-Gavin, 1996), this study would make an important contribution to the generalizability of the hypothesised self-concept structure in a non-western culture. Second, this study is expected to provide a useful framework for conceptualising the structure of secondary school students' Academic self-concept. Previous researches in self-concept in Nigeria are generally limited in providing mainframe for inferring the students' self-concept in their specific academic areas or domains. That is, most of the studies as stated in the conceptual framework for this study, focused on students' general self-concept rather than on specific areas (e.g. academic self-concept). As such, this study is expected to fill this missing gap. Unless a mainframe for inferring students' self-concept in their specific academic areas is provided, viable educational programmes related for association between academic self-concept change and academic achievement of Nigerian students could not be feasible.

Thirdly, this study is expected to explore the relationship between academic self-concept and academic achievement. This is pertinent for (to educational practitioners) evolving programs that would be useful in assisting

students to achieve more. A clear direction on the relationships between academic self-concept and academic achievement of students within Nigerian educational setting is pertinent for this gesture. One assumption of self-concept as an important intervening variable for academic achievement behaviour is that when no self-concept occurs, no increase in achievement would be expected.

Fourthly, knowing students' self-perceptions in various academic domains will, to a great extent, help educationists place students in appropriate career or course offerings. This is even more pertinent to senior secondary school students who need to be placed in appropriate course of study (Science, Arts or Technical). Finally, this study is expected to spur other research works related to academic self-concept and academic achievement as well as intervention programs based on presumed self-concept change.

1.9. Scope and Delimitation of the Study

This study involved students in secondary schools level in Nigeria. Within the secondary school level, the study focused on the senior secondary school section. Furthermore, only academic subjects actually offered by the students in Science, Arts and Technical domains were explored.

The study was limited to some selected secondary schools in Jigawa, Kano, and Katsina States in the Northwestern region of the Federation. Finally, the study was concerned with the students' self-conceptions of academic subjects. Other facets of the General self-concept paradigm (e.g. non-academic self-concept — social, emotional, and physical self-concepts) did not fall within the framework of this study.

CHAPTER TWO

REVIEW OF LITERATURE

2. 1. Introduction

Scholars (James, 1890, 1963; Mead, 1934; Cooley, 1902) for quite a long time have shown that one of the bases of human behaviour lies in his interpretation of himself, i.e. his self-concept. These scholars "ascribed to the self-concept a key role as a factor in the integration of personality, in motivating behaviour, and in achieving health" (Burns, 1979). From the propositions of these early writers, a belief in the power of self-concept is incorporated into "diverse strands of psychological, sociological, and educational theory, all of which have emphasised the influence of subjective inner experiences as sources of individual behaviour (Scheiver & Kraut, 1979).

In an effort to explore the importance of self-concept as an educationally significant variable, psychologists and educationists (Purkey, 1970; Bailey, 1971; West & Fish, 1973; Zirkel, 1971) have provided an extensive literature concerned with aspects of self-concept in a variety of educational settings and for a diversity of students. Similarly, a very large number of literatures have been provided on substantive topics in self-concept theory; methodical issues in self-concept research; intervention programs with presumed self-concept change; and the relationship between self-concept and performance/achievement measures.

Reviewers of self-concept research (Shavelson et al, 1976; Byrne, 1984) claimed that most of the early self-concept studies considered the structure of the construct to be unidimensional and used measurement instruments designed to measure global self-concept. As such, these reviewers observed that given that

bulk of these research in self-concept (i.e. prior to 1976) addressed substantive issues related to students' perception of self within an academic context, it is not surprising that the early findings were inconsistent, confounded and ambiguous. Therefore, the reviewers called for a halt to further research in this direction until issues of construct definition and theoretical structure of self-concept had been addressed.

In an effort to stimulate the construct validation research in self-concept, therefore, Shavelson et al (1976) proposed a model of self-concept capable of being tested empirically in different educational settings. To date, more studies (Shavelson & Bolus, 1982; Marsh/Shavelson, 1985; Byrne, 1986, Byrne & Shavelson, 1986; Marsh, 1990a; Vispoel, 1995; Byrne & Worth Gavin, 1996) have been conducted and improvements have been made on Shavelson (1976) model. However, most of these works have been western in nature. Thus, construct validation of self-concept structure in Nigeria settings is yet to be fully undertaken. This study is, therefore, aimed at filling this lacuna.

Hence, this chapter presents a review of related literature on self-concept research both in western and non-western settings. In the chapter, theories of self-concept (i.e. both traditional and modern), within the psychological theory have been reviewed. In addition, empirical studies on self-concept that have been based on the theories reviewed have been examined.

2.2. Definition and Conceptualisation of Self-concept

A review on self-concept literature (Shavelson et al, 1976; Byrne, 1984) has indicated that there is no clear concise and universally accepted operational definition of the construct. A very large number of self-theories reviewed by

Byrne (1984) claimed that self-concept in general terms is an individual perception of himself. And in specific terms, self-concept is an individual's activities, feelings and knowledge about his abilities, skills, appearance, and social acceptability. The perceptions that an individual holds about himself are derived from his social environment (i.e. social reinforcement and significant others). An individual's perceptions of him influence the ways in which he behaves and his behaviour in-turn influences the ways in which he perceives himself.

Shavelson et al (1976), in their review of self-concept research, distinguished seven attributes of the construct. That is, self-concept can be described as organised; multi-dimensional/multi-faceted; hierarchical; stable; developmental; evaluative; and differentiable. Each of these self-concept attributes will be explained later in this review.

In another review of self-concept research, Winne & Marx (1981) revealed three aspects of self-concept upon which self-concept theorists agreed. They are:

a) that interaction with "significant others" strongly influences the development of one's self-concept;
b) that self-concept comprises at least three and sometimes four differentiable facets corresponding to how an individual views himself in specific situations (these include: academic, social, physical, and emotional dimensions); and
c) that the relationship between self-concept and other external variables is 'non-recursive'.

However, Winnie & Marx (1981) observed that there was a major disagreement between self-theorists on the structure (i.e. within network relations) of the construct as it applies to stable general facet of self-concept and the more specific facets of the construct. Self-concept, therefore, can be conceptualised as a person's interpretations of himself, which can be inferred from his responses to situations as he interacts with his social environment.

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2.3. Theories of Self-concept

Before reviewing the different conceptions of self-concept as propounded in different theories of self-concept, it is pertinent to highlight some perspectives upon which self-concept theories can be categorised. Four perspectives (i.e. models) of self-concept were described by Byrne (1984) and are briefly reviewed below:

i. ***The nomothetic position***

This perspective is the oldest of the four and claimed that self-concept is perceived as unidimensional construct (as unitary phenomenon). This view holds that characteristics descriptive of self-concept are used to explain an individual's behaviour in various settings. Theories and studies that established self-concept as unitary phenomenon are still available in the literature of self-concept.

ii. ***The hierarchical position***

This perspective posits that self-concept is a multidimensional phenomenon (multifaceted). And that the multiple facets of self-concept may be ranked in hierarchical formation. That is, at the base of the hierarchy are the situation specific self-concepts; and at the apex, general self-concept. This view claimed that the general self-concept facet is almost stable and situation specific facet, less table. This view further claimed that the different facets that made up one's self-concept are proportionally related. The works of modern self-concept theorists fall within this perspective.

iii. ***The taxonomic position***

This perspective supports some notions of multidimensionality view of self-concept. That is, self-concept is structured with several specific factors. This

view has claimed of a basic general factor and semiautonomous specific factors as constituents of self-concept. The view holds that the factors (i.e. facets) that made up self-concept are independently related. Several empirical studies have evolved from this view.

iv. ***The compensatory position***

This view supports the notion of multidimensionality of self-concept, but differed in that the specific facets of self-concept are inversely related rather than proportionally or independently so, as proposed by the hierarchical and the taxonomic models, respectively. That is, the lower status of one's own specific facet of self-concept might be compensated by higher status on another specific facet of self-concept. The view holds that, for example, a student who is relatively less successful academically may perceive himself relatively more successful on the physical and/or social facets. Conversely, a student who viewed himself as relatively successful in physical and/or socially may be less successful academically. This view further holds that lack of self-perceived success and satisfaction on one facet tends to be associated with perceptions of success and satisfaction in another area.

From the main tenets of these four perspectives on self-concept, two approaches to self-theories can be discerned: the unitary approach and the hierarchical approach. The first approach, which is the oldest, conceptualised self-concept as unidimensional construct and the second conceptualised self-concept as multidimensional construct. For the purpose of the review of self-concept theories, the former is termed the traditional approach to self-concept whereas the latter as modern approach.

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2.3.1. The Traditional Theories of self-concept

Four major theoretical approaches within psychological theory, which permeate research on self-concept, would be explained. These included:

i. the pioneer work of William James;
ii. the symbolic interactionism;
iii. the psychoanalysis; and
iv. the phenomenological approach.

i. *William James' theory of self-concept*

William James (1890, 1963) is said to be the first psychologist to elaborate on the self-concept. Another added credit is that James gave self-concept a deeper coverage than any of his predecessors, and his theory marks "the change between the older and newer ways of thinking about it" (Burns, 1979, 1982). James considered the self as global and composed up of 'ME' & 'I'.

'ME' & 'I' are two discriminated aspects of the same entity; discrimination between what James called 'pure-experience' (I) and the contents of that experience (ME). James claimed that the 'self-as-known' or 'ME' is everything that a man can call his. He proposed that self-concept is developed from man's level of self-evaluation in relation to the position he wants to hold in the complex society. That is, in his attempt to adjust in the society man sets goals, each one related to different conception of the self, for himself. He then evaluates his success at them. James then argued that it is the position a man wishes to hold in the complex society—contingent to his success or failure that determines his self-esteem or self-regard (i.e. self-concept). Therefore, James claimed that a man's level of self-esteem (i.e. self-concept) could be reduced only by his deficiencies or raised only by his achievements, which are relevant to his pretensions.

Hence, James discovered self-concept as a moderator as well as a facilitator to an individual's achievement. In other words, James long ago unearthed the value of self-concept as a construct, which has potential scientific importance for interpreting one's achievement outcomes. James (1890, 1963:310-11) wrote:

> So our self-feeling in this world depends entirely on what we back ourselves to be and do. It is determined by the ratio of our actualities to our supposed potentials; a fraction of which our pretensions are thus,
>
> $$\text{Self-esteem} = \frac{\text{Success}}{\text{Pretensions}}$$

James detected four components of the objective self whom he classified in descending order of importance: the spiritual self, the material self, the social self, and the bodily self. The spiritual self is the centre around which all the three aspects of the objective self-cluster—"it is the source of interest, effort, attention, will and choice, a composite of all one's intellectual, religious and moral aspirations" (Burns, 1979).

James (1890, 1963:296) asserted, thus:

> We take a purer self-satisfaction when we think of our ability to argue and discriminate or our moral sensibility and conscience, or our indomitable will than when we survey any of our other possessions. Only when these are altered is a man said to be *alienates a se.*

It can be argued, however, that the multidimensionality of self-concept is so pronounced in James' theory of self. James theory of self-concept spurred further empirical works and subsequent self-theories.

ii. ***The symbolic interactionism and self-concept***

The conception of self-concept within the symbolic interactionists' perspective stemmed from three basic premises. That is, man responds to environment on the basis of the meanings that elements of the environment have

for him as individual; that such meanings are a product of social interaction; and that these societal (i.e. cultural) meanings are modified through individual interaction within the ambit of this shared interaction. From these basic premises, the symbolic interactionists claimed that a full understanding of ones self demands a full understanding of the others, hence, self and others form an inseparable unit. From this perspective, self-concept was theorised by social psychologists within this school of thought. The views of Cooley (1902) and Mead (1934) would be reviewed.

a) **The Theory of C.H. Cooley**

Cooley's (1902) theory of self-concept was derived from his modified belief on the relationship (i.e. interdependency) between an individual and society. Cooley (1902) earlier proposed that individuals are prior to society, but later reversed his claim thereby giving more emphasis on society. Cooley (1912:5), thus, claimed that "self and society are twin born... and the notion of separate and independent ego is an illusion". He defined self as that "which is designated in common speech by the pronouns of the first person singular "I", "ME", "MINE", and "MYSELF" (Cooley, 1902:136).

Cooley (1902) believed that an individual's self-concept develops out of symbolic interaction between him and his various primary groups. That is, as the individuals interact with a group, the face-to-face relationship serves to produce feedback for him to evaluate and to relate to his own person. Thus, like James, Cooley provides an evaluative perspective of an individual's self-concept.

Cooley's perspective on the self is demonstrated in his "Looking glass self" theory. The "Looking glass self" theory claimed that ones self-concept is

significantly influenced by what the individual believes others think of him, i.e. the imagined evaluations of others about one's actions. Cooley's "Looking glass self" theory is explained below:

> As we see... our face, figure, and dress in the glass, and are interested in them because they are ours, and pleased or otherwise with them accordingly as they do or do not answer to what we should like them to be; so in imagination we perceive in another's mind some thought of our appearance, manners, aims, deeds, character, friends, etc., and are variously affected by it. A self-idea of this sort seems to have three principal elements: the imagination of our appearance to the other person; the imagination of his judgment of that appearance; and some sort of self-feeling, such as pride or mortification. The comparison with a looking glass hardly suggests the second element, the imagined judgment, which is quite essential (Cooley, 1902:159).

It was claimed that Cooley was the first self-concept theorist to point out the importance of an individual's subjective interpretation of physical and social reality as a main source of data about the self (Burns, 1979). The notion of self-concept as multidimensional is also embedded in Cooley's theory. He claimed that the objects which self-concepts are formed include the physical body opinions; purposes; possessions; ambitions, abilities; and any idea or system of ideas drawn from the communicative life that mind cherishes as its own" (Cooley, 1902:68).

b) **The Theory of G.H. Mead**

In an effort to theorised self, Mead (1934) drew from the early theories of James (1890, 1963) and Cooley (1902, 1912) and produced a more extensive theory of self-concept. Like Cooley (1902, 1912), Mead (1934) believed in social interaction as the basic source for the development of self-concept. That is, self-concept as an object, according to Mead (1934), arises from the social experiences, i.e. the out growth of the individual's concern about how others react to him.

Hence, Mead emphasised that self is a social structure arising out of social experience.

Like Cooley (1902, 1912), Mead (1934) emphasised the communicative life of an individual in the formation of self-concept. He saw language as a tool of connection between self and society. Through the shared meanings, an individual takes "the attitudes of another and act towards himself as others act" (Mead, 1934:171) Mead also believe in he two distinguishable aspects of the self — "I" & "ME" postulated by James (1890,1963). However, he elaborated the two aspects of the self-concept by giving them different context in which to operate. He, thus, defined "ME" as that representing the incorporated "other" within the individual; and "I" as the perception of one self as reflected by the shared meanings and values of "others". Distinguishing Mead's "I" & "ME" aspect of self-concept from that of James' initial formulation, Burns (1979:15), thus, claimed:

> Mead's "I" is the impulsive tendency, the unorganised undisciplined, undifferentiated activity of the individual (almost a parallel to the Freudian id). Every behaviour commences as "I", but develops and ends as "ME" as it comes under the influence of societal constraints, "I" provides the propulsion; "ME" provides direction.

Though, Mead's theory did not clearly indicate aspects of self-concept within an individual, his claimed of social process (i.e. interactions) as essential for the development of self, signifies self as multi-faceted. This is because the attitudes of significant others emphasised by Mead are numerous and differ from others to others.

iii. ***Psychoanalysis and Self-concept***

The psychoanalysis school of psychology has its roots from the works of Sigmund Freud (1923, 1962). The psychoanalysis sees behaviour as determined partly by inner forces that are outside our awareness and control (i.e. the unconscious forces). Within the psychoanalytic school, there were very many theorists who elaborated on the Freud's theory. Many of these theorists differed from Freud on several grounds of which some are: the importance of the unconscious process in directing human behaviour; and the Freud's failure to elaborate on the nature and functions of the ego (Carver & Scheirer, 1992). These theorists formed the neo-analytic (neo-Freudians) group. Therefore, in this sub-section, the Freudian and neo-Freudian postulates on self-concept will be highlighted.

a) **Freud and self-concept**

Self-concept in the Freudian theory was not sufficiently explained (Burns, 1979; Olowu, 1985). Freud (1923, 1962) postulated that personality has three components, which interact with each other to produce the complexity of human behaviour. The three components are the 'id', the 'ego', and the 'superego'. The 'id' is the original component of personality. It is present at birth and encompasses all the inherited, instinctive, primitive aspects of personality. The id functions entirely in the unconscious and conforms to what is called the 'pleasure principle'. This principle implied that all human needs should be satisfied immediately. Unsatisfied needs results to an aversive tension state. Thus, people become motivated to gratify needs immediately.

The ego (the Latin word for 'I') evolves from the id and harnesses part of the id's energy for its own function. Ego processes centred on ensuring that id impulses are expressed effectively, albeit rationally. The ego does this by taking into account the demands of the external word. Therefore, the ego is said to conform to the 'reality principle'. This principle holds that behaviour must take into account the state of the external world rather than just the needs and urges arising from within (Carver & Scheirer, 1992). Carver & Scheirer (1992:206) expounded on the functions of the ego:

> ...its leads you to consider the risks associated with various options before acting. If the risks of a course of an action seem too high, you'll consider another way to meet the need. If no safe way can be found to reduce tension immediately, you'll delay gratification of the need to a later safer or more sensible time.

Burns (1979) who claimed it to be the global self has expounded the concept of self as is implied in the ego. Burns (1979:17-18), thus, stated:

> The ego is a set of processes such as perceiving and thinking; it determines the content of consciousness, and distinguishes between reality and imagination. Such an element, then, is the same as the global self that totality of psychological process, which control the speed and direction of the flow of consciousness, intimately concerned with positive motivated behaviour.

However, self-concept can further be conceptualised within the realm of Freudian superego. Superego (Latin words for 'over-I') is the embodiment of parental and societal values. It decides what is right and what is wrong and strives for protection. It consists of two systems: ego ideal, which consists of rules for good behaviour (standards of excellence towards which the ego must strive); and conscience, which consist of rules about what behaviour, are wrong. Hence, an individual's self-concept is embedded within the superego (c.f. with Adler, Sullivan, etc.).

b) **Neo-Freudian and self-concept**

Neo-Freudian psychologists, who deviate from Freud on the grounds that the latter did not give enough attention to the ego, fall within two categories (Carver & Scheirer, 1992). The first group (Adler, 1927; Sullivan, 1953; Allport, 1955; Jung, 1960) addresses the question of what kind of problems is central in the ego's transactions with the world. They held the view that the ego's primary tasks revolve around the nature and quality of the person's social interactions. The second group (Horney, 1945; Erikson, 1965) emphasises on how ego operates. The theories of Adler (1927), Sullivan (1953), Allport (1955), Jung (1960), and Erikson (1965) were reviewed here.

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c) **Adler (1927) and self-concept**

Adler (1927) emphasised socio-cultural situation and inter-personal relationships as significant in the development of self as object. Unlike Freud who emphasised unconscious materials, Adler (1927) believed in the consciousness as determiner of and individual personality (self). Adler (1927) conceived man as a conscious being usually aware of his reasons for behaviours (i.e. by setting goals for himself), capable of organising and guiding his actions with complete awareness of their implications for his own self-realisation.

The conception of self in Adler's theory can be understood from his perspective of 'life style' as determiner of behaviour. Adler believed that a person's life style can be identified and if identified can give a clue to the themes that are playing themselves out in the person's life (Carver & Scheirer, 1992). That is people who see themselves as having control over events in their lives reported early memories involving mastery over the environment. People who see

themselves as having little control tended to recall experiences in which they were perceived and events beyond their control. As such for Adler, self is a highly personalised subjective system through which a person interprets and gives meaning to his experience (Burns, 1979). Or self is how the person looks at the events that give insight into the person's concerns—his feeling of inferiority on some domains and superiority on others. Adler's (1927) theory has provided a technique through which an individual's self-concept can be assessed.

d) **Sullivan (1953) and self-concept**

Sullivan (1953) like Adler emphasised the role of interpersonal relationship in the development of self. He claimed that the self (i.e. personality) is shaped primarily by social forces, with which the child's lengthy period of dependence makes it (i.e. the self) particularly vulnerable to influence by others. Sullivan conception of self-concept is implied in his model of "self-dynamism".

Sullivan (1953) model of self-dynamism appeared to mean certain habits utilised by an individual to be freed from tension of anxiety, and sometime to mean an individual's view of himself. Sullivan further asserted that we organism, we experience (i.e. personify) by forming mental conceptions of others and ourselves. The personifications consist learned feelings and beliefs, which often do not correspond well with reality. Thus, Sullivan (1953), claimed that children personify experiences into "good me", bad me", and "not me". Burns (1979:20) conceives Sullivan's self- system as "purely a result of interpersonal experience arising out of anxiety encountered in the pursuit of need satisfaction".

Sullivan (1953) believed that human organism transform physical energy (i.e. not psychic energy) into behaviours to satisfy its needs. To Sullivan,

therefore, self-dynamism is "the relatively enduring pattern of energy transformations which recurrently characterised the organism in its duration as a living organism (Sullivan, 1953:103).

e) **Allport (1955, 1961) and self-concept**

In contrast to the interpersonal theories of Adler, and Sullivan, Allport (1955) regard self (i.e. personality) as something within the individual. He, therefore, believed in motive as a central core to psychological study of personality. In fact, to Allport (1961:196), motive means "any internal condition in the person that induces action or thought". Self-concept, therefore, in Allport's conception is implied in his new coined out term—"proprium". Ewen (1980) conceives Allport's proprium theory as that "unifying distinctively personal core of personality. Somewhat similar to "self" or "ego", but more comprehensive, including the sense of bodily self, the sense of continuing self-identity, self-esteem, self-extension, the self image the self as rational coperpropriate striving and the self as knower".

Allport (1955:40), thus, asserted: "We think of (the proprium) as the warn, central private region of our lives, ...(one) we regard as peculiarly ours, and which... (makes) for inward unity". Allport claimed that the different aspects of the proprium develop at different times of life. He, thus, considered the mature person a time extension of all the self-concepts he has gained in attaining adulthood.

f) **Jung (1960) and self-concept**

Jung's conception of the self is embodied in his postulation on the conscious and the unconscious. For Jung, the ego is a complex of conscious ideas

which constitute the centre of one's awareness and which appears to possess a high degree of continuity and identity. The ego constitutes the conscious mental activities of the man thinking, perceiving and identifying sensations in the world in which he lives. And the unconscious are all the experiences man undergoes as he lives through life-experiences which are not forgotten, nor do they disappear, but stored in the region of mind. The unconscious is divided into two parts: the personal unconscious and the collective unconscious. The former contains such things as "persona" and "complexes" (i.e. experiences), while the latter contains the concepts of 'archetypes', 'shadow' and 'synchronicity' (Jung, 1960).

Therefore, the self in Jung's conception represents equilibrium between the ego (i.e. conscious) and the unconscious levels. Jung (1960) claimed that self emerges only when the various components of personality were fully developed and individuated. And this, according to Jung, is attained in the middle age of development.

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g) **Erikson (1965) and self-concept**

Of all the neo-psychoanalytic theorists referred herein, Erikson was the only theorist who paid much attention to self as an object (Burns, 1979). Erikson extended the Freudian theory by emphasising ego development in the cultural context. The conception of self in Erikson's theory is embodied in his postulation on construct of identity. For Erikson, the ego is far more than a mediator between the pleasure-seeking id and the punitive superego, and its capacities extend considerably beyond defenses against illicit instincts and anxiety. Therefore, one crucial and constructive function of the ego is to preserve a sense of identity (ego identity) of the growing individual.

Thus, identity to Erikson (1965) is "a process located in the core of the individual (as well as) in the core of his communal culture". In his eight-stage developmental sequence of identity growth, Erikson (1965) demonstrated that identity is formed from "achievement that has meaning in culture" and that it arises out of gradual integration of child's identifications of adults. Ewen (1980) conceives of Erikson's ego identity as a complicated inner state that includes four distinct aspects: individuality; wholeness and synthesis; Sameness and continuity; and social solidarity. The concept of the self in Erikson's theory is clearly demonstrated here:

> In psychological terms, identity formations employs a process of simultaneous reflection and observation, a process taking place on all levels of mental functioning, by which the individual judges himself in the light of what he perceives to be the way in which others judge him in comparison of themselves and to a typology significant to them; while he judges their way of judging him in the light of how he perceives himself in comparison to them and to types that have become relevant to him (Erikson, 1968:22).

Hence, Erikson (1968) further reaffirmed the claim that self as a social structure arises from social interaction.

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iv) ***The phenomenological approach to the self-concept***

The phenomenological perspective on behaviour has its roots in the uniqueness of each person's frame of reference. One major premises of this perspective is that the subjective experience of reality is extremely important in understanding human behaviour. Another premise that characterised the phenomenological perspective is the idea that people can determine for themselves what their lives are to be like. Another premise of this perspective holds that human beings are intrinsically good and self-perfecting-meaning-that unless there are very strong blocks, human nature strife consistently in the

direction of good health, self-sufficiency, and maturity. It is from the basic assumptions of the phenomenological perspective that human behaviour (self-concept inclusive) is explained. There are quite a number of theorists that make up this school. However, only the works of Rogers (1951, 1965), and Kelly (1955) were reviewed.

a) **Rogers' (1951, 1965) self-theory**

Rogers (1965) explained the concept of self explicitly. He is even sometimes referred to explicitly as a self-theorist (Carver & Scheirer, 1992). And it has been claimed that his theory of personality revolves around the concept of the self (Bischof, 1964). Rogers assumed that the self does not exist at birth and that an individual (i.e. infant) must learn to differentiate self from non-self. That is, as the person grows, the self continually becomes more elaborated and complex. The development of self never ends. It continues to evolve over the years.

The self in Rogers' postulation has several connotations. In some instances, he viewed it as the subjective awareness of being. At other instances, Rogers used self interchangeably with self-concept. Rogers (1951:136) asserted that self-concept:

> May be thought of as an organised configuration of perceptions of the self... It is composed of such elements as the perceptions of one's characteristics and abilities, the perceptions and concepts of self in relation to others and to the environment; the value qualities which are perceived as associated with experience and objects; the goals and ideas which are perceived as having positive or negative valence.

Rogers (1965) gave distinctions of the elements that form the self-concept. Thus, he distinguished between the actual (or real or experienced) self and the individual self (i.e. ideal self). The former connotes when an individual think he is

really like a person at the moment, whereas the ideal self refers to an image of the kind of a person an individual wants to be.

Rogers' (1965) notion of self is embodied in his thesis of self-actualisation. He, therefore, proposed that "the organism has one basic tendency and striving — to actualise, maintain, and enhance the experiencing organism". Hence, according to Rogers, self is an outgrowth of the organisms' basic tendency of growth — to actualise and expand itself. Hall & Lindzey (1967:478) summarised the properties of Rogers' notion of self, thus:

i. it develops out of the organisms' interaction with the environment;
ii. it may interject the values of other people and perceives them in a distorted fashion;
iii. the self strives for consistency;
iv. the organism behaves in ways that are consistent with the self;
v. experiences that are not consistent with the self-structure are perceived as threats; and
vi. the self may change as a result of maturation and learning.

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b) **Kelly's (1955) self-theory**

The conception of self-concept within Kelly's (1955) theory can be understood in his thesis on 'personal constructs'. Kelly (1955) assumed that an individual's behaviour and personality can be explained in terms of the individual and unique complex of constructs and cognition he possesses, and by means of which he adapts to the world as he perceives it to be (Burns, 1979). In the thesis of personal constructs, Kelly (1955) claimed that every man in his own way is a scientist. That is, in order to fulfill his technological aspirations, an individual behaves much like a research scientist, thus, forming various theories for understanding and relating to the environment; testing the hypotheses against reality and retaining or revising them depending on their predictive accuracy.

Ewen (1980:293) provides succinct explanations for Kelly's personal construct theory and he reviews, thus:

> ...each of us devises and 'tries on for size' out own 'personal constructs' for interpreting, predicting, and thereby controlling the environment. We not only respond to the external world, but also actively construct (interpret) it and behave accordingly; and whether we do so accurately or inaccurately, it is our creative interpretation of reality that gives events their meaning and determines our subsequent behaviour.

Thus, from Kelly's expositions, an individual's personal construct is his own view of self. This is because an individual's placement and clarification of his own behaviour within his personal construct system come to define the self. Some of the eleven 'corollaries' posited by Kelly to elaborate the nature of one's personal constructs explain self as a construct. The 'organisation corollary' for instance, an individual organises his personal construct in some way thereby placing certain construct a greater importance than others. And in the dichotomy corollary' an individual polarised his personal construct, for instance, 'gentle' vs. 'aggressive', 'able vs. 'unable', etc.

Kelly's (1955) exposition on self-concept in his thesis on 'personal construct' suggests the multi-faceted nature of the construct. Perhaps the modern self-theories drew a lot from his theory.

The traditional theories of self-concept so far reviewed have some basic limitations. First, most of the works of the theories reviewed bear some relationship to the self, yet it does not appear central to their themes. Second, though the theories emphasised the importance of self and how it is developed, but were more concerned with its implications for therapy than for self-theory. Third they conceived self-structure as global or the theorists, to explain an

individual's behaviour in various settings used unidimensional, i.e. the characteristics descriptive of the self-concept.

Yet the traditional theories of self-concept have provided theoretical bases upon which subsequent theories on self-concept were propounded. These theories have further provided important in sights into self-concept thereby exposing the construct's potential scientific importance for interpreting achievement outcomes. Hence, many empirical studies concerned with aspects of self-concept in a variety of educational settings and for a diversity of students surfaced. From this empirical works and modern theories of self-concept were evolved.

2.3.2. Development of Self-concept

The trend in self-concept development as portrayed in the works of self theories reviewed, centred on the view that self is acquired and modified through the accumulated experience of the emerging individual (Purkey, 1970). The individual's self-perceptions emerged from early years of life and gradually begins to develop as one interacts with significant others (Cooley, 1902, 1912; Mead, 1934; Sullivan, 1960).

Purkey (1970) discussed two factors that are very critical in the development of one's self. These factors include home and school. These factors would be briefly reviewed:

a) Home and the development of self-concept

The home environment has been said to exercise tremendous influence in the development of one's self right from birth through adolescence. Purkey (1970) emphasised the role of parents who are the closet immediate 'significant

others' to the newborn, in the development of an individual's self-concept. The parents are the one's who reflect the earlier appraisals, they give or withhold love and affection, and proffer rewards and punish, and above all, serve as models for emulation.

The early years of life are the most critical in the formation of child's development of self-regard. Parents' styles of upbringing and the attitude to the child according to his birth order may give the offspring false, and misleading perceptions of themselves, which may affect their future development. Purkey (1970:34) summed-up the role of early experiences in the development of self-concept, thus:

> Self is formed from the experiences woven in everyday life, concealed in everyday occurrences, hidden in the deep communications of unspoken feelings and affections. The child becomes the way he is treated.

b) School and the development of self-concept

Children enter school with all sorts of predisposition toward achievement and underachievement acquired from early training at home. The school builds on this, i.e. by reaffirming or changing the child's self-concept. The school with its curricular, methods, and teachers and with the expectations on the child to adjust therein opens another environment for child's enhancement of self-concept. The child faces rewards (grades and grade levels, report cards, honours, etc.) acquired through competitions. At the same time (in fact side-by-side with the reward contingencies), the child confronts punishments (failure, detention, rejection, and even expulsion). All these have tremendous effect on child's development of self-concept.

2.3.3. Modern Theories of Self-concept

The shift in emphasis from cognitive to non-cognitive outcomes of education and the realisation of the fact that self-concept (as an affective factor) construct has potential scientific importance for interpreting achievement outcomes, a very large number of empirical studies on self-concept were conducted. Most of the early studies, considered the structure of self-concept as unidimensional and as such employed assessment techniques designed to measure general (i.e. global self-concept). Therefore, modern theorists of self-concept in their reviews of self-concept studies observed that the bulk of the early studies addressed substantive issues relating to studies of self-concept within our academic context. Thus, these reviews (e.g. Shavelson et al, 1976; Byrne, 1984; Byrne & Worth-Gavin, 1996) claimed that it is not surprising that the early findings were "inconsistent", "compounded", and "ambiguous". This disconcerting mélange of self-concept studies prompted empirical works on self-concept construct definition and theoretical structure. Hence, the birth of modern conception of self-concept.

i. *The Shavelson (1976) Self-concept Model*

In an effort to stimulate self-concept construct validation research, Shavelson and his colleagues drew from the early theories of James (1890, 1963); Cooley (1902, 1912) and Kelly (1955), to propose the first self-concept model capable of being tested empirically. Shavelson et al (1976:411) defined self-concept in broad terms to signify "a person's perception of himself. These perceptions are formed through his experiences with his environment, ...in the

manner suggested by Kelly (1973), and are influence especially by environment reinforcement and significant others".

Shavelson et al (1976) further posited that there is no entity within a person called 'self-concept', however, the construct is potentially significant in exploring and predicting how one acts. The process runs as follows: an individual perceptions of himself influence the ways in which he behaves and his behaviours in turn influence the ways in which he perceives himself. An individual's self-concept is inferred from his responses to situations, which might be physical or symbolic.

Shavelson et al (1976) posited that an individual's perception of himself is structured. This implied that self-concept is multidimensional and hierarchically ordered, with general (i.e. global) perception of the self as a person at the apex and specific behaviours at the base. And as one moves from the apex to the bottom of the hierarchy, the structure becomes increasingly differentiated.

The general self-concept is divided into two facets: Academic and non-academic (physical, social, and emotional) self-concepts. Furthermore, these facets are in-turn divided into separate and more specific facets (e.g. Math self-concept, physical appearance self-concept, etc.). See Figure 1 for the schematic representation of the model. Shavelson et al (1976) gave seven features of self-concept structure that are critical to the construct definition. That is, self-concept may be described as: organised, multifaceted (i.e. multidimensional); hierarchical; stable; developmental, evaluative; and differentiable.

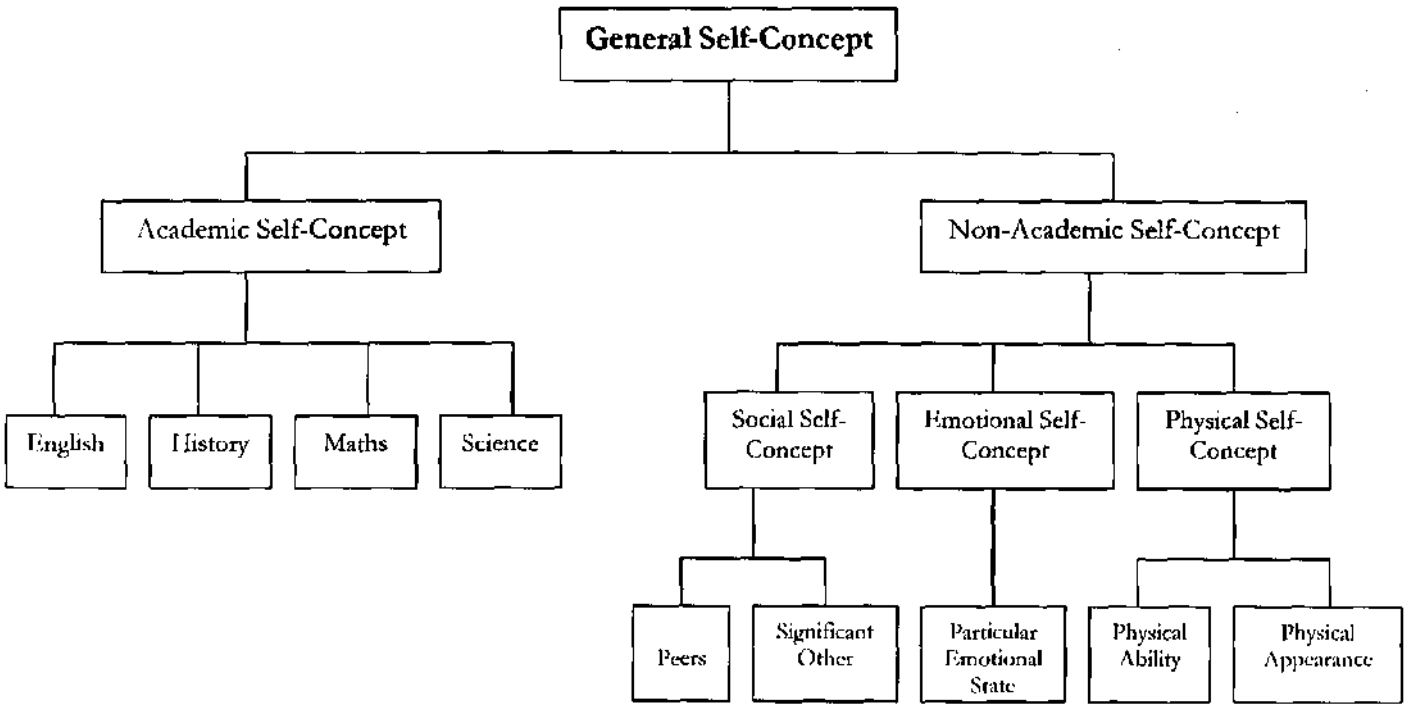


Figure 1: The original model of self-concept proposed by Shavelson et al (1976).

Self-concept as organised, implied that individuals tend to categorise the vast amount of information they have about themselves and relate them (i.e. the categories) to one another. This attribute of self-concept as expounded by Shavelson et al (1976) is very similar to the organisation corollary (of personal construct) given by Kelly (1955). In an effort to perceive himself, an individual amassed great diversity of experiences. The individual records the complex experiences (e.g. from family, school, and community) into simpler forms or categories (i.e. facets). The facets, thus, represent a way of organising experience and given meaning.

Multifaceted self-concept implies that particular facets reflect the category system adopted by a particular person and/or shared by groups, such category system appear to be school (academic), physical ability/attractiveness. Byrne &

Worth Gavin (1996:216) clarified Shavelson et al (1976) intended meaning of multidimensionality of self-concept, thus:

> ...multidimensionality implies that sc facets, although inter-correlated, can be measured as separate constructs, for example, although general sc is expected to correlate with academic sc, academic sc with subject specific scs, and general sc with subject-specific scs, each of these dimensions operates as a relatively independent entity.

The hierarchical nature of self-concept implies that the facets of self-concept formed a hierarchy from an individual's experiences in specific situations at the base of the hierarchy to general self-concept at the apex. The hierarchical nature of the self-concept is in some ways very similar to Vernon (1960) & Spearman's (1904) hierarchical models of intellectual activities. Taking the academic portion of the Shavelson et al (1976) model, Byrne & Worth-Gavin (1996:216) clarified Shavelson' et al (1976) intended meaning on this:

> Hierarchical structure, however, suggests that the strengths of correlations between sc facets varies in systematic patterns such that (1) general sc correlates highest with academic sc, next highest with subject-specific scs, and lowest with academic achievement, (2) academic sc correlates higher with subject-specific scs than with academic achievement, and (3) subject-specific scs (e.g. math sc) correlate higher with their matching academic achievement scores (e.g. math) than with non-matching academic achievement scores.

Self-concept as a stable implies that general self-concept is stable, but as one descends the hierarchy, self-concept becomes increasingly situation specific and as a consequence less stable. The developmental aspects of self-concept imply that self-concept becomes increasingly multi-faceted as the individual develops from infancy to adulthood. Self-concept as evaluative, means that it has both descriptive and evaluative dimension in such a way that an individual describe himself (e.g. I am happy) and evaluate himself (e.g. I do well in school). Finally, self-concept is differentiable in the sense that it can be differentiated from

other constructs with which it is theoretically related. This included constructs (i.e. facets) within the structure (e.g. academic vs. non-academic self-concepts) and constructs without the structure (e.g. academic achievement).

Shavelson et al (1976:415) expounded on this:

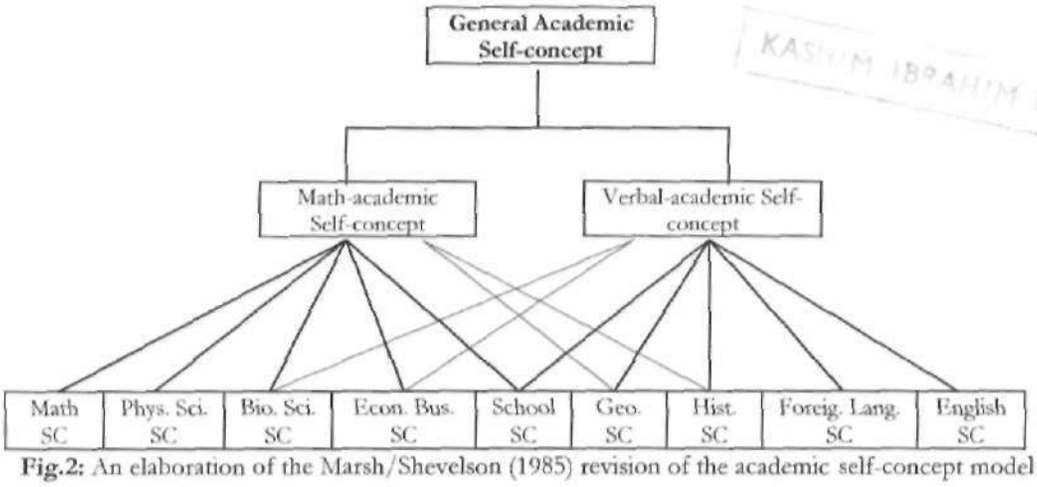
> ...the more closely self-concept is linked with specific situations, the closer is the relationship between self-concept and behaviour in that situation. If one were to focus on the academic side of the hierarchy..., one could hypothesised that (a) self-concept of mental ability should be more clearly related to academic achievement than to ability in social and physical situation, and (b) self-concept of academic ability in science should be more closely related to achievement in science than to achievement in say English or overall grade point average.

The self-concept facets and structure proposed by Shavelson et al (1976) were judged to be 'heuristic' and 'plausible' (Marsh, 199a). Therefore, more empitical studies spurred up to test the Shavelson model. Most of these studies (Boersma & Chapman, 1979; Dusek & Flaherty, 1981; Harter, 1982; Marsh, Smith Barnes & Butler, 1983, Marsh, Parker & Smith, 1983; Marsh & Smith, 1982; Fleming & Courtney, 1984) centred on the academic portion of the Shavelson model and, thus, supported the multidimensionality of the construct. However, on the hierarchical nature of the model, the findings of these studies suggested that the single higher order dimension of the academic self-concept is inadequate to explain relations among first order factors (i.e. subject specifics self-concepts). This called for the review of the Shavelson model.

ii. ***Marsh/Shavelson (1985) Self-concept Model***

The Marsh/Shavelson (1985) self-concept model was solely based on the structure of the academic self-concept posited in the Shavelson et al (1976) model. The Marsh/Shavelson model was consistent with the Shavelson model in the

multidimensionality aspects of the academic self-concept structure. However, it differs from the Shavelson model in that, there were two higher order academic factors— Math-academic and Verbal-academic instead of just one — the single higher order academic self-concept. Figure 2 presents an elaborated version of the Marsh/Shavelson model.



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Fig.2: An elaboration of the Marsh/Shevelson (1985) revision of the academic self-concept model

In the model, general academic Self-concept is at the apex, and it is divided into Math-academic and Verbal-academic at the next level. Math-academic is then divided into self-concepts in specific subject related areas (e.g. Math, Sciences). Verbal-academic self-concept also is divided into self-concepts in specific subject related areas (e.g. English, History). As one descends further the hierarchy, self-concepts in particular behaviours become differentiated.

A clear look at the model as represented in figure 2 above indicates a cross correlation of some specific subjects to the two higher order academic self-concept factors. For instance Biology and Economics, originally defined as Math-academic self-concept factor correlated with Verbal-academic self-concept factors. In like manner, Geography and History originally defined as Verbal-academic self-concept factor correlated with Math-academic self-concept factors.

Marsh/Shavelson model was therefore, tested in a number of empirical studies (Marsh, 1987; Marsh et al, 1988). The result of these studies indicated that the self-concept hierarchy is more complicated than originally anticipated by Shavelson et al (1976). Furthermore, as noted by Marsh et al (1988):

> Academic self-concepts were more differentiated than anticipated in the original Shavelson et al's (1976) model, and a similar fate may befall the Marsh/Shavelson when it is tested more fully... the academic subject areas... [*in the Marsh et al's1988 study*] represent core academic subjects. If additional subjects (e.g. physical education, art and music, etc.) were included, it is unlikely that just two higher order factors would be sufficient. Thus, the inclusion of an even more diverse variety of subjects than are [*in Marsh et al's 1988 study*] would test the limits of the Marsh/Shavelson model.

More studies (Marsh, 1990a, 1990b; Vispoel, 1995; Byrne & Worth-Gavin, 1996) tested the Marsh/Shavelson model and revealed important findings that called for further revisions. These studies were reviewed in this chapter.

2.4. Empirical Studies

In her review of general/academic self-concept, Byrne (1984:428) posited that: "an important pre-requisite to the valid use of self-concept in educational research is a through understanding of the construct itself. Conceptualisation of self-concept within theoretical framework is the central issue". And this entails defining the nomological network of the construct. Nomological research on self-concept involves two things: analysis of the relationships among the differentiable facets of the construct (i.e. internal examination of the construct) and analysis of the relationships between the construct and other constructs presumed to be mutually related (i.e. external examination of the construct).

Since the purposes of this study resolves around the two analyses (i.e. internal and external examinations of self-concept construct), review of related

literature is organised under the two categories of construct validation research. That is, studies that examine the internal structure of self-concept were classified (and reviewed) as within network studies (Cronbach, 1971). And those studies that examine the relationship between self-concept and other construct (e.g. academic achievement) were classified as between network studies (Cronbach, 1971) and are reviewed.

2.4.1. **Within Network Studies**

Studies reviewed here investigated some aspects of self-concept definitions and structure. That is, the relationships between self-concept facets (e.g. GSC & ACS) and whether these facets were differentiable from one another.

i. ***Western empirical studies on self-concept***

Prior to Shavelson's (1976) model, many empirical studies were conducted to develop self-concept scales among different populations of studies. Some of these Sales included: Tennessee Self-concept Scale (TSCS), Fitts (1965); self-concept scale, Lipsitt (1958); self-concept scale, Piers & Harris (1964); "How I see myself scale", Gordon (1968); self-esteem inventory, Coopersmith (1967), the self-concept of ability scale (Brookover et al, 1962). Many of these instruments have been used by researchers world over, to assess self-concept. However, most of these instruments have been criticised as invalid and unreliable.

For instance, Burns (1979:95) in his review of these early self-concept instruments, cautioned self-concept researchers that the instruments "need to be applied with caution until more research and development is carried out on them". In another review, Shavelson et al (1976:408) criticised the early self-concept studies that used early self-concept instruments "in that the self-concept

interpretations of their measurement may not be valid". Shavelson and his colleagues gave three reasons to justify their claim. First, definitions of self-concept were imprecise and vary from one study to the next. Second, there is difficulty in interpreting measures of self-concept because data were not readily available on the equivalence of various self-concept measurement instruments. Third, data were not available to test rival counter-interpretations. Hence, Shavelson et al (1976) claimed that the importance of the self-concept and the paucity of studies that examines the construct's interpretations of their measurements, make construct validation study vitally needed.

A very large number of empirical studies have been undertaken to validate self-concept interpretations of the early instruments. These studies (Whylie, 1974; Kokenes, 1974; Michael, Smith & Michael, 1975; Michael & Smith, 1976; Byrne, 1984) found the underlying factors of the selected instruments to be less clear than their developers originally claimed (Byrne, 1984). Whylie (1974), in her through surveys of published research works on self-concept utilising these early self-concept instruments, claimed that such studies were inclusive 'because of flaws in designs'.

A very large number of empirical studies (Boersma & Chapman, 1979; Dusek & Flaherty, 1981; Harter, 1982; Byrne, 1984; Shavelson & Bolus, 1982; Marsh, Smith & Barnes, 1983) tested the Shavelson (1976) model (Shavelson & Bolus, 1982, for instance), using Multitrait-Multimethod Matrix (MTMM) analysis, structural equation model and causal modeling Study, reported strong support for the multidimensionality structure of self-concept, and less support for the hierarchical structure for their 7th and 8th graded intermediate school children.

The study of Marsh, Smith & Barnes (1983) investigated the extent of student-teacher agreement for ratings of self-concept as measured by Self-Description Questionnaire (SDQ). Using factor analysis and MTMM, the results of the investigation validated the multidimensionality of self-concept structure for their three independent diverse samples. In another study, Marsh, Smith, Barnes & Buttler (1983), in their attempt to find the psychometric ptoperties of self-concept as measured by the SDQ over time, found strong support for the construct validity of self-concept as proposed by Shavelson et al (1976).

Taken together and with specific reference to the hierarchical structure of self-concept, these studies reviewed, confirmed that self-concept is a hierarchical construct with General Self-concept (GSC) at the apex and situation specific self-concepts at the base. However, their findings did not support the assumption that self-concept facets become increasingly stable toward the apex of the hierarchy, but rather the facets were found to be equally stable (Shavelson & Bolus, 1982) and slightly more stable (Byrne, 1982). Byrne (1984) expounded more on the stability of self-concept structure by contrasting her findings with that of Shavelson & Bolus (1982). Byrne (1984:435), thus, asserted:

> ...that GSC, despite its correlation with ASC, can be measured as a separate construct. The relationship between ASC and AA (.41) was found to be the strongest, followed by that of GSC and ASC (.38) and GSC and AA (.16), respectively. Whereas, Shavelson and Bolus (1982) found equal stability between GSC and ASC, Byrne (1982) found ASC to be slightly more stable than GSC. Further, the relationship between GSC and ASC was found to be the least stable among GSC, ASC and AA.

Further empirical studies (Marsh & Hocevar, 1985; Marsh & Shavelson, 1985; Shavelson & Marsh, 1986; Byrne & Shavelson, 1986; Byrne, 1986) have tested the Shavelson (1976) model. The studies of Marsh and his colleagues, using

newly developed SDQ I, tested the first and second order structure of the academic self-concept (ASC) of students in Grades 2-5. The results of the studies revealed that first-order factors (specific self-concepts) analyses at each grade level supported the factors that the SDQ was designed to measure. Furthermore, three different conflicting models were revealed. First, a second-order model with just one higher-order factor was revealed and was unable to explain adequately relations among the first-order factors at any of the grade's levels. Second, a second order model with two second-order factors was revealed one defined by the non-academic factors and one defined by the academic factors — did better, but was not adequate too. Third, a hierarchical model was revealed and posited two second-order academic factors — Reading/Academic and Math-academic self-concept — and a second non-academic factor. The third model fit the data significantly better than any of the two at each grade level.

The third model supports Shavelson et al's (1976) assumptions that self-concept is hierarchically ordered, albeit the particular form of this higher order was more complicated than was previously proposed. This, therefore, called for the revision of Shavelson model. Hence, Marsh & Shavelson (1985) greatly facilitated by the development of SDQ I, II & III — an age grade series of multidimensional self-concept inventories, revised the Shavelson (1976) model. The revision led to a new model—Marsh/Shavelson (1985) model. This model differed from the original Shavelson model primarily in that two higher order academic factors — Math-academic and Verbal-academic — instead of just one were revealed (see Figure 2, p.42).

The Marsh/Shavelson's model was subjected to testing by many empirical studies. Marsh (1987) tested the Marsh/Shavelson's model using Australian samples. His purpose was to define whether the facets of self-concept as measured by the SDQ III could be reliably differentiated, and if so, to determine suitable higher order factors to account for the correlations among self-concept facets as contained in the Shavelson's model. Using the confirmatory factor analysis, first-order factors representing 13 measured facets were well defined and modestly correlated. Hierarchical confirmatory factor analysis results supported the separation of the first-order factors into academic and non-academic components of self-concept, but did not adequately fit the data. Yet, of particular reference, is that the need for two higher-order academic factors—Math-academic and Verbal-academic—was clearly supported. Marsh's (1987) study clearly indicated that the self-concept hierarchy is more complicated than originally anticipated.

Marsh, Byrne, further validated the Marsh/Shavelson's model & Shavelson (1988) using Canadian samples. This study used the Math, Verbal and General school scales from the three different self-concept instruments: SDQ III; the self-concept of ability scale (Brookover et al, 1962); and the affective perception inventory (Soares & Soares, 1982). The study was intended to find out whether correlations among the first order factors could be adequately explained by a single higher order factor as posited in the Shavelson (1976) model; or by two higher order factors, as posited in Marsh/Shavelson's (1985) model. The results of this study were of too fold.

First, hierarchical confirmatory factor analysis revealed a first factor model which provided strong support for the nine 'a priori' factors—Math, Verbal and General school factors from each of the three self-concept instruments. Second, the study revealed the superiority of the Marsh/Shavelson model over the original Shavelson model. That is, the correlations among the nine factors were adequately explained by Marsh/Shavelson's two higher order factors— Math-academic and Verbal-academic. The study further revealed that all the three verbal self-concept scales were nearly uncorrelated with each of the three Math self-concept scales. Similarly, the Math-academic and Verbal-academic higher order factors were not significantly correlated. From these findings, Marsh and his colleagues claimed that academic self-concepts were more differentiated than anticipated in the original Shavelson model and that a similar fate may befall the Marsh/Shavelson model when tested more fully.

The Marsh/Shavelson model was further validated. Marsh (1990a) tested the structure of academic self-concept posited in the Marsh/Shavelson model. In order to realise this, Marsh (1990a) constructed two new Academic Self-Description Questionnaires (ASDQ I & II) to assess a more diverse variety of academic self-concept. He used 13 (Grades 5-6) and 16 (Grades 7-10) school academic subjects of his Australian subjects. The result of the study indicated that first-order factor analysis identified the scales each instrument was designed to measure. This showed that academic self-concept is remarkably subject-specific. Furthermore, the study revealed that the two higher order factors were sufficient to explain relations among, only "Core academic subjects". Thus, additional higher order factors were needed to explain other school subjects (e.g. physical

education, art and music, technical, etc.). Marsh (1990a), therefore, cautioned that researchers interested in particular subjects are advised to used self-concept scales specific to those subjects in addition to other measures of academic self-concept.

Vispoel (1995) extended the Marsh/Shavelson model by integrating students' self-perceptions of dance, dramatic art, visual art and music skills into the self-concept model. Using Marsh's (1988) SDQ III and his arts self-perception inventory (ASPI) on American samples, Vispoel's study revealed very significant findings. That is, the dance, dramatic art, visual art and music self-concepts were best integrated into the self-concept hierarchy as component of a higher order artistic self-concept factor quite distinct from Marsh/Shavelson's (1985) two higher-order factors: Math-academic and Verbal-academic. Furthermore, all specific self-concept facets were clearly defined, but much of the variance in the facets was unaccounted for by higher order factors. Vispoel (1955), therefore, asserted that his findings support the multi-faceted or domain specific nature of self-concept, but only moderately support self-concept hierarchy.

In another recent study, Byrne & Worth Gavin (1996), revisited the academic position of the Shavelson model (Marsh/Shavelson, 1985). This study was aimed at testing for the validity of a multidimensional and hierarchical academic self-concept structure. Based on the analysis of covariance structures and using data from 3rd, 7th, and 11th grades American school subjects; the study revealed two important within network findings. First, the multidimensionality of ASC was substantiated, but no support for increasing differentiation across age. Second, there was minor deterioration of hierarchical self-concept for early and

late adolescent, but no pattern of progressive weakening structure across age. From these findings, Byrne & Worth Gavin (1995:225) asserted:

> Taken together our findings underscore Marsh's (1993a:61) contention that "self-concept cannot be adequately understood if its multidimensionality is ignored". Thus, educators interested in determining change in Math sc following a remedial Math intervention program, for example, must use an instrument capable of measuring Math sc. To rely solely on the measurement of either academic or general sc would not only be inappropriate, it would yield information that was less than accurate because these higher order facets cannot provide sufficiently reliable feedback on the subject area of interest.

Taken together, the findings from the studies reviewed here, support the contention that self-concept is multifaceted and hierarchically structured. In addition, the studies showed that academic self-concepts are more differentiated and that an inclusion of even more diverse variety of academic subjects may test the limits of the Marsh/Shavelson model. Hence, the need for further constructs validity study more especially in typical, albeit different academic settings.

ii. ***African/Nigerian empirical studies***

Within network self-concept studies in African context are very few. Even the few that exist focused on the construction and validation of western (traditional) self-concept scales. This really indicates that the modern conception of self-concept structure is yet to be incorporated into African conceptions. This subsection, reviewed the few available African literature of the within-network self-concept studies.

In an attempt to construct a self-concept scale for cross-cultural use (Olowu, 1982, 1983), developed a semantic differential technique for measuring self-concept. To realise this, he obtained responses to the 'easy on myself' from two culturally different samples of adolescents of the same age. The two groups

comprised of Nigerian Yoruba and English adolescents. From the subjects' responses, content analysis was performed and six self-concept areas represented by four pairs of scales were obtained. The self-concept areas included: physical self, character self, emotional self, family/kinship self, academic self, and social self. Olowu (1982, 1983) reported an inter-judged reliability of .72 for his scale.

In another effort to provide a culture fair self-concept scale, Ezeilo (1982a, 1982b) using Nigerian samples test the applicability of the Tennessee self-concept scale (TSCS) in Nigeria. The study found TSCS to be both valid and reliable for measuring the self-concepts of literate Nigerians. Using data from another Nigerian sample (Enugu), Ezeilo (1987) further developed and validated a semantic differential scale for measuring self-concept.

Biao (1990) in his attempt to develop a culture fair self-concept scale for use in Africa observed that the TSCS was the most popular employed self-concept scale in African educational (including non-formal adult education) practices despite the fact that the use of the scale has sociological, cultural and psychological implications. Therefore, Biao (1990) constructed the "Adult learners self-concept inventory (ALSCI)". The ALSCI was tested on data drawn from two African countries: Nigeria and Republic of Benin. According to Biao (1990), the design of ALSCI was based on four theories derived from the literature on self-concept measurement. "These theories submit that:

a) Self-concept is a reflexive phenomena;
b) Self-concept operates merely indirectly;
c) Self-concept is best elicited through the generation of a semantic field appropriate for the population to be studied; and
d) A multi-scaled self-concept instrument elicits most meaningful and most valid a respondent's concept of self".

The self-concept scales reviewed here reflected the traditional conception of the construct. As such, they measure general (i.e. global) self-concept. It is high time to study African self-concept from the modern conceptualisation of the construct so as to pave way for valid and reliable research to be done in the area. Hence, within network self-concept study is needed in Nigerian (African) context.

2.4.2. **Between-Network Studies**

Studies reviewed here investigated the relationship between self-concept and other constructs (i.e. variables) that seemed to be related.

i. ***Western studies***

Studies that explore the relationship between self-concept and academic achievement are of two fold: those that are concerned with determining the association between self-concept and academic achievement; and those that focused on establishing causal direction (Byrne, 1984). The former was of concern here.

Purkey (1970) reported that there has been an invigoratory amount of research into the relationship between self-concept and academic achievement since 1960. In his review of the studies relating self-concept and academic achievement, Purkey (1970) asserted that in overall, the research evidence clearly indicated a persistent and significant relationship between self-concept and academic achievement at each grade level. And the association appears quite evident for boys than for girls. However, most of the early studies reviewed by Purkey (1970) related general self-concept with academic achievement.

In another review of early between-network studies which related general self-concept with academic achievement, Byrne (1984) reviewed some studies that

reported positive, but low correlation between self-concept and academic achievement. For instance, Piers & Harris (1964) from the data collected from students in Grades 3, 6, and 10, reported a positive, but low correlation between self-concept and academic achievement. The relationship appeared to be stronger at Grade 6 (.32). The results from similar studies (Coopersmith, 1967; Butcher, 1968; Mintz & Muller, 1977) concurred with Piers & Harris' (1964) findings. These researchers intimated that the selection and use of inappropriate and inadequate instruments might have led to the spuriously low correlation between self-concept and academic achievement.

Later studies which used modern self-concept theories as frame of references, revealed different, but interesting findings. That is, general self-concept and academic self-concept can be measured independently from academic achievement; and that subject area specific self-concepts (e.g. Math sc and reading ability sc) can also be distinguished from academic achievement.

As part of these later studies, Marx & Winne (1980) explored the relationship between academic achievement and the academic, social, and physical dimensions of self-concept. The results of this study revealed that academic self-concept was positively related to academic achievement, but the non-academic self-concept facets (social and physical dimensions) were inversely related to academic achievement. Similar studies (Shavelson & Bolus, 1982; Marsh, Parker & Smith, 1983; Marsh, Smith, Barnes & Butler, 1983, cited in Byrnes, 1984) reported more elaborate findings. Byrne (1984:450) reported that these studies showed academic achievement to be "highest correlated with the specific academic dimension of sc, most closely linked with a particular academic ability,

moderately correlated with overall ASC, and uncorrelated with the non-academic facets of sc".

The findings further underscore the contention that the relationship between self-concept and academic achievement (including other variables mutually related to the construct) could not be adequately explored if the multidimensionality of the construct is ignored.

ii. ***African/Nigerian empirical studies***

Just like the within-network self-concept studies, the between network self-concept studies in Nigerian context are equally few. Most of the between-network self-concept studies available in Nigeria related the construct to variables such as *socialisation patterns* (Olowu, 1985); *vocational choice* (Olowu, 1990); *moral* reasoning (Okatahi, 1984); locus of control (Okatahi & Adeyaju, 1989) psychopathology (Bolarin, 1994; Ezeilo, 1990); exceptionality (Olukotun, 1994; Abosi, 1986). Only very few studies related the construct to academic achievement. For the purpose of this study only self-concept studies that explored the relationship between the construct and academic achievement were reviewed here.

Adediran (1985) observed that the effect of self-concept on academic performance among the African population has not been generally or widely known. Furthermore, he asserted that mention had not been made about the extent to which self-concept has influence on adolescents' academic achievement in the Nigerian setting. Therefore, in his attempt to explore whether self-concept has paramount influence on students' academic achievement Adediran (1985), collected data from 991 form five students (age range between 12 and 18 years).

Self-concept was measured using the Tennessee self-concept scale-TSCS (Fitts, 1986). Analyses of data revealed low, negative and non-significant correlation between total self-concept and academic performance of male, urban and rural students. However, for the girls, the correlation between total self-concept and academic performance was significant, but negative. This low and negative correlation of self-concept and academic achievement as revealed in Adediran's study could be attributed to problem earlier raised. That is, inadequate conceptual framework and inadequate measuring instrument.

Another study (Abdullahi, 1985), which related self-concept and academic achievement, revealed different findings. Abdullahi's (1985) study explored the construct validity of Marsh & Smith's (1983) Self-Description Questionnaire (SDQ) among primary school adolescents. In addition, the study explored the relationship between self-concept and academic achievement; and between self-concept and teachers' ratings of students' self-concept. The sample of the study comprised of 110 primary six pupils. Analyses of results revealed positive correlation between academic self-concept and academic achievement; between non-academic self-concept and academic achievement; and between total self-concept and academic achievement. The study further found SDQ to be valid for Nigerian pre-adolescents. In this study, academic self-concept was found to correlated with teachers' ratings (0.26) and from 0.121-0.15 with academic attainment; non-academic self-concept correlated with teachers' ratings (0.104) and from 0.92-0.53 with Math, English and Social Studies; and total self-concept correlated with teachers' ratings (0.123) and from 0.28-0.132 with academic achievement. These findings did not support the assumption that self-concept

facets become increasingly stable toward the apex of the hierarchy (cf Marsh & Shavelson, 1985).

In a very recent study (Abdullahi, 1997), another conflicting trend in the relationship between self-concept and academic achievement was revealed. Using 200 SSS students (age range: 15-25 years) and Marsh, Parker & Smith's (1981) SDQ, Abdullahi (1997), examined the inter-relationship between students' personal factor (as defined by self-concept and academic ability) and type of home and achievement in Mathematics. The result of the study revealed that self-concept and academic ability were negatively skewed and that self-concept has significant, but negative relationship with academic achievement in Math. Abdullahi (1997) concluded that the three independent variables of self-concept, academic ability and type of home did not predict objective measure of the students in Math. The study of Okatahi & Adeyanju (1989) on the other hand revealed, among their primary school subjects, significant relationships between Mathematics, Primary Science, Social Studies, English Language, Locus of Control, and Self-concept.

From the findings of the studies reviewed, it can be justified that academic self-concept is more likely to correlate high with academic achievement and other academic behaviours than is general self-concept.

2.4.3. **Gender and Self-concept**

Gender differences in self-concept structure have been another line of study in the multidimensionality self-concept. Review of research conducted prior to 1977 by Whylie (1979) showed that there was no evidence for sex differences in overall self-concept at any age level. Whylie (1979), therefore, suggested that

differences in specific components of self-concept might be lost when responses to items are summed to obtain a total score. However, review of recent research on self-concept after 1980 suggests sex differences in general self-concept. For instance, the studies of Marsh (1989), Skaalvik (1986a) suggested that boys have slightly higher general self-esteem than girls as measured by context-free instruments such as that of Rosenberg self-esteem scale. However, the result of these studies are less convincing when self-esteem is measured by instruments summing self-descriptions in different areas, for example, the Coopersmith self-esteem inventory. Skaalvik (1986a) concluded that when one studies gender differences in self-concept, the results may be dependent on the instruments used.

With regards to gender differences in specific areas of self-concept, there appeared to be counterbalancing gender differences, which are consistent with sex stereotypes. Dusek & Flaherty (1981) reported that boys had higher self-concepts in masculinity and achievement/leadership and lower self-concepts in congeniality/sociability. The studies (Marsh, 1984; Marsh, Parker & Barnes, 1985), using SDQ found sex differences favouring boys in physical ability self-concepts, and favouring girls in reading self-concept among the pre-adolescents and adolescents samples. These studies have further revealed sex differences favouring boys in Math self-concepts. Several studies reviewed by Marsh (1989), revealed higher verbal and reading self-concepts for girls than for boys. The study of Marsh, Smith & Barnes (1985) also showed that girls had significant higher self-concept in reading, but had lower Math self-concept than did boys.

The study of Skaalvik & Rankin (1990) using path analyses examined among other things, gender differences in the structure of academic self-concept.

Using data from Norwegian sixth grade students (117 boys and 114 girls), Skaalvik & Ranking (1990), reported that the structure of self-concept differed for boys and girls. That is, verbal self-concept had a significant and relatively strong direct effect on general academic self-concept for girls, and had no significant effect for boys. For Math self-concept, a direct and positive effect appeared for boys, whereas a negative effect appeared for girls. Furthermore, Skaalvik & Ranking (1990) observed that verbal achievement did not have any significant effect on general academic self-concept for girls, whereas Math achievement did. On the other hand, the opposite pattern emerged for boys. Thus, the researchers claimed that sex stereotypes were the cause of this apparent gender differences and this suggests that boys have better Math abilities than girls and that Math is more important for boys, whereas girls are said to have better verbal ability than boys.

In another study (Skaalvik, 1990), using the cognitive dimension measure of academic self-concept, reported that girls had a substantially higher level of achievement and higher success expectation than their male counterparts in Norwegian and English language tasks, whereas there were no gender differences in achievement and success expectation in Math or in general academic self-esteem.

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Most of the studies that examined gender differences in self-concept concentrated on the pattern of relations between Math and verbal self-concepts with general academic self-concept. Since most of the studies reviewed, interpreted the apparent gender differences in terms of sex stereotypes, a replication of the results with dimensions of academic self-concept (e.g. science,

arts and technical self-concepts) is pertinent before any firm conclusions can be drawn.

2.4.4 Self-concept and Self-esteem:

Self-concept and Self-esteem are two widely used terms to think about the self and some authors used them interchangeably. Franken (1994) for instance, claimed that Self-concept is related to Self-esteem in such away that people who have good Self-esteem have a clearly differentiated Self-concept. "When people know themselves they can minimize outcomes because they know what they can and cannot do" Franken, (1994: 439). Strein (1995) argued that various authors, often use the terms "Self-concept", "Self-esteem", "Self-worth", "Self-acceptance", interchangeably and inconsistently, when discussion about how people view themselves.

2.5. Summary

Self-concept has been, for long, the focus of countless research studies. However, self-concept research prior to 1980s world over, has addressed itself to substantive problems before problems of definition, measurement, and interpretation have been resolved (Shavelson, 1976). That is to say, self-concept studies before 1980s considered the structure of self-concept to be unidimensional and, thus, used measurement instruments designed to assess general (i.e. global) self-concept. Hence, the findings of self-concept studies prior to the 1980s were said to be inconsistent, confounded and ambiguous (Shavelson, 1976).

In an attempt to address the issue of self-concept construct definition and theoretical structure, self-concept researchers in the west during the 1980s and early 1990s proposed self-concept models capable of being tested empirically.

Many self-concept studies have been conducted to test the generalizability of the modern self-concept theories in different educational settings and some have even extended them a little further. However, in Nigerian educational setting, little attempt has been made to test the structure of self-concept as theorised by the modern theorists of self-concept. In other words, there is lack of within network self-concept studies in Nigeria. What is most glaring is between-network portion of self-concept studies in Nigeria. It is pertinent to state that Shavelson (1976) posited that within-network studies should pre-cede between network studies. Hence, there is a need for construct validation study of self-concept within Nigerian context so as to explore the potential importance of self-concept in interpreting Nigerian students' achievement outcomes.

CHAPTER THREE

METHODOLOGY

3.1. Introduction

The intent of this study was to present a construct validation study of self-concept in the Nigerian educational setting. As reported in the conceptual framework of this study, an important pre-requisite for the valid use of self-concept research is the understanding of the construct itself. This entails defining the nomological network relating differentiable aspects of the construct to each other (i.e. the within-network portion) on one hand, and relating the construct to other educationally significant variables such as academic achievement (i.e. the between-network portion) on the other. This research, being a construct validation study, focused on the two aspects. This is because the study's main theme: to integrate student's self-conceptions of academic subjects into the Marsh/Shavelson's (1985) self-concept model; and to find out the relationship between students' academic self-perceptions and academic achievement, fits therein. Therefore, this chapter described the general design of the study; the population and sample of the study; and the procedures for data collection and analyses.

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3.2. Research Design

Since this study focused on the within network and between network portions of the students' academic self-concepts, three Ex post facto designs were employed to test the hypotheses formulated. These designs included correlational design; criterion -group design; and factorial group design. For clearer justification

on how and where these designs fit in the study, it is pertinent to examine what the three ex post factor designs entails.

According to Shavelson (1981), an Ex post factor design examines the degree of relationships between two or more variables, but not causal relationships. Shavelson (1981:39) further claimed:

> These designs are called ex post factor designs because when the researcher comes on the scene, nature has already implemented a treatment, either through differences in environments in which subjects find themselves, through difference in inheritance, or through some combination of these two factors. Thus, the researcher arrives after the fact (*ex post facto*) that the treatments have been imposed on the subjects.

Correlational designs: Cronbach (1971) posited that construct validation studies fall into three major categories: logical analyses; correlational techniques; and experimental techniques. Of these three categories of construct validation studies, Shavelson and Stuart (1981) pointed out that correlational techniques have been the most widely used. Therefore, this study employed the correlational design.

According to Gay (1992), a correlational research describes in quantitative terms the degree to which two or more variables are related. The relationships to be investigated in correlational research should be suggested by theory or derived from experience. Elaborating the correlational design, Shavelson (1981) asserted that, one group of subjects is measured on two or more continuous individual - differences variables. Thereafter, the two measures are correlated. A schematic representation of the correlational designs is given below:

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Measurement Test (1)	Measurement Test (2)
Group (1) Var. 1	Var. 2

Fig.3.1: Schematic representation of correlational design.

In this study, the subjects of the study were measured on academic self-concepts and academic achievement on one hand and on science academic and/or arts and technical self-concepts on another. As such interrelationships between these students' paired measured variables were obtained.

Criterion-group design: In criterion-group design, subject falling into discrete (i.e. independent variables) are compared on measures of dependent variable. An example of criterion-group designs as given by Shavelson (1981) is a comparison of normal and neurotic subjects on measure of self-concept with the expectation that the former will differ in their evaluations of themselves than the latter. A Schematic representation of the criterion-group design is given below:

	Assignment	Measurement/Observation
Group 1	C_1	O
Group 2	C_2	O

Fig.3.2: Schematic representation of criterion-group design.

In this study, students identified as having special educational needs and those not so identified were compared on their measures on academic self-concepts. Hence, criterion-group design was employed to test hypothesis leading to this direction.

Factorial-criterion design: The factorial-criterion design combines factorially, two or more discrete independent variables (Shavelson, 1981). The factorial-criterion design is Schematically represented below:

3.4. Sample

From the population, a total number of 384 (220 males and 164 females) students were selected as subjects of this study. Krejcie and Morgan's (1970) table for determining sample size from a given population was used in projecting the number of subjects used in this study (see Appendix 1 for full details of the Kreycie & Morgan's, table).

The subjects were drawn from 9 senior secondary schools in the three selected States. Only senior secondary school offering science, arts and technical academic subjects were selected. Randomisation was employed in selecting the samples of the study; i.e. the table of random numbers method was employed to select students from each school visited. The procedures in the use of table of random numbers method suggested by Leedy (1993) were adhered to in the randomisation. The procedures followed are described below.

First, entry numbers into the horizontal and vertical columns of the random numbers table were found. The numbers were obtained using the serial number of a N20 bill (DL/42 762379). The first two digits 7 and 6 were chosen as entry numbers.

Second, the researcher flip a coin to determine which of the two digits should go for horizontal column and which for vertical column. Heads for horizontal column was decided. The coin came down tails. As such the entry number for horizontal column became 6 and vertical column 7.

Third, students in each school were assigned serial numbers for identification purpose. Fourthly, the random selection was done. The total

number of sample selected was proportionate to the total number of Senior Secondary Students present in each state. That is the state with larger number of population was assigned larger number of subjects. The table below presents the subjects selected by state, school and sex:

Table 3:2—Sample by State, School and Gender

State	School	Type	No. Male Subjects	No. Female Subjects	Total
Jigawa	GSS, B/Kudu	Boys	30	-	30
	GGSS, Garki	Girls	-	30	30
	GSS, Hadejia	Boys	30	-	30
Kano	AKCC	Mix	40	30	70
	GGC, Dala	Girls	-	60	60
	Rumfa College, Kano	Boys	60	-	60
Katsina	Govt. Col. Katsina	Boys	30	-	30
	GGC Katsina	Girls	-	44	44
	GSS, M/Fashi	Boys	30	-	30
Total =			**220**	**164**	**384**

3.5. Measuring Instruments

For the purpose of this research, two kinds of measuring instruments were used. The first measured the academic self-concepts of the students, while the second measured the subjects' academic achievement. These instruments are described below:

3.5.1. **Academic self-concept Measures**

Two types of academic self-concept measures were employed in this study. They are the evaluative dimension measure and the cognitive dimension measure. A background to these two dimension measures of academic self-concept is pertinent.

Self-concept researchers have distinguished two distinctive dimensions of academic self-concept measures. Rosenberg (1979), for instance, has

distinguished between self-knowledge and self-evaluation, or between describing and evaluating the self. Skaalvik & Ranking (1990) and Skaalvik (1990) elaborating these dimensions further, posit that the evaluative dimension focuses on the general feelings of doing well or poorly in academic subjects. That is on "how well do I do" or "well/poor" perspective. The cognitive (i.e. descriptive) dimension on the other hand, measures students' academic self-concept from their own perceptions of "can I do it?" or "can I do the specific task?" perspective. Skaalvik (1990) argued that answering question "can I do the task?" requires some kind of judgment — a judgment of whether one is able to perform a certain activity, independent of whether that is "good or poor or what others can do".

In line with the suggestions given by Marsh (1990a), that is, researchers and educational practitioners interested in the self-concept of particular subject areas should use self-concept scale specific to those subject areas in addition to other measures of academic self-concept, these two dimension measures were employed in this study.

i. ***The evaluative dimension measure (EDM)***

The Academic Self-Description Questionnaire (ASDQ) of Marsh (1990a) which is an evaluative dimension measure of students' academic self-concepts was adopted and used to measure the students' academic self-concept. The ASDQ (modeled after Marsh's [1988] Self-Description Questionnaire) corresponded to school subject actually taken by students. It comprised a six-item self-concept scale for each of the school subject. The wordings of each of the six self-concept scales were as follows:

- "Compared to others of my age, I am good at (a specific school subject)".
- "I score good marks in (a specific school subject)".
- "Work in (a specific school subject) classes is easy for me".
- "I'm hopeless when it comes to (a specific school subject)".
- "I learn things quickly in (a specific school subject)".
- "I have always done well in (a specific school subject)".

In addition the ASDQ included a general school scale in which the term "most school subjects" was substituted for the specific academic subjects. The general school scale was intended to measure the subjects' general academic self-concept—i.e. the subjects' general feeling of doing well in school.

The items in ASDQ are answered with 6-point true-false scale ranging from 'false' (1) 'to true' (6). For the purpose of this study, a slight modification in the scaling was made. This is pertinent so as to provide uniform scoring with the cognitive dimension measure of the self-concept. Hence, the ASDQ was scored (i.e. answered) on 5 point ranging from absolutely false (1) to 'absolutely true' (5).

The school subjects taken by the SSS students in Sciences, Arts and Technical domains were used in wording the ASDQ. As such the following SSS subjects were used as academic subjects from which students' self-perceptions was measured. The academic subjects include the following:

Agricultural Science
Auto-mechanics
Biology
Chemistry
Commerce
Economics
Electronics
English Language
English Literature
Geography
Government
Hausa
History
Mathematics
Metal Work
Physics

Technical-Drawing
Woodwork

Appendix 2 contained the actual items of the ASDQ modified to cover these academic subjects.

The reliability of the ASDQ has been demonstrated in several studies. For instance, Marsh (1990b) reported coefficient alpha estimates of 0.881 to 0.941 and 0.885 to .949 for Grades 5-6 and 7-10 (Australian students) samples, respectively. The reliability estimate using Nigerian Hausa students revealed coefficient alpha estimate of 0.66 to 0.96.

ii. ***The cognitive dimension measure (CDM)***

The cognitive dimension of the students' self-concept was measured using the Success Expectations on Defined Problems (SEDP) procedure of Skaalvik & Rankins (1990). The SEDP was composed of concretely defined problems (i.e. tasks) in different academic areas (subjects), which required the students to think and respond to whether they would be able to solve the given problems. Six-item scale of SEDP was constructed for each of the academic subjects listed above. To realize this, the assistance of experts in Kano Educational Resource Department (KERD) was sought. Items in the SEDP were generated using past question papers on SSCE and UME. Only items that depict SS II Syllabus were adopted. The items in SEDP composed of objective type test and were answered using a five- point scale—'absolutely not sure' (1) to 'absolutely sure' (5).

The general academic self-concept of the cognitive dimension measure of self-concept was assessed using academic self-esteem of Skaalvik (1990) modeled after Harter's (1979) perceived competence scale. The actual self-esteem scale contained 7 items. Each described two different groups of students and the

students are asked to respond as to what group they mostly belong. An example of one item was as follows:

"Some pupils think that they are good at their school work,	While	Other pupils do not think that they are good".

Items in the general self-esteem are responded to on a 4- point scale—'partly true' (1) to 'absolutely true' (4). For the purpose of this study, six of the seven items were used. The reason, of course, is to make the scale tally with the general academic self-concept measure of the evaluative dimension. Furthermore, the items were scored on a 5 -point scale—'absolutely not true' (1) to 'absolutely true' (5). Appendix 3 contained the full text of the SEDP.

The reliability of this scale has been demonstrated in several studies. Skaalvik & Ranking (1990), for instance, reported that Cronbach's alpha in four different studies using Norwegian students has been shown to be between .80 and .81. While with the Nigerian secondary school students, the Cronbach's alpha of between 0.67 to 0.96 were obtain in a pilot study conducted by the present researcher.

3.5.2. Academic Achievement Measures

The SEDP was used to assess students' academic performance. That is, after the students have been asked to indicate their ability on the SEDP, they were then required to solve the problems. One point was given for each item answered correctly and zero point for incorrect response.

3.5.3. **Identification of Students with Special Educational Needs**

Students with special educational needs are those who appear to have long history of failure at school. They are often presumed to lack motivation, hold low self-perceptions of ability and consequently pose a range of problems to their teachers and school (Galloway et al, 1995). Empirical studies (Galloway et al, 1995; Craske, 1988) had employed NFER cognitive ability tests of Thorndike et al (1986) to identify students with special educational needs. The NFER cognitive ability test was based on students' academic subjects such as Mathematics and English.

For the purpose of this study, the subjects' scores on SEDP were used to identify students with special educational needs. To achieve this, Galloway's (1993, 1995) procedure was adopted. That is, the students were placed in one of four bands based upon their academic achievement scores as follows: Band 1 scores 25-30; Band 2 scores 16-24; Band 3 scores 10-15; Band 4 scores <10. Band 4 students were regarded as having special educational needs.

3.5.4. **Quality Estimate of the Instruments**

i. ***Pilot study***

A pilot study was conducted so as to establish the quality estimate of the measuring instruments. The essence of the pilot study was to estimate the reliability and validity of the study's measuring instruments. One hundred students were selected from one State of the north- west zone: Kano. From the data obtained the validity and reliability estimate of the ASDQ and SEDP were ascertained.

ii. ***Validity***

Construct validity, i.e. the factorial validity estimates of the ASDQ and SEDP were sought. Anastasi (1990) defined construct validity of a test "as the extent to which the test may be said to measure the theoretical construct or trait". Construct validity is sought using many procedures, among which factor analysis is the most widely used. In factor analysis, the number of variables in terms of testees' performance are reduced to smaller number of factors or common traits. After the factors (i.e. traits) have been identified, they are used to describe the factorial composition of the test.

Anastasi (1990) has elaborated clearly on how the factorial validity of a test can be obtained. Thus, he claimed that all techniques of factor analysis begin with a complete table of matrix, i.e. table of inter-correlation among a set of tests. Once the factor matrix has been computed, then the interpretation and rating of factors proceeds. An inspection analysis is done. Tests having high correlation with each other and low correlation with all other tests define common traits or factors. Such characterisation of a test(s) in terms of the major factors determining its scores, Anastasi (1990) defined as factorial validity of a test. Anastasi (1990:155), thus, stated: "It should be noted that factorial validity is essentially the correlation of the test with whatever is common to a group of tests or other indices of behaviour".

Using factor analysis on ASDQ and SEDP sub-scales 3 factors were revealed. All sub-scales measuring Academic Self-concept in Science subjects loaded together and those sub-scales measuring Art subjects loaded together as Science and verbal Academic Self-concepts, respectively. In like manner, sub-

scales measuring technical subjects converged together. Sub-scales measuring General Academic Self-concept correlated with all the sub-scales defining the 3 factors (see Appendix 4 for the validity report).

iii. ***Reliability***

Internal consistency type of reliability for the two measures—ASDQ and SEDP was sought. Internal consistency reliability determines how each item in the test (or sub-tests) relates to all other items in the test or (sub-tests). In other words, internal consistency reliability estimates the reliability of a test on the basis of the number of items in the test and the average correlation between pairs of items. Gay (1992) and Anastasi (1990) referred to this type of reliability as *inter-item* consistency, i.e. the consistency of responses to all items in the test.

Inter-item consistency of a test is estimated using Rationale equivalence reliability (i.e. the Kuder-Richardson reliability) method or the Cronbach's alpha method. The rationale-equivalence reliability method estimates internal consistency reliability of a test using one of the two formulas known as KR-20 or KR-21. Gay (1992) and Anastasi (1990) posited that both formulas are applicable to tests whose items are scored dichotomously, i.e. 'right' or 'wrong', 'correct' or 'incorrect', or '1' or '0'. However, for items in a test that yield scores in such a way that responses are worth different numerical values, e.g. 0, 1, 2, 3, 4, or 5, a generalised formula known as Cronbach's alpha is applicable. Gay (1992) posited that "Cronbach's alpha is a general formula of which KR-20 or KR-21 is a special case".

According to Frude (1993), Cronbach's alpha is an estimate of the correlation to be expected between scores obtained on a scale and the true score

(i.e. the score that would be obtained from a perfect measure of the scale variable). Therefore, inter-item consistency of ASDQ and SEDP were ascertained using the Cronbach's alpha procedure.

The coefficient alpha estimates of reliability determined for the 19 ASDQ scales varied from .6631 to .9606 (Mdn = .9215). For the 19 SEDP scales, the coefficient alpha estimates of reliability varied from .6650 to .9626 (Mdn = .9266). (See Appendix 4 for the reliability report).

Frude (1993) posited that the greater the number of the items in the scale, and the greater the correlation between the items, the higher the value of the alpha. And the higher the alpha value, the better (i.e. more reliable) the scale. Therefore, these alpha values of the ASDQ and SEDP were high enough to judge the sub-scales more reliable.

3.6. Data Collection Procedure

Data for the pilot study and the actual study was collected with the help of teachers (research assistants) employed in each school. The first procedure was the identification of the sample. That is, before the commencement of the data collection in each of the schools selected, students were sorted into classes according to their course offerings: Science, Arts, or Technical. All the questioners were numbered serially so as to easily identify the respondents according to their course offerings during data coding phase. After the sampling, the two instruments were administered one after the other with ASDQ first. As for the ASDQ, the teacher read the set of instructions to the students. Thereafter, he read the actual items to the students, although each student has a copy of the instrument. The students were instructed to fallow the teacher

reading the items and respond to each item as he reads. The reason for this procedure was to ensure that every student spends the same amount of time on each question; that all students complete the task at the same time; facilitate class control; and reduce any effort of poor reading skills. Marsh (1988) suggested this procedure.

At the end, the teacher gave the students some few minutes to check their responses. Students were also given chance to ask questions pertaining to meaning of any word or expression. The teacher then paraphrased the expressions as best as he could without changing the meaning of the items. Students were then asked to answer as best as they can.

For the SEDP, the teacher read and explained the instruction to the students in clear language on what the respondents were required to do. For instance, a respondent was expected to circle 1 if it is absolutely **not true** he can solve the problem; and circle 5 if it is absolutely **true** he can solve the problem. Thereafter, the teacher read each task for the respondents. As each task was read by the teacher, the students were given some seconds to indicate whether he/she was able to solve it. Teachers ensure that the presentation and the time (usually not more than 10 seconds) given for responding to item was too short for the student to really do the task, but long enough to grasp the nature of the task. For the academic achievement measure of the SEDP, the students were later on (i.e. after a short break) asked to solve the tasks described within a stipulated period of time.

The data collection procedures explained above greatly assisted in minimizing the problem of mortality. No subject was allowed to go home or even move out of the testing room with any of the instrument in all the Schools visited.

3.7. Data Analysis Procedure

Since this research used the correlational design, data analyses were based on correlational procedures. Explaining the correlational design, Gay (1992) asserted that two or more scores are obtained for each individual member of the selected sample, one score for each variable of interest and the paired scores are then correlated. The obtained coefficients indicate the degree of relationships.

Among the three correlational techniques: Factor analysis, multiple correlation, and regression analysis, the first two techniques were employed for the purpose of this study. Factor analysis assists in reaching a meaningful interpretation of the ways in which the variables are related (Ferguson & Takane, 1989). Furthermore, Byrne (1984:417) stated, thus:

> ...factor analysis, arranges a matrix of correlations into convergers or clusters among tests or among items on a test. If the test operates as its design suggests, items measuring say, academic self-concept should cluster together, and this cluster should be distinct from a cluster of items on say, physical self-concept. When this occurs, we gain some confidence in our interpretation of test scores. If unanticipated clusters are formed in the test, some revision is called for.

Since the design of this study is anchored to seek inter-correlations among the facets of general academic self-concept, clusters among tests items (i.e. scores) of various facets of students' academic self-concept were expected to converge together. Anastasi (1990) pointed out that in construct validation study, an

investigator is expected to show the convergent and discriminant validations of the variables under study. The former process entails test scores in some variable(s) to correlate highly with other variable with which it should theoretically correlate. The latter process on the other hand, denotes that variable(s) does not correlate significantly with variables from which it should differ.

Therefore, Anastasi (1990) proposed a dual approach—Multitrait - Multimethod Matrix (MTMM) as a design for obtaining convergent and discriminant validations. Multitrait-Multimethod Matrix requires the assessment of two or more traits (i.e. facets) by two or more methods (i.e. tests). This study assessed students' self-perceptions in academic subjects using two methods, i.e. tests: the evaluative dimension and the cognitive dimension. As such the MTMM procedure were employed as statistical analysis in this study.

To realise the procedures stated above, subjects' responses to items in the ASDQ and SEDP were summed up to obtain a total score for each scale. For instance, items measuring academic self-concept in English language in both ASDQ and SEDP were summed up to obtain a total score from each scale. In like manner items measuring General School concept in ASDQ and Academic self-esteem of SEDP were summed up to obtain a total score for each scale. Thereafter, inter correlations of the total scores on each scale were sought. Furthermore, t-test statistical analysis was employed to test the hypothesis on the difference in academic self-concept measures of those students identified as having special educational needs and those not so identified. To realise this, the mean scores of the two groups in academic self-concept measures were compared.

CHAPTER FOUR

RESULTS AND DATA ANALYSIS

4.1. Introduction

In the preceding chapter, detailed discussion of the study's methodology was presented. In this chapter, details of the results and analyses of data for the actual study were presented. For clear presentation of the results of the study, the hypotheses were treated sequentially.

4.2. Results of the Study

4.2.1. Hypotheses Testing of Within Network Study

a) Hypotheses i-iv.

One of the main objectives of this study was to integrate students' self-perceptions of the academic subjects into the Marsh/Shavelson's model. To realise this, Nomological network portion of the students' self-perceptions in academic subjects were examined. Hence, the study assumed that: Students' self-perceptions of academic subjects would be best integrated into the academic self-concept hierarchy as components of second order factors — science-academic and arts-academic; and that separate second order factor — technical-academic self-concept in addition to the two above might be revealed to account for relations among specific facets of academic self-concept.

As such the following four hypotheses were posed for testing:

i) There are no significant interrelationships between science-academic self-concept facets and general academic self-concept using the cognitive and evaluative dimension measures of self-concept;

ii) There are no significant interrelationships between arts-academic self-concept facets, and general academic self-concept using the cognitive and evaluative dimension measures of self-concept;

iii) There are no significant interrelationships between technical-academic self-concepts facets and general academic self-concept using the cognitive and evaluative dimension measures of self-concept; and

iv) There are no significant relationships between science-academic, arts-academic, and technical-academic self-concepts facets using the cognitive and evaluative dimension measures of self-concept.

To test these hypotheses, students' responses to the 19 scales of the ASDQ and SEDP were obtained. Each student's responses to the six items in each scale were summed up to get a final score. Since each of the ASDQ and SEDP scale was responded to on a 5 point Likert scale, the total score for each scale ranged from 6-30. Thereafter, correlation matrixes of the two measures (i.e. ASDQ and SEDP) were computed using SPSS PC+ computer package. The correlation indices of students' responses on sciences, arts and technical academic subject scales (for both ASDQ and SEDP) are tabulated and presented below in Tables 4.01 to 4.04

Table 4.01

Inter-scale correlation Matrix of ASDQ (Decimals have been omitted)

ASDQ	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1 ASAGR																			
2 ASAUT	-02																		
3 ASBIO	81	-01																	
4 ASCHE	75	03	79																
5 ASCOM	00	-07	-02	-18															
6 ASECO	-02	-01	-02	02	89														
7 ASELA	23	03	26	14	70	71													
8 ASELE	-01	81	-01	-01	02	09	07												
9 ASELT	02	-04	-01	-16	78	78	73	04											
10 ASGEN	51	30	51	40	36	38	57	27	39										
11 ASGEO	75	00	78	80	-14	-13	14	-08	-11	**39**									
12 ASGOV	08	-09	03	-13	72	72	61	01	68	**35**	-05								
13 ASHAU	24	-05	27	12	69	68	80	-02	69	**48**	16	61							
14 ASHIS	05	-07	-00	-19	82	80	71	-03	81	**35**	-09	77	73						
15 ASMAT	66	04	73	73	07	10	37	07	09	**51**	72	10	28	03					
16 ASMET	-08	81	-10	-00	-00	05	02	86	-03	**26**	09	-03	-07	-07	03				
17 ASPHY	72	07	77	86	-28	-30	17	-02	-24	**35**	81	-19	15	-22	75	-02			
18 ASTEC	-08	80	-04	04	-03	04	06	84	-02	**29**	-01	-04	-04	-05	-08	88	03		
19 ASWW	-06	71	-05	03	-06	02	04	76	-04	**23**	-04	-05	-07	-10	07	78	03	84	

Key:
Correlation within the range of < .26 to >.12 is significant at the 0.05 level (2-tailed)
Correlation >.26 is significant at the 0.01 level (2-tailed)

Inspection of the correlation matrix of ASDQ presented in Table 4.01 above suggests important findings. That is, all the science-academic self-concept facets correlated significantly with one another and all with general academic self-concept. Likewise arts-academic self-concept facets correlated with one another and with general academic self-concept. Furthermore, technical-academic self-concept facets correlated with one another and with General academic self-concept. This revelation, therefore, disproves the first three hypotheses of the study, which assert no significant interrelationships between science-academic, arts-academic and technical-academic self-concept facets and general academic self-concept. The same trend of finding was revealed in Table 4.02, which depicts inter-scale correlation matrix of SEDP.

Table 4.02

Inter-scale correlation Matrix of SEDP (Decimals have been omitted)

SEDP	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1 SEAGR																			
2 SEAUT	-03																		
3 SEBIO	81	-07																	
4 SECHE	76	07	78																
5 SECOM	04	-08	02	03															
6 SEECO	10	-10	03	-12	37														
7 SEELA	42	08	41	26	42	43													
8 SEELE	-07	79	-08	01	-06	-07	09												
9 SEELT	01	-05	04	-14	51	50	62	-01											
10 SEGEN	49	29	47	35	23	22	64	32	38										
11 SEGEO	52	00	51	57	-07	-06	16	-01	-08	25									
12 SEGOV	07	-11	04	-14	34	35	37	-07	53	19	-06								
13 SEHAU	30	-03	27	12	35	35	62	-01	53	42	10	33							
14 SEHIS	05	-08	02	-22	53	54	64	-04	83	38	-15	56	52						
15 SEMAT	45	09	45	45	02	01	30	08	04	35	89	01	18	-00					
16 SEMET	-09	80	-10	01	-08	-09	10	83	-04	28	-01	-07	-04	-04	09				
17 SEPHY	37	04	35	44	-05	-06	18	07	-05	24	30	-06	19	-07	27	03			
18 SETEC	-11	82	-12	-04	-11	-09	08	83	-06	31	-04	-11	-03	-06	07	84	01		
19 SEWW	-10	81	-11	-00	-11	-12	07	83	-08	31	-03	-12	-04	-09	07	83	04	92	

Key:
Correlation within the range of < .26 to .12 is significant at the 0.05 level (2-tailed)
Correlation >.26 is significant at the 0.01 level (2-tailed)

Inspection of Tables 4.01 and 4.02 reveals that general academic self-concept correlated significantly with all the academic self-concept facets in science-academic, arts-academic and technical-academic. This finding confirm one of the study's assumption that general academic self-concept would be clearly defined and would be significantly correlated with the second — order academic self-concept factors — science-academic, arts-academic and technical-academic.

Inspection of Tables 4.01 and 4.02 reveals that the science-academic self-concept facets; arts-academic self-concept facets; and technical-academic self-concept facets did not correlate with one another in all the two measures (i.e. ASDQ and SEDP) of academic self-concept. However, there is an incidence of significant relationships between two arts-academic self-concept facets and nearly all the science-academic self-concept facets. These relationships occurred between

academic self-concept in English language and Hausa language; and with nearly all the science-academic self-concept facets. Academic self-concept in English language correlated significantly (P. <0.05) with all the science-academic self-concept facets in both the ASDQ and SEDP measures. Academic self-concept in Hausa language correlated significantly (P. <0.05) with nearly all science academic self-concept facets: Agriculture, Biology, Geography, and Mathematics in both the ASDQ and SEDP measures. Thus, it is revealed that there are no significant interrelationships between science-academic and technical-academic self-concept facets. Similarly, no significant interrelationships exit between arts-academic and technical academic self-concept facets. Furthermore, it was discovered that there is significant interrelationships between some science-academic self-concept and arts-academic self-concept facets. Hence, the fourth hypothesis of this study, which claimed that there are no significant interrelationships between science-academic; arts-academic; and technical-academic self-concept facets, is upheld.

To further present clearly the results of the study relating to hypotheses i-iv above, the correlation indices of all science-academic, arts-academic, and technical-academic self-concept facets were fished out from the correlation matrices and presented in Tables 4.03 and 4.04 below.

Table 4.03

Inter-scale correlation matrices of SASC, AASC & TECSC (ASDQ)

SASC: Science-Academic Self-concept

Scale	ASAGR	ASBIO	ASCHE	ASGEO	ASMATH	ASPHY	ASGEN
ASAGR	1.00						
ASBIO	0.81**	1.00					
ASCHE	0.75**	0.79**	1.00				
ASGEO	0.75**	0.78**	0.80**	1.00			
ASMATH	0.66**	0.73**	0.73**	0.72**	1.00		
ASPHY	0.72**	0.77**	0.86**	0.81**	0.76**	1.00	
ASGEN	0.51**	0.51**	0.40**	0.39**	0.51**	0.35**	1.00

AASC: Arts-Academic Self-concept

Scale	ASCOM	ASECO	ASELA	ASELT	ASGOV	ASHAU	ASHIS	ASGEN
ASCOM	1.00							
ASECO	0.89**	1.00						
ASELA	0.70**	0.71**	1.00					
ASELT	0.78**	0.73**	0.73**	1.00				
ASGOV	0.72**	0.72**	0.61**	0.68**	1.00			
ASHAU	0.69**	0.68**	0.80**	0.69**	0.61**	1.00		
ASHIS	0.82**	0.80**	0.71**	0.81**	0.77**	0.73**	1.00	
ASGEN	0.36**	0.38**	0.57**	0.39**	0.35**	0.48**	0.35**	1.00

TECSC: Technical-Academic Self-concept

Scale	ASAUT	ASELE	ASMET	ASTEC	ASWW	ASGEN
ASAUT	1.00					
ASELE	0.81**	1.00				
ASMET	0.81**	0.86**	1.00			
ASTEC	0.80**	0.84**	0.88**	1.00		
ASWW	0.71**	0.76**	0.78**	0.84**	1.00	
ASGEN	0.30**	0.27**	0.26**	0.29**	0.23*	1.00

* Correlation is significant at 0.05 level (2-tailed)

** Correlation is significant at 0.01 level (2-tailed)

Table 4.04

Inter-scale correlation Matrix of SASC, AASC & TECSC (SEDP)

SASC: Science-Academic self-concept

Scale	SEAGR	SEBIO	SECHE	SEGEO	SEMATH	SEPHY	ASGEN
SEAGR	1.00						
SEBIO	0.81**	1.00					
SECHE	0.76**	0.78**	1.00				
SEGEO	0.52**	0.51**	0.57**	1.00			
SEMATH	0.45**	0.45**	0.45**	0.89**	1.00		
SEPHY	0.37**	0.35**	0.44**	0.30**	0.27**	1.00	
SEGEN	0.49**	0.47**	0.35**	0.25*	0.35**	0.24*	1.00

AASC: Arts-Academic self-concept

Scale	SECOM	SEECO	SEELA	SEELT	SEGOV	SEHAU	SEHIS	ASGEN
SECOM	1.00							
SEECO	0.37**	1.00						
SEELA	0.42**	0.43**	1.00					
SEELT	0.51**	0.50**	0.62**	1.00				
SEGOV	0.34**	0.35**	0.37**	0.53**	1.00			
SEHAU	0.35**	0.35**	0.62**	0.53**	0.33**	1.00		
SEHIS	0.53**	0.54**	0.64**	0.83**	0.56**	0.52**	1.00	
SEGEN	0.23*	0.22*	0.64**	0.38**	0.19*	0.42**	0.38**	

TECSC: Technical self-concept

Scale	SEAUT	SEELE	SEMET	SETEC	SEWW	ASGEN
SEAUT	1.00					
SEELE	0.79**	1.00				
SEMET	0.80**	0.83**	1.00			
SETEC	0.82**	0.83**	0.84**	1.00		
SEWW	0.81**	0.83**	0.83**	0.92**	1.00	
SEGEN	0.29**	0.32**	0.28**	0.31**	0.31**	1.00

* Correlation is significant at 0.05 level (2-tailed)

** Correlation is significant at 0.01 level (2-tailed)

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These tables show that science-academic self-concept facets correlated with one another. In like manner, arts-academic self-concept facets correlated with one another. Similarly, technical-academic self-concept facets correlated with each other. This is so true for both the ASDQ and SEDP. The finding further support the assumption of this study that first order factors representing specific

facets of students' academic self-concepts might be significantly defined and correlated.

Principal-factor solutions were done on both the ASDQ and SEDP scores in order to further integrate the students' self-perceptions in the Marsh/Shavelson's (1985) model. Tables' 4.05a and 4.05b show the principal-factor solutions in which four factors were extracted.

Table 4.05a

A four-factor solution on ASDQ (Decimals Omitted and insignificant correlations Suppressed)

Scale	Factor 1	Factor 2	Factor 3	Factor 4	Comm.
ASGOV	92*				87
ASECO	92				87
ASCOM	92				85
ASHIS	91				85
ASELT	90				82
ASELA	87				82
ASHAU	84				76
ASCHE		93			88
ASPHY		92			90
ASGEO		90			81
ASBIO		89			84
ASMATH		88			85
ASAGR		84		37	85
ASGEN	47	51	32	48	82
ASWOO			96		92
ASMET			96		92
ASTEC			95		91
ASELE			95		91
ASAUT			91		86

* All correlations are significant at 0.01 levels. (2-tailed)

Total variance explained.

Factor	Total	% of var.	Cum. %
1	6.006	31.612	31.612
2	5.214	27.444	59.056
3	4.606	24.242	83.298
4	0.461	2.427	85.725

Table 4.05b

A four-factor solution on SEDP (Decimals Omitted and insignificant correlations Suppressed)

Scale	Factor 1	Factor 2	Factor 3	Factor 4	Comm.
SEGEO	92*				86
SECHE	92				87
SEPHY	90				83
SEBIO	89				81
SEAGR	88				81
SEMATH	75				61
SEECO		91			85
SECOM		91			85
SEHIS		91			84
SEGOV		89			81
SEHAU		82			78
SEELA		80			80
SEGEN	51	55	37		70
SETEC			95		90
SEWOO			95		90
SEMET			94		88
SEELE			94		88
SEAUT			93		88
SELT				99	99

* All correlations are significant at 0.01 levels. (2-tailed)

Total variance explained.

Factor	Total	% of var.	Cum. %
1	5.719	30.101	30.101
2	4.893	25.750	55.851
3	4.277	22.511	78.362
4	0.958	5.043	83.405

From table 4.05a, it can be seen that the first factor accounts for 31.6% of the total variance, the second for 27.4%, the third for 24.2%, and the forth for only 2.4%. For table 4.05b, the first factor accounts for 30.1% of the total variance, the second for 25.8%, the third for 22.5%, and the fourth for only 5%. It is important to note from the two tables, that the fourth factors account for 2% and 5% of the common variances for ASDQ and SEDP respectively. These variances are not significant percentages. Also another important thing to note is

that all the four factors together, in the two tables account for not more than 85% of the total variances. These total variances are not sufficiently close to 100%. Perhaps, further extraction of lesser number of factors may provide more sufficient percentages close to 100% of the total variances. Therefore, tables' 4.06a and 4.06b show the principal-factor solutions of the ASDQ and SEDP in which three factors were extracted.

Table 4.06a

A three-factor solution on ASDQ (Decimals Omitted and Loading <. 30 Suppressed)

Scale	Factor 1	Factor 2	Factor 3	Comm.
ASCOM	91*			84
ASECO	91			85
ASELA	85			79
ASELT	89			80
ASGOV	82			68
ASHAU	83			75
ASHIS	91			85
ASAGR		87		78
ASBIO		91		84
ASCHE		91		85
ASGEO		90		81
ASMATH		85		75
ASPHY		91		87
ASAUT			90	80
ASELE			93	87
ASMET			94	89
ASTEC			95	90
ASWW			88	98
ASGEN	50	55	33	66

* All correlations are significant at 0.01 levels. (2-tailed)

Total variance explained.

Factor	Total	% of var.	Cum. %
1	5.845	38.07	38.07
2	5.147	33.52	71.59
3	4.360	28.40	99.99

Table 4.06b

A three-factor solution on SEDP (Decimals Omitted and Loading (<. 30 Suppressed)

Scale	Factor 1	Factor 2	Factor 3	Comm.
SEAUT	90*			82
SEELE	92			84
SEMET	92			85
SETECT	95			90
SEWW	94			90
SECOM		66		44
SEECO		66		45
SEELA		77		77
SEELT		88		78
SEGOV		65		43
SEHAU		68		53
SEHIS		90		83
SEAGR			85	76
SEBIO			86	76
SECHE			87	78
SEGEO			79	63
SEMATH			73	54
SEPHY			53	29
SEGEN	38	50	52	67

* All correlations are significant at 0.01 levels. (2-tailed)

Total variance explained.

Factor	Total	% of var.	Cum. %
1	4.753	36.74	36.74
2	4.543	35.11	71.85
3	3.642	28.15	100.00

Table 4.06a shows that the first factor accounts for 38.07% of the total variance, the second for 33.52%, and the third for 28.40%. In table 4.06b, the first factor accounts for 36.74% of the total variance, the second for 35.11%, and the third for 28.15%. It is pertinent to note that all the three factors together, in the two tables account for 99.99% and 100% of the common variances respectively. Thus, the three-factor solution defined the three hypothesized factors: Arts-academic, Science –academic, and Tec-academic.

Therefore, the assumptions of the study which claimed that student's academic self-perceptions would be best integrated into the academic portion of the self-concept hierarchy as component of second order factors — science-academic and arts-academic; as well as that an additional separate second order factor — technical-academic self-concept would be revealed, hold true. All the three second- order factors revealed, accounted for the relations among specific facets of the academic self-concept.

Hence, students' self-perceptions of the academic subjects can be represented schematically, in the following hierarchical figure below.

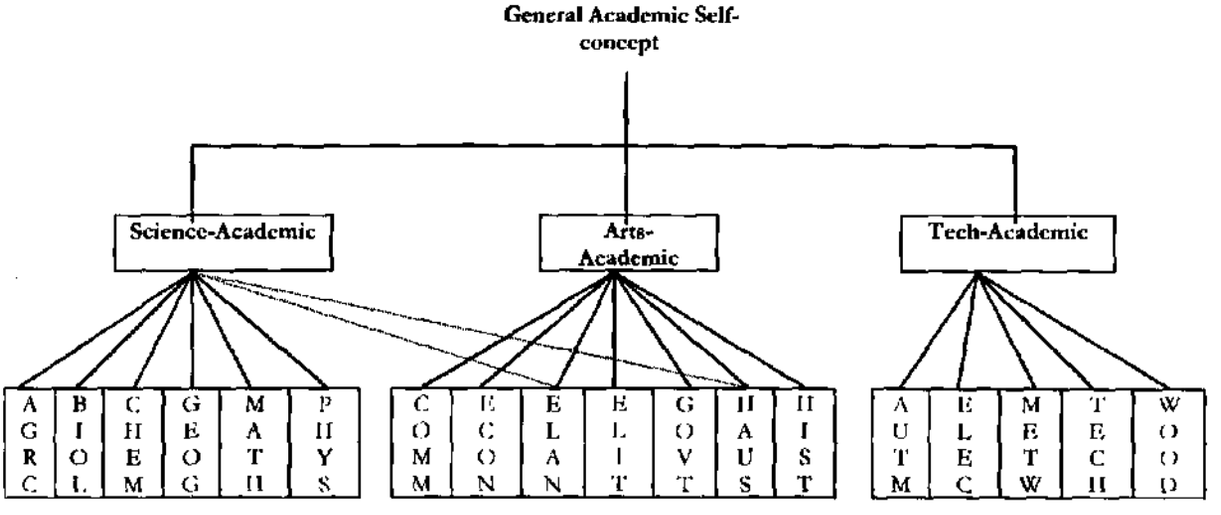


Fig.4: An Elaboration of the Marsh/Shavelson's Model of Academic Self-concept

Figure 4 portrayed an elaboration of the Marsh/Shavelson's (1985) model of academic self-concept based on a wider variety of specific academic subjects typical to Nigerian educational setting. At the apex is the global (General) perception of self in academic subjects. The General academic self-concept splits into three facets: science-academic, arts-academic, and technical-academic. These

three facets in turn split into separate and more specific components, for instance, academic self-concept Physics, academic self-concept History; academic self-concept Auto-mechanic, etc, respectively.

This schematic illustration further confirms the assertion that academic self-concept is structurally ordered and becomes increasingly differentiated from top to the bottom of the hierarchy (Shavelson et. al. 1976).

b) Hypothesis v

There is no significant relationship between the students' academic self-Description measures and their Success Expectations measures on defined Problems.

To test this hypothesis, multiple correlations of all the ASDQ (the evaluative dimension measure and SEDP—the cognitive dimension measure) sub-scales were computed. The correlation matrix is presented in Table 4.08 below.

Table 4.07

Correlation Between ASDQ & SEDP (Decimals were omitted and insignificant correlation repressed)

ASDQ/SEDP	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
ASAGR	**76**		54	47						48	58				28		20		
ASAUT		**70**						67		24						66		71	71
ASBIO	54		**76**	51						45	43				41		38		
ASCHE	47		51	**79**						44	38				53		48		
ASCOM					**50**	54	48		37	56		56	66	51					
ASECO					54	**50**	37		22	52		38	42	27					
ASELA					48	37	**74**		68	54		47	62	64	21				
ASELE		67						**72**		38						66		67	69
ASEL					37	22	68		**73**	54			62	64					
ASGEN	48	24	45	44	56	52	54	38	54	**76**	50	47	65	48	37	21	26	20	21
ASGEO	58		43	38						50	**51**				49		48		
ASGOV					56	38	47			47		**40**	48	51					
ASHAU					66	42	62		62	65		48	**57**	53	14				
ASHIS					51	27	64		64	48		51	53	**71**					
ASMATH	28		41	53			21		37	49			14		**45**		46		
ASMET		66						66		21						**74**		56	62
ASPHY	20		38	48						26	48				46		**46**		
ASTEC		71						67		20						56		**79**	69
ASWW		71						69		21						62		69	**71**

Key
Correlation <.26 is significant at 0.05 level (2 tailed)
Correlation >.26 is significant at 0.01 level (2 tailed)
Inter-scale correlation appears in Diagonal (**Bold**)

SEDP

1. SEAGR	2. SEAUT	3. SEBIO	4. SECHE	5. SECOM	6. SEECO	7. SEELA
8. SEELE	9. SEELT	10. SEGEN	11. SEGEO	12. SEGOV	13. SEHAU	14. SEHIS
15. SEMATH	16. SEMET	17. SEPHY	18. SETEC	19. SEWW		

All parameters < .12 were suppressed in the above table. An inspection of the table reveals that science Self-concept facets in ASDQ correlated significantly (P. <0.05, P. <0.01) with their counterparts in SEDP. Similarly, arts and technical self-concepts in ASDQ correlated significantly (P. <0.05, P. <0.01) with their counterparts in SEDP. Correlation between same academic self-concept scale from ASDQ and SEDP appear in the diagonal. Furthermore, inspection of Table 4.07 reveals that all correlation <0.12 were repressed. This indicates that the correlations between Science-Academic self-concept facets (ASDQ) and Arts-

Academic and Technical-Academic self-concept facets (SEDP); between Arts-Academic self-concept facets (ASDQ) and Science-Academic and Technical-Academic self-concept facets (SEDP); and Technical-Academic self-concept facets (ASDQ) and Science-Academic and Arts-Academic self-concept facets (SEDP) are near zero. Hence, the hypothesis, which claimed there is no significant relationship between the students' academic self-Description measures and their Success Expectations measures on, defined Problems. is not upheld.

4.2.2 Hypotheses Testing of Between Network Study

This study was further intended to test the relationships between academic self-concept and some other variables that are mutually related to it. Therefore, the hypotheses of the study, which reflected the between network studies, were tested below.

a) Hypothesis vi

There is no significant relationship between students' academic self-concept measures and academic achievement measures.

In order to test this hypothesis, three sub-hypotheses were formulated. These are as follows:

a) There is no significant relationship between science-academic self-concept measures and science-academic achievement measures of the students;

b) there is no significant relationship between arts-academic self-concept measures and arts-academic achievement measures of the students; and

c) there is no significant relationship between technical-academic self-concept measures and technical-academic achievement measures of the students.

Theses hypotheses were tested using the correlational analysis. Tables 4.08 and 4.09 present the correlation matrices between academic self-concept and academic achievement for both ASDQ and SEDP scores.

Table 4.08

Correlation Between Academic Self-concept and Academic Achievement (ASDQ) (Decimals were omitted and insignificant correlation repressed)

	ACHIEVEMENT																		
Scale	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**
ASAGR	**59**		69	68			24			65		12		59		68			50
ASAUT		**61**						62						11	66		63	67	25
ASBIO	62		**75**	71			25			68		12		64		72			46
ASCHE	54		69	**73**			11			70		12		63		72			38
ASCOM					**73**	66	62		69		73	68	75						38
ASECO					72	**65**	62		67		72	67	73						40
ASELA	22		23	14	59	53	**67**		78	15	57	66	63	29					58
ASELE		60						**63**							64		65	69	25
ASELT					66	61	62		**65**		67	61	67						40
ASGEO	56		68	72						**72**		14		66		73			36
ASGOV					57	56	56		58		**61**	**61**	65						38
ASHAU	20		22	14	59	50	64		57	16	54	**63**	60	24		10			50
ASHIS					67	60	61		66		69	67	**70**						38
ASMATH	55		60	58			31			57		17		**61**		60		74	49
ASMET		62						64							**69**		**69**		23
ASPHY	58		69	73						70		12		61		**76**			34
ASTEC		65						66							68		**69**	73	24
ASWW		58						58							61		62	**66**	21
ASGEN	48	33	48	43	40	36	56	29	40	43	38	46	41	56	28	39	29	27	**82**

Key

Correlation <.26 is significant at 0.05 level (2 tailed)
Correlation >.26 is significant at 0.01 level (2 tailed)
Inter-scale correlation appears in Diagonal (**Bold**)

Achievement

1. Agric. Science 2. Auto. Mech. 3. Biology 4. Chemistry 5. Commerce 6. Economic
7. Eng. Lang. 8. Electronics 9. Eng. Lit. 10. Geog. 11. Govt. 12. Hausa
13. History 14. Mathematics 15. Metal Work 16. Physics 17. Tech. Drawing 18. Wood Work
19. General

Table 4.09

Correlation Between Academic Self-concept and Academic Achievement (SEDP) (Decimals were omitted and insignificant correlation repressed)

	ACHIEVEMENT																		
Scale	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
SEAGR	**56**		44	53			13			49		10		47		38			47
SEAUT		**62**						51							48		52	48	32
SEBIO	46		**51**	51			10			43		14		51		43			41
SECHE	43		48	**53**			10			46		10		53		45			34
SECOM					**49**	50	48		46		38	52	38						37
SEECO					57	**46**	47		39		49	48	41						51
SEELA	17		19		49	48	**51**		55	13	48	57	50	13					55
SEELE		49						**65**							47		51	47	31
SEELT					51	38	57		**62**		42	49	48						34
SEGEO	52		48	43						**47**		11		47		41			47
SEGOV					53	44	51		42		**44**	38	54						38
SEHAU	12		11		43	41	49		45	11	47	**46**	51						54
SEHIS					51	48	59		51		58	41	**68**						46
SEMATH			52	52			14			48		12		**42**		49			37
SEMET	41	51						54							**66**		48	51	22
SEPHY	38		51	61						41		10		48		**37**			31
SETEC		43						51							51		**67**	56	21
SEWW		37						50							52		59	**63**	20
SEGEN	41	31	43	45	43	41	51	21	32	42	47	43	51	43	21	25	24	21	**75**

Key

Correlation <.26 is significant at 0.05 level (2 tailed)
Correlation >.26 is significant at 0.01 level (2 tailed)
Inter-scale correlation appears in Diagonal (**Bold**)

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Achievement

1. Agric. Science 2. Auto. Mech. 3. Biology 4. Chemistry 5. Commerce 6. Economic
7. Eng. Lang. 8. Electronics 9. Eng. Lit. 10. Geog. 11. Govt. 12. Hausa
13. History 14. Mathematics 15. Metal Work 16. Physics 17. Tech. Drawing 18. Wood Work
19. General

Table 4.08 presents the correlation matrix of the relationships between academic self-concept and academic achievement of the ASDQ scores. From the table, it can be observed that significant correlation (P.<0.05, P.<0.01) exist between science-academic self-concepts and academic achievement in Science subjects; between arts-academic self-concepts and academic achievement in Art subjects; and between Technical-academic self-concepts and technical-academic subjects. On the other hand no significant relationship was obtained between

science-academic self-concept and academic achievement in either Art subjects or Technical subjects. Likewise, no significant relationship was revealed between arts-academic self-concept and academic achievement in either Science subjects or Technical subjects. Similarly, no significant relationship was discovered between technical-academic self-concept and academic achievement in either Science subjects or Art subjects. This finding indicated that there is significant relationship between students' academic self-concepts and academic achievement. However, the academic self-concept and academic achievement relationship tend to be situation specific. The same trend of relationship was revealed in Table 4.09, which presents the correlation matrix of the SEDP scores.

Another important revelation is that students' academic self-concept in English and Hausa languages correlated significantly (P. <0.05, P.<0.01) with academic achievement scores of almost all science academic subjects. However, these arts-academic self-concept facets did not correlate with academic achievement in technical subjects.

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b) Hypothesis vii

There are no significant relationships between academic self-concept, sex and academic achievement measures.

Correlational analysis was conducted to test the above hypothesis. The correlation between academic self-concept, sex and academic achievement appear in Table 4.10 below.

Table 4.10

Correlation between Academic self-concept, Sex and Academic Achievement (Decimals have been omitted

ASDQ				SEDP			
Self-concept	Sex	AACH	Sex	Self-concept	Sex	AACH	Sex
ASAGR	-08	AGR	-02	SEAGR	-04	AGR	-02
ASAUT	-15*	AUT	-25**	SEAUT	-19*	AUT	-25**
ASBIO	11*	BIO	14*	SEBIO	08	BIO	14*
ASCHE	04	CHE	07	SECHE	05	CHE	07
ASCOM	10*	COM	12*	SECOM	09	COM	12*
ASECO	08	ECO	13*	SEECO	08	ECO	13*
ASELA	15*	ELA	10*	SEELA	12*	ELA	10*
ASELE	-23*	ELE	-25**	SEELE	-23*	ELE	-25**
ASELT	11*	ELT	15*	SEELT	16*	ELT	15*
ASGEN	01	GEN	04	SEGEN	01	GEN	04
ASGEO	06	GEO	13*	SEGEO	07	GEO	13*
ASGOV	06	GOV	09	SEGON	16*	GOV	09
ASHAU	17*	HAU	13*	SEHAU	14*	HAU	13*
ASHIS	14*	HIS	13*	SEHIS	17*	HIS	13*
ASMATH	-08	MAT	-04	SEMATH	-08	MAT	-04
ASMET	-26**	MET	-27**	SEMET	-23*	MET	-27**
ASPHY	08	PHY	08	SEPHY	-05	PHY	08
ASTEC	-23*	TEC	-22*	SETEC	-23*	TEC	22*
ASWW	-23*	WW	-28**	SEWW	-24*	WOO	-28**

* Correlation is significant at 0.05 level (2 tailed)

** Correlation is significant at 0.05 level (2 tailed)

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In the analysis, male was coded 1 and female 2. Therefore, positive correlation indicated higher self-concept scores for girls than for boys. On the other hand, negative correlation indicated higher self-concept scores for boys than for girls. Hence, it can be seen from the Table (under ASDQ) that girls had significantly (P. <0.05) higher academic self-concept and significantly (P.<0.05) higher academic achievement in Biology, Commerce, English language, English literature, Hausa language, and History than did boys. Girls had higher, but non-

significant academic self-concept in and higher non-significant academic achievement in Chemistry, General (academic self-concept and academic achievement); Government; and Physics than boys. Furthermore, girls had higher, but non-significant academic self-concepts in and higher significant (P. <0.05) academic achievement in Economics and Geography than boys.

On the other hand, boys had higher, but non-significant academic self-concept in and higher non-significant academic achievement in Agriculture and Mathematics than girls. This hold true for both ASDQ and SEDP scores. Another noticeable finding from Table 4.10 is that boys had higher and significant (P.<0.05, P.<0.01) academic self-concept and higher significant (P.<0.05, P.<0.01) academic achievement in all technical academic subjects. This finding also hold true for both ASDQ and SEDP scores.

To clearly test Hypothesis vii of this study, correlation between academic self-concept factors, sex and academic achievement was sought. This is presented in Table 4.11 below.

Table 4.11

Correlation between Academic self-concept factors, sex and Academic Achievement

ASDQ				SEDP			
Self-concept	Sex	AACH	Sex	Self-concept	Sex	AACH	Sex
SASC	05	Science	08	SASC	05	Science	08
AASC	12*	Arts	12*	AASC	13*	Arts	12*
TECSC	-22*	Tech.	-25**	TECSC	-20*	Tech.	-25**
GASC	01	GEN	04	GASC	01	GEN	04

* Correlation is significant at 0.05 level (2 tailed).
** Correlation is significant at 0.01 level (2 tailed)

Key:

AACH Academic Achievement.
AASC Arts Academic self-concept.
GASC General Academic self-concept.
SASC Science-Academic Self-concept.
TECSC Technical-Academic self-concept.

Inspection of Table 4.11 suggests that girls had highet, but non-significant academic self-concepts and academic achievement in science academic subjects than boys. Furthermore, girls had higher and significant (P.<0.05) academic self-concepts and academic achievement in arts academic subjects than boys. On the other hand, boys had higher and significant (P. <0.05, P. <0.01) academic self-concepts and academic achievement in technical academic subjects than girls. These findings suggest that the parameter estimates in the academic self-concept structure are invariant for boys and girls in science-academic self-concepts and variant in arts-academic and technical-academic self-concepts.

c) Hypothesis viii

There are no significant differences in the means of academic self-concept measures of those students identified as having special educational needs and those not so identified.

To test this hypothesis, independent sample t-test was computed on the scores of each of the ASDP and SEDP scores. The output, which contained the means, standard deviations, standard error differences and t-test values for each scale, appear in Tables 4.12 and 4.13.

Table 4.12

Independent Sample t-test of WSEN & SWOSEN on ASDQ

Scale	SES	N	Mean	SD	SE	t	df	P
ASAGR	SWISEN	97	9.70	4.20	0.73	12.36	382	0.01
	SWOSEN	287	18.72	6.74				
ASAUT	SWISEN	97	8.27	3.49	0.78	6.26	382	0.01
	SWOSEN	287	13.15	7.40				
ASBIO	SWISEN	97	9.67	4.04	0.81	11.78	382	0.01
	SWOSEN	287	19.21	7.65				
ASCHE	SWISEN	97	8.67	3.21	0.80	9.19	382	0.01
	SWOSEN	287	16.02	7.65				
ASCOM	SWISEN	97	9.68	3.65	0.87	7.67	382	0.01
	SWOSEN	287	16.35	8.34				
ASECO	SWISEN	97	9.65	4.10	0.86	8.98	382	0.01
	SWOSEN	287	16.94	8.14				
ASELA	SWISEN	97	10.01	4.00	0.72	14.75	382	0.01
	SWOSEN	287	20.63	6.70				
ASELE	SWISEN	97	8.44	3.04	0.75	5.64	382	0.01
	SWOSEN	287	12.67	7.19				
ASELT	SWISEN	97	9.03	3.60	0.81	8.79	382	0.01
	SWOSEN	287	16.15	7.70				
ASGEN	SWISEN	97	13.67	3.13	0.35	33.77	382	0.01
	SWOSEN	287	25.49	2.95				
ASGEO	SWISEN	97	10.07	3.78	0.82	8.83	382	0.01
	SWOSEN	287	17.31	7.81				
ASGOV	SWISEN	97	9.02	3.63	0.94	8.06	382	0.01
	SWOSEN	287	16.60	8.97				
ASHAU	SWISEN	97	11.38	4.98	0.78	12.03	382	0.01
	SWOSEN	287	20.76	7.09				
ASHIS	SWISEN	97	8.94	3.85	0.87	8.01	382	0.01
	SWOSEN	287	15.91	8.23				
ASMATH	SWISEN	97	8.60	3.91	0.76	12.37	382	0.01
	SWOSEN	287	18.00	7.15				
ASMET	SWISEN	97	8.12	3.10	0.75	5.40	382	0.01
	SWOSEN	287	12.17	7.13				
ASPHY	SWISEN	97	9.07	3.60	0.83	8.13	382	0.01
	SWOSEN	287	15.82	7.86				
ASTEC	SWISEN	97	7.59	2.76	0.80	6.08	382	0.01
	SWOSEN	287	12.45	7.73				
ASWW	SWISEN	97	7.64	2.99	0.89	5.26	382	0.01
	SWOSEN	287	12.32	8.56				

Key:

SES = Students' Educational Status.
SWISEN = Students With Special Educational Needs
SWOSEN = Students Without Special Educational Needs

Table 4.13

Independent Sample t-test of SWISEN & SWOSEN on SEDP

Scale	SES	N	Mean	SD	SE	t	df	P
ASAGR	SWISEN	97	9.27	4.08	0.75	13.52	382	0.01
	SWOSEN	287	19.41	6.92				
ASAUT	SWISEN	97	8.53	3.55	0.75	5.44	382	0.01
	SWOSEN	287	12.61	7.06				
ASBIO	SWISEN	97	9.44	4.16	0.82	11.68	382	0.01
	SWOSEN	287	19.02	7.70				
ASCHE	SWISEN	97	8.76	3.55	0.84	8.12	382	0.01
	SWOSEN	287	15.58	8.02				
ASCOM	SWISEN	97	9.85	3.74	1.52	5.09	382	0.01
	SWOSEN	287	17.56	14.83				
ASECO	SWISEN	97	9.96	4.12	1.52	5.19	382	0.01
	SWOSEN	287	17.85	14.70				
ASELA	SWISEN	97	10.31	4.49	0.60	18.87	382	0.01
	SWOSEN	287	21.63	5.29				
ASELE	SWISEN	97	8.85	3.81	0.74	5.69	382	0.01
	SWOSEN	287	13.06	6.98				
ASELT	SWISEN	97	9.02	3.50	0.79	9.42	382	0.01
	SWOSEN	287	16.46	7.49				
ASGEN	SWISEN	97	12.94	4.29	0.47	26.02	382	0.01
	SWOSEN	287	25.17	3.95				
ASGEO	SWISEN	97	9.24	3.97	1.51	5.21	382	0.01
	SWOSEN	287	17.11	14.70				
ASGOV	SWISEN	97	9.36	3.77	1.50	5.11	382	0.01
	SWOSEN	287	17.02	14.60				
ASHAU	SWISEN	97	13.06	11.75	0.91	10.33	382	0.01
	SWOSEN	287	22.46	5.73				
ASHIS	SWISEN	97	9.00	3.94	0.82	8.89	382	0.01
	SWOSEN	287	16.29	7.75				
ASMATH	SWISEN	97	8.49	3.78	1.47	7.31	382	0.01
	SWOSEN	287	19.23	14.30				
ASMET	SWISEN	97	8.38	3.55	0.74	5.76	382	0.01
	SWOSEN	287	12.64	6.93				
ASPHY	SWISEN	97	8.52	3.46	1.41	5.32	382	0.01
	SWOSEN	287	16.02	13.77				
ASTEC	SWISEN	97	8.42	4.14	0.77	5.14	382	0.01
	SWOSEN	287	12.38	7.21				
ASWW	SWISEN	97	8.41	4.24	0.77	4.95	382	0.01
	SWOSEN	287	12.22	12.22				

Key:

SES = Students' Educational Status.
SWISEN = Students With Special Educational Needs
SWOSEN = Students Without Special Educational Needs

Inspection of Tables 4.12 and 4.13 reveal that the means of students without special educational needs are higher than those of the students' identified as having special educational needs. This differences in the means of the two

group existed in all the ASDQ scores and SEDP scores. The means and differences of the two groups in ASDQ and SEDP appeared to be larger in General, English language, Hausa language, Agriculture, Biology and Mathematics academic self-concepts. However, all the means differences of the two groups are significant (P.<0.01). Therefore, the hypothesis of the study which claimed that there are no significant difference in the means of academic self-concept measures of students identified as having special educational needs and those not so identified, is rejected. Hence, it can be claimed that in over all, students identified as having special educational needs have lower academic self-concepts than those students not so identified.

To further substantiate the differences in academic self-concept of the two groups, a t-test analysis was computed on the students' self-concepts in science-academic; arts-academic; and technical-academic factors for the ASDQ and SEDP measures. Table 4.14 presents the summary of the analysis.

Table 4.14

Interdependent t-test of SWISEN & SWOSEN on Academic Self-concept Factors

ASDQ

SC	SES	N	X	Sd	SE	t	df	P
SASC	SWISEN	97	9.30	3.79	0.79	10.30	382	0.01
	SWOSEN	287	17.51	7.48				
AASC	SWISEN	97	9.53	3.91	0.84	9.63	382	0.01
	SWOSEN	287	17.62	7.88				
TECSC	SWISEN	97	8.01	3.08	0.79	5.75	382	0.01
	SWOSEN	287	12.55	7.60				
GASC	SWISEN	97	13.67	3.13	0.35	33.77	382	0.01
	SWOSEN	287	25.49	2.95				

SEDP

SC	SES	N	X	Sd	SE	t	df	P
SASC	SWISEN	97	8.95	3.83	1.13	7.77	382	0.01
	SWOSEN	287	17.73	10.91				
AASC	SWISEN	97	10.08	10.91	1.09	7.70	382	0.01
	SWOSEN	287	18.47	5.04				
TECSC	SWISEN	97	8.52	3.86	0.75	5.89	382	0.01
	SWOSEN	287	12.94	7.07				
GASC	SWISEN	97	12.94	4.29	0.47	12.23	382	0.01
	SWOSEN	287	25.17	3.95				

Key:

SC = Self-concept.
SES = Students' Educational Status.
SASC = Science-Academic self-concept.
AASC = Arts-Academic self-concept.
TECSC = Technical Academic self-concept.
GASC = General Academic self-concept.
SWISEN = Students With Special Educational Needs.
SWOSEN = Students Without Special Educational Needs.

It can be seen from Table 4.15 that the means differences the SWISEN and SWOSEN in science-academic; arts-academic; and technical-academic self-concept factors are all significant (P. <0.01). These differences appeared in both ASDQ and SEDP measures of academic self-concept. These findings did not reaffirm the hypothesis that no significant differences exist in the means of

academic self-concept measures of those students identified as having special educational needs and those not so identified.

4.3. Summary of Findings

The findings of this study are summarised as follows:

a) Significant interrelationships exist within science-academic self-concept facets; arts-academic self-concept facets; and technical-academic self-concept facets;

b) there are significant interrelationships between science-academic; arts-academic; and technical-academic self-concept facets on one hand, and general academic self-concept on the another;

c) in overall, there are no significant interrelationships between science-academic; arts-academic; and technical-academic self-concept facets;

d) arts-academic self-concept facets (English language and Hausa language) correlated significantly ($P.<0.05$) with science-academic self-concept facets;

e) there is significant relationship between the students' academic self-Description measures and their success Expectation measures on defined problems;

f) there are significant relationships between students' academic self-concept measures and academic achievement measures;

g) the parameter estimates in the academic self-concept structure are different for boys and girls in that:

   i. girls had higher, but non-significant academic self-concept and academic achievement in science academic subjects;
   ii. girls had higher, but non-significant General academic self-concept and General academic achievement;
   iii. girls had higher and significant academic self-concepts and academic achievement in arts academic subjects; and

iv. boys had higher and significant academic self-concept and academic achievement in technical subjects.

h) there are significant differences in the means of academic self-concept measures (ASDQ and SEDP) of those students identified as having special educational needs and those not so identified.

CHAPTER FIVE

DISCUSSION, RECOMMENDATION, AND CONCLUSION

5.1. Introduction

In the preceding chapter, details of the analyses of data as well as the summary of findings of this study were presented. This chapter discusses the result of the study and offers recommendation for theory and practices. Furthermore, general conclusions are made on the basis of the findings of the study.

5.2. Discussion

This study was intended to present a construct validation study of self-concept structure albeit the academic portions in Nigerian education settings. This entails defining the *nomological network* relating differentiable aspects of the construct to each other (i.e. the within network portion) on one hand; and relating the construct to other educationally significant variables such as Academic Achievement (i.e. the between network portion) on the other.

The within network aspect of this study examined the relationships between academic self-concept facets such as the General academic self-concept and academic self-concept factors; General academic self-concept and subject specific self-concepts; and academic self-concept factors and subject specific self-concept facets. The between network portion of this study explored the relationships between academic self-concept facets and academic achievement, sex and students' educational status. Therefore, for clear and lucid presentation, the discussion on the findings of this study is treated under the distinctions of *within network* and *between network portions.*

5.2.1 **Within Network Study**

a) **The structure of academic self-concept**

This study examined the interrelationships within the students' self-perceptions of academic subjects. Multiple correlation of each of the 19 scales of the ASDQ and SEDP indicated that Science-academic self-concept scales correlated significantly with each other. Similarly, Arts-academic self-concept scales correlated significantly with each other; and Technical-academic self-concepts too, correlated with each other. On the other hand all Science-academic self-concept scales were nearly uncorrelated with Arts-academic self-concept scales. Similarly, Science-academic self-concept scales did not correlate with Technical-academic self-concept scales. Furthermore, no significant correlation was obtained between Arts-academic self-concept scales and Technical-academic self-concept scales. However, the General-academic self-concept scale (in both ASDQ & SEDP) correlated significantly with all the Science-academic, Arts-academic, and Technical-academic self-concept scales.

These findings underscore Marsh/Shavelson's (1985) prediction that the structure of Academic self-concept is more differentiable than anticipated in the original Shavelson et al (1976) model. The finding further confirmed Marsh/Shavelson's (1985) contention that Academic self-concept is remarkably subject-specific. More so, the findings are consistent with the findings of Marsh (1987); Marsh, Byrne, and Shavelson (1985) which revealed that academic self-concept is hierarchically structured.

Factor analysis on the ASDQ and SEDP scales defined 3 factors — Science-academic, Arts-academic, and Technical-academic. The correlations

among the 19 scales in both the ASDQ and SEDP were adequately explained by these 3 higher order factors. This finding tend to support the prediction of Marsh/Shavelson (1985) that Academic self-concept in specific subject areas could be best explained in terms of at least *two higher order factors* instead of just one (as in Shavelson et al, 1976 Model). This finding further provided empirical support on Marsh, Byrne, Shavelson (1985), and Marsh (1990b) contention that single higher-order factors and/or two higher-order factor (as posited by Shavelson's et al, 1976 Model, Marsh/Shavelson's (1985) Model, respectively are inadequate to explain the dimension of Academic self-concept. If more diverse variety of subject specific Academic self-concepts is included, it is unlikely that more than two higher-order factors could be sufficient. Thus, the findings of this study substantiated the claim of Marsh, Byrne and Shavelson (1988) that:

> Academic self-concept are more differentiated than anticipated in the original Shavelson et al's (1976) model, and similar fate may befall the Marsh/Shavelson Model when it is tested more fully... the academic subject areas... *(In the Marsh et al's 1988 study)* represent core academic subjects. If additional subjects (e.g. physical education, art and music, etc.) were included; it is unlikely that just two higher order factors would be sufficient. Thus, the inclusion of an even more diverse variety of subjects than *(in Marsh et al's 1988 study)* would test the limits of the Marsh/Shavelson Model.

The integration in this study of Technical-academic self-concept as an additional higher-order factor in the hierarchical structure of the Marsh/Shavelson's (1985) Model revealed an important finding very similar to that of Vispoel (1995). Vispoel's (1995) study revealed an additional component of a higher-order factor (Artistic-academic self-concept) distinct from Marsh/Shavelson's (1985) two higher-order factors: Math-academic and Verbal-

academic. Thus, the findings of this study support the contention that Academic self-concept is remarkably subject-specific which cannot only be explained by just two-higher-order factors.

b) **GASC, SASC, AASC and TECSC Correlation**

The findings of this study revealed significant correlation between General-academic self-concept with all the Science-academic; Art-academic; and Technical-academic self-concept facets. This holds true for both the two measures (ASDQ & SEDP) academic self-concept employed in this study. However, the inter-correlation between General-academic self-concept; Science-academic; Art-academic; and Technical-academic self-concept facets, though, significant were substantially lower than inter-correlation typically revealed within Science-academic, Arts-academic, and Technical-academic self-concept facets. This inconsistency is, of course, not puzzling. It substantiated Shavelson et al's (1976) prediction and the findings of Marsh/Shavelson's (1985) and Marsh, Byrne and Shavelson (1988) that self-concept structure is organised and stable in addition to being multi-faceted.

Academic self-concept as organised connote that students tend to categorised the vast amount of information they have about themselves (i.e. their capabilities or incapability on specific academic subjects via teachers' feedback and evaluation from significant others, etc.) and relate these (i.e. the categories) to one another. Thereafter, they evaluate themselves, for instance, capable or incapable of Science, Arts or Technical subjects. This follows the rule of "From specific to General".

This attribute of Academic self-concept (i.e. self-concept as organised) as expounded by Shavelson et al (1976) and reaffirmed by this study and those cited above further substantiated the Kelly's (1955) organisation and dichotomy corollaries of his self-theory. Kelly (1955) theorised that an individual, in his effort to perceive himself, amassed great diversity of experiences and records (i.e. the complex experiences from family, school, peer-group, the community, etc.) into simpler forms or categories (i.e. facets). Thereafter, the individual organises his *personal structure* in some way thereby placing certain construct as more important than others do. Finally, the individual polarises his personal construct. For instance, "able" or "unable", "good" or "poor" in Science, Arts or Technical academic subjects, for example.

Stability of academic self-concept implies that students' self-perceptions of General academic subjects are stabled (i.e. undifferentiated). It implies that as one descend the hierarchy, self-concept in academic subjects become differentiated (i.e. less table) or increasingly situation specific. Hence, correlation between one's self-concept in specific situation tends to be higher than the corresponding correlation between self-concept in General academic ability and specific academic subjects. Shavelson et al (1976:415) expounded on this:

> ...The more closely self-concept is linked with specific situations, the closer is the relationship between self-concept and behaviour in that situation. If one were to focus on the academic side of the hierarchy... one could hypothesised that (a) self-concept of mental ability should be more clearly related to academic achievement than to ability in social physical situation, and (b) self-concept of academic ability in Science should be more closely related to achievement in Science than to achievement in say English or overall grade point average.

In this study it was also found that the correlations between General academic self-concept, Science-academic and Arts-academic factors were higher than the correlation between General-academic self-concept and Technical-academic self-concept factor in both the ASDQ and SEDP. That is General-academic self-concept factor correlated (see Tables 4.06a & 4.06b) 0.55 and 0.52 (in both ASDQ and SEDP, respectively) with Science-academic self-concept factor; 0.50 (in both ASDQ and SEDP) with Arts-academic self-concept factor. On the other hand, the correlations between General-academic self-concept and Technical-academic self-concept factor were 0.33 and 0.38 (for ASDQ and SEDP, respectively). This disparity in correlation between General-academic self-concept and Science-academic self-concept factor and Arts-academic self-concept factor on one hand and between General-academic self-concept and Technical-academic self-concept on the other is worth interpreting.

First, it can be inferred that students who showed positive self-perceptions in technical subjects may have lower general-academic self-concept compared to their counterparts offering Science and/or Arts academic subjects. Or put otherwise, it can be inferred that Science and/or Arts students may have higher General-academic self-concept compared to their counterparts — the Technical students. Second, it can be hypothesised that the placement of the low ability students to technical schools/class can be the main cause of this disparity.

c) **SASC & AASC Correlation**

Another remarkable finding of this study was that two Arts-academic self-concept facets (English language and Hausa language) correlated significantly with nearly all Science- academic self-concept facets. These two Art-academic self-

concept facets failed to correlate with any of the Technical-academic self-concept facets. The finding hold true for both ASDQ and SEDP measures of academic self-concept (see Tables 4.01 & 4.02). However, these correlations, though significant were far less than that of the correlation within Science-academic and Arts-academic self-concept facets.

The correlation between academic self-concept in English language and Hausa language with all the Science-academic self-concept facets could be explained from the cultural context, i.e. from the Nigerian educational background/settings. In Nigeria, English language and local languages are regarded as core academic courses for all students irrespective of the course offerings — whether Science, Arts or Technical. In fact, English language is used as a medium of communication for the teaching and learning of all academic courses. As such students' performance in these two academic subjects in relation to their internal/external comparisons might probably determine their self-perception of ability in them as it might be in other subjects of their course offerings.

However, if this assumption hold true, how then can the lack of correlation between Academic self-concept in English language and all the Technical-academic self-concept facets; as well as between Academic self-concept in Hausa language and all the Technical-academic self-concept facets be accounted for? The emphasis laid in practical applied skills rather than basic theoretical (scientific) knowledge in technical schools might probably account for this lack of correlation.

d) **The Near-zero Correlation between SASC, AASC & TECSC**

All the other five Arts-academic self-concept (Commerce, Economics, English literature, Government, and History) did not correlate (i.e. near zero correlated) with all the Science-academic self-concept facets as well as with the Technical-academic self-concepts. Similarly, near-zero correlation was revealed between Science-academic self-concept facets and Technical-academic self-concept facets.

The near-zero correlation between some SASC, AASC, and TECSC revealed in this study implies that academic self-concept structure is multidimensional and differentiable. This implies that self-concept facets, although theoretically related, operate as a relatively independent entity and can be measured as separate constructs. In this study, therefore, it can be interpreted that, although GASC correlated with SASC, AASC, and TESC; each of the SASC, AASC, and TESC factors correlated with subject-specific self-concepts; and GASC correlated with subject - specific self-concepts, each of these dimensions operates as a relatively independent entity.

Science academic subjects and Technical academic subjects are presumed to bear certain relationships. Since subjects such as Mathematics, Physics and Chemistry are often regarded as prerequisite courses for technology. As such one would, therefore, expect that Science-academic self-concept facets would correlate substantially with Technical-academic self-concept facets. However, the findings of this study revealed otherwise. In fact the inter-scale correlation matrices of the ASDQ and SEDP (Tables 4.2.01 and 4.2.02) revealed a near-zero correlation

between all the Science-academic self-concept facets and Technical-academic self-concept facets.

This non-correlation of the Science-academic and Technical-academic self-concept facets could be explained on two grounds. First, the level at which the technical-academic courses are offered. At the post-primary as against the post-secondary level more emphasis is given to practical and applied skills rather than to basic scientific knowledge. This is clearly stated in Section 6:50:14 of the National Policy on Education (NPE). Equally note worthy is the academic status of the recipients of Technical education at the post-primary school level. Most of the recipients are students on the presumption that they are average or below average in most of academic subjects (e.g. Arts or Sciences) offered in secondary schools. As such because of the student's low abilities in Arts and/or Sciences, their academic perception and expectations might probably be low in comparison with their counterparts offering Science academic subjects. Second, the lack of preference and low achievement of female subjects in Technical-academic courses might contribute to this lack of correlation between the Science-academic self-concept and Technical-academic self-concept facets.

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e) **Correlation between the ASDQ and SEDP**

The Multiple Correlation analysis (see Table 4.2.08) in this study reveal that all Science-academic self-concept facets; all the Arts-academic self-concept facets; and all the Technical-academic self-concept facets in ASDQ (the evaluative dimension measure) correlated significantly p. <0.05 to p. <0.01) with their counterparts in SEDP (the cognitive dimension measure). This, therefore, suggest *strong convergent validity across the two measures of academic self-concept.*

Furthermore, the near-zero correlation between all the academic self-concept facets of the 3-academic self-concept factors: Science, Arts, and Technical, suggests divergent (discriminant) validity of ASDQ and SEDP. Thus, the internal structure of academic self-concept (i.e. its nomological network) is furthermore ascertained. This claim is supported by Winne and Marx's (1977) elaboration on how relationships among constructs, theoretically to be internally related are analysed. Winne and Marx (1977:893), thus, stated:

> When constructs are theoretically related and show strong correlation in the predicted directions, the measurements of these constructs are said to be convergently valid. When constructs which theory predicts to be unrelated show near-zero correlation the measurements are considered to have discriminant or divergent validity. Both properties are important for describing fully a nomological network.

5.2.2 Between-Network Study

a) ACSC and AACH Correlation

The findings of this study reveal significant relationships between students' academic self-concept and academic achievement. All Science-academic self-concept facets correlated significantly with students' achievement in Science academic subjects. Similarly, relationships were revealed between Arts-academic self-concept facets and students' achievement in Arts subjects, while Technical-academic self-concept facets and students' achievement in Technical academic subjects indicated significant relationships. This finding is consistent with studies (Marx & Winne, 1980; Shavelson & Bolus, 1982; Marsh, Parker & Smith, 1983) designed from the conception of the multidimensionality nature of self-concept. On the other hand, the finding did not lend support to some Nigerian studies (Adediran, 1985; Abdullahi, 1985; Abdullahi, 1997) that reported negative and

non-significant correlation; very low and insignificant correlation; and negative skew ness of self-concept and academic achievement relationship.

This discrepancy of findings may be attributed to difference in conceptual framework and measuring instrument employed to measure self-concept. The study of Adediran (1985), for instance, was framed from the unidimensional conception of self-concept. Furthermore, the study's measuring instrument assessed total (global) self-concept. However, the unidimensional definition of self-concept has been criticised to be imprecise and could lead to difficulty in interpreting measures of self-concept and thereby rendering research results invalid (Shavelson et al, 1976).

The studies of Abdullahi (1985) and Abdullahi (1997) used SDQ (Self-Description Questionnaire); an instrument designed to test the multidimensionality of self-concept structure. However, this instrument may be criticised on two grounds. First, the SDQ was yet to be fully developed as valid instrument for measuring the multidimensionality of self-concept. Second, SDQ was limited in assessing self-concept in more diverse variety of academic subjects compared to its successor(s)—ASDQ (I & II). Thus, the finding of this study underscore Shavelson's et al's (1976:415) contention cited above.

b) **Sex, Academic Self-concept and Academic Achievement Relationship**

With regards to sex difference in general and specific areas of Academic self-concept, this study reported a counterbalancing result, which is consistent with sex stereotypes. On the structure of academic self-concept, this study's findings revealed that male subjects had higher and significant academic self-concept and academic achievement in technical academic subjects than their female subjects.

On the other hand, female subjects had higher and significant academic self-concept in Arts and academic achievement in Arts than their male counterparts. Whereas in Science subjects, no significant sex difference in Academic self-concept and Academic achievement was obtained. These findings were consistent with the findings of Dusek and Flaherty (1981); Marsh (1984, 1989); Marsh, Parker and Smith (1983) who reported sex difference in self-concept and achievement in masculine academic subjects/abilities for boys and verbal academic subjects/abilities for girls.

The sex differences in Academic self-concept and Academic achievement in Technical-academic and Arts-academic subjects revealed in this investigation can be interpreted in terms of sex stereotype that produce variations in attitudes and beliefs which affect students' choices and their placement in certain course of studies. Therefore, girls, for instance, may have negative preference for technical academic subjects/course because these are masculine. As such they may opt for Science or Arts academic subjects. This sex stereotype in technical subjects has wide societal implications in the Northern States to the extent that very few girls are placed in technical courses.

The lack of sex differences in Science-academic self-concept and academic achievement in Science subjects could be attributed to the present emphasis on Science courses for both sexes by the State and Federal governments. This emphasis in Science led to the proliferation of Science secondary schools/courses for both sexes in the Northern States.

With regards to academic self-concept in specific subject areas, the finding of this study revealed that the female subjects had significant and higher academic

self-concept in English and Hausa languages and History. This finding is consistent with findings of Skaalvik (1990) and Skaalvik and Rankins (1990) that reported that girls had significantly higher level of academic self-concept and academic achievement in local (Norwegian) and English languages than their boy counterparts. This sex difference in self-concept could be attributed to the superiority of girls over boys in verbal related skills.

Furthermore, this study is not consistent with the findings of Marsh (1989) and Skaalvik (1986a), which reported significant sex difference in favour of boys in Mathematics self-concept and General self-concept (self-esteem). This study, on the other hand, reported lack of significant sex difference in Mathematics self-concept, General Academic self-concept, and General Academic achievement. This disparity in findings can be interpreted in terms of the difference in measuring instruments used. The study of Marsh (1989) and Skaalvik (1986a) measured self-concept using Roseberg self-esteem scale — an instrument that measured self-concept in different areas — but as unidimensional constructs.

However, Skaalvik (1990) contended that when other dimension measures of academic self-concept are used as the cognitive and evaluative, different findings might be revealed. The present investigation, using both dimension measures confirms Skaalvik's (1990) contention. A possible interpretation of the lack of apparent gender differences in Mathematics self-concept, General academic self-concept and achievement can be stated in terms of fading away of some aspects of sex stereotype in Hausa society. The emphasis in equal educational (Science Education inclusive) opportunities for both sexes and the proliferation of women in key sectors of the nation's economic, political, and

social sectors. These factors may devalue sex stereotype suggesting that boys have better Mathematics abilities and receive higher in overall school work than girls.

Another important finding of this study, which can be explained in terms of the fading away of the sex stereotyping, is the sex, academic self-concept and achievement relations. It was revealed in this study that boys had higher, but non-significant academic self-concept and achievement in Agricultural Science (in both ASDQ and SEDP) than girls. On the other hand, girls had higher and significant academic self-concept and achievement in Biology and Commerce (in both ASDQ and SEDP) than boys.

A plausible interpretation of this finding centres on the emphasis given to Agricultural Science and Commerce for both sexes in secondary schools as well as the campaigns within the society for women's welfare and liberation. The activities of women commission as in Family Support Programme (FSP) and Women Farmers' Association of Nigeria (WOFAN) may be among the factors responsible for the lack of disparity in academic self-concept and achievement in Agricultural Science and Commerce. The supremacy of female subjects in academic self-concept and achievement in Biology than their male counterparts could be interpreted from the nature of Biology as a course. Girls than boys may favour biology being a paramedical (such as nursing, physiotherapy, etc.) course as well as some topics such as reproduction, which has significant bearing on females as mothers. This may predict the girls to have higher academic self-concept and achievement in Biology than the boys.

c) **SES Difference in Academic Self-concept**

Students' Educational Status (SES) was among the variables considered in this study. SES, as defined in this study, denotes students' level in academic achievement test. Students who scored <10 in the 0—30 ranged achievement test were regarded as students with special educational needs (SWISEN). On the other hand, students who scored >10 were considered students without special educational needs (SWOSEN). Therefore, the finding of this study indicated that SWOSEN have higher significant General academic self-concept, Science-academic, Arts-academic, and Technical-academic self-concepts than the SWISEN.

This finding underscores the contention by Burns (1979) and Purkey (1970) that academic success or failure appears to be as deeply rooted in concepts of the self as it is in measured mental ability. In like manner, the finding supports Harter's (1990) and Pintrich and Schranben's (1992) claim that students' ability and self-perceptions are important predictors of task engagement and performance. Similarly, the finding is consistent with Galloway et al's (1995) ascertain that students with special educational needs appear to lack motivation, hold low self-perceptions of ability and are likely to pose a range of problems to their teachers and school.

The low academic self-concept of the SWISEN can be explained from the reformulated learned helplessness model of Abramson et al (1978) and/or perhaps the self-worth theory of Beery (1975). The two models hold that repeated school failure can disrupt academic performance resulting in diminished self-esteem. According to Abramson et al (1978) a state of learned helplessness is

reached when an individual perceives that he lacks control in obtaining a desired outcome. Thus, in an academic context, as exemplified by Craske (1988:152), "a student who have failed repeatedly at a particular task, and who construes the failures as a consequence of his lack of ability, will experience negative affect and a lowering of his self-esteem..."

The self-worth theory holds that students stand to maintain self-concept by avoiding failure. However, on the occasions when failure is unavoidable, students attribute failure (low ability) to stable external factors (such as difficulty) as to unstable elements (such as bad luck and insufficient effort). The self-worth perspective states that the application of effort by a student under conditions of possible failure can be risky: suspicious of low ability are increased.

5.3. Implications and Recommendation

The Marsh/Shavelson (1985) academic self-concept model hypothesised that students' self-concept in specific school subjects could be explained in terms of two higher order factors — Mathematics — academic and verbal-academic. Subsequent, revision of the model (Marsh, 1990a) tested the limits of the model and claimed that when diverse variety of specific school subjects were included, students' academic self-concept could be explained in terms of more than two factors. There is, from the findings of this study, reasonable support for this claim. The present investigation considered students' self-concept in school subjects classified as 'Science', 'Arts', and 'Technical' courses. However, support may be lacking when consideration is expanded to include students' self-concept in other school subjects classified as commercial or vocational, for instance. Therefore, support for the Marsh's (1990) claim, in this study is based in part on a

decision concerning which school subjects are 'Science', 'Arts', or 'Technical' academic subjects.

Hence, further research is needed to determine whether students' self-concept in school subjects stipulated in the National Policy on Education (NPE) for both JSS and SSS could be considered a part of the structure of academic self-concept and whether they could test further, the limits of Marsh/Shavelson's (1985) model. Furthermore, a research is needed to replicate the present study on refined distinctions (Science, Arts and Technical) of the school subjects herein. This is to test the limits of the support for the Marsh/Shavelson's (1985) model as well as provide further elaboration of the model. Pending the outcome of further research, it is useful to retain the findings of this study as a key reference to students' self-concept in Science, Arts and Technical academic subjects.

Support for the multidimensionality of academic self-concept is clearly presented in the findings of this study. The implication here is that students' academic self-concept could be viewed from three dimensions — Science, Arts, and technical in addition to General academic self-concept. As such, students' self-concept in particular specific subjects can only be sought using instruments that are capable of measuring self-concept in those particular specific subjects. The use of measurement instrument that solely assesses General self-concept or academic self-concept factor would yield inappropriate and inaccurate information. This, of course, is due to the fact that these higher order factors (General self-concept and academic self-concept factor) cannot provide sufficient and reliable feedback on the students' areas of interest.

The strong relationships revealed in this study between students' academic self-concept in specific academic subjects might have certain implications that need to be verified empirically. For instance, self-concept in English language correlated highly and significantly with English literature in both the two measures of academic self-concept — ASDQ and SEDP. Similarly, Mathematics self-concept correlated highly and significantly with Physics self-concept. As such some empirical questions can be posed: Can student's performance in English literature be improved by enhancing his self-concept in English language and vice-versa? In like manner, can student's performance in Physics be improved by enhancing his Mathematics self-concept and vice-versa? These questions can be further posed in the relationships that existed between Arts-academic self-concept facets and/or in Technical-academic self-concept facets.

The clarification of these questions is useful for further practical implications for the application of academic self-concept structure in enhancing students' academic achievement. Therefore, further research works intended towards these directions are needed.

The multidimensionality of academic self-concept is supported in this study from both the cognitive (SEDP) and evaluative (ASDQ) dimensions measures of self-concept. The former defined students' self-concept in academic subjects from their conceptions of being able to or not able to do certain academic subject's task (i.e. from the "Can I do it" perspective). The latter defined students' self-concept in academic subjects from their evaluation as whether they are 'good' or 'poor' in reference to what others (peers) are able to

do. Hence, the use of one dimension measure of academic self-concept may not represent a limitation as to the generalizability of results.

The practical implication of this finding for educators or researchers is that students' academic self-concept in specific subject areas can be measured either with the cognitive or evaluative dimension or both measure(s) of self-concept.

This study had provided statistical relationships between student's academic self-concept and academic achievement. The relationships established were hierarchical in the sense that subject-specific self-concepts (e.g. Physics self-concept) correlated higher with their matching academic achievement scores (e.g. Physics) than with non-matching academic achievement scores (e.g. History). This result, therefore, may suggest two things: (a) the predominance of academic self-concept over academic achievement, and/or (b) the predominance of academic achievement over academic self-concept.

The first issue stem from the belief that academic self-concept has motivational properties such that enhancement of students' academic self-concept will lead to improvement in their subsequent achievement. It is from this stand that the claim poor students' academic performance is attributable to academic self-concept deficits, can be made. The second stem from the belief that improvement of students' academic achievement will enhance their academic self-concept. Therefore, it's from the clarification of these two contrasting models that the educational benefits of academic self-concept can be reached. This study is limited to providing any hints on these directions. As such before any sound practical recommendation is made for educational intervention program—either self-concept enhancement intervention or academic skills development, it is

pertinent to recommend for a study on causal ordering of academic self-concept and academic achievement in Nigerian context.

Byrne (1984) noted that any study purporting to test causal predominance between academic self-concept and academic achievement must satisfy three basic prerequisites: (a) a statistical relationship must be established, (b) a clearly established time precedence must be established in a longitudinal study, and (c) a causal model must be tested. The present study has provided the basis of establishing the statistical relationship between academic self-concept and academic achievement.

This study has further shown that the parameter estimates in the academic self-concept structure are invariant for boys and girls in Science-academic self-concept factor and at the same time variant in Arts-academic and Technical-academic self-concept factors. The practical implication of this is that the superiority of girls over boys in Arts-related academic subjects can be equated by enhancing the latter's academic self-concept in Arts-related subjects. Similarly, the superiority of boys over girls in Technical-related academic subjects can be equated by enhancing the girls' self-concept in technical subjects. However, this is only possible when more emphasis is given to technical education for girls. As more technical schools for girls are established in the North there will be need for research to investigate sex differences in technical self-concept. This will provide basis for self-concept enhancement in technical self-concept of girls in order to equate the existing sex disparity in self-concept and achievement in Technical education.

What practical implication of this study can be drawn from the significant differences in academic self-concept between SWISEN and SWOSEN revealed herein? The low academic self-concept of the students identified with special educational needs (i.e. the low achieving students in both Science, Arts, and Technical) compared with their high achieving students indicated low academic self-concept deficit of the former. Therefore, there is a need for intervention program to enhance the general as well as specific academic self-concepts of students with low ability.

Teachers need to pay more attention to attribution retraining of low ability students. Attribution retraining holds that increased emphasis on effort mediates improved self-efficacy and hence, improved performance. However, enhancement of students' general and specific self-concepts depends on further work to clarify the causal ordering of academic self-concept and academic achievement. Similarly, teachers' behaviour in determining students' self-worth in classroom needs to be studied.

The generalizability of this study's findings is limited to students in three States of Nigeria. As such there is a need for similar study in other parts of the nation for wider generalisation on the structure of students' academic self-concept. Furthermore, more diverse variety of academic subjects needs to be considered so as to elaborate the Marsh/Shavelson's model further.

5.4. Conclusion

The senior secondary school students' academic self-perceptions of specific subject areas within Nigerian educational settings can be explained within the academic self-concept model of Marsh/Shavelson (1985). The academic self-

perceptions of the students can be explained in terms of at least three higher order factors – Science-academic; Arts-academic; and Technical-academic self-concepts facets. However, an inclusion of more subject specific areas within the course offerings of students may test the limits of this assertion.

The Students' academic self-concepts can be measured using their self-evaluation – i.e. – on "how well/poor do I do" perspective. Equally too, the students academic self-concept can be measured using their (students') judgment of whether one is able to perform a certain activity – i.e. – on "Can I do it" perspective. These two dimensions of academic self-concept measures can be both useful for understanding students' academic self- concept in specific subject areas.

Students' academic self-concept is significantly related to their academic achievement. However, the academic self-concept – academic achievement relationship tend to be specific rather than general. This implies for instance, that self-concept of academic ability in Science is more closely related to achievement in Science than to achievement in Arts or Technical or overall General achievement.

The academic self-concept structure and academic self-concept-academic achievement relationship is different for male and female students. The sex differences could be interpreted in terms of sex stereotype.

Finally, the present students poor academic achievement may be attributed to the students' negative self- concept. The significant difference in academic self-concept between low achieving and high achieving students suggests this claim. Therefore, improving students' self-concept in specific subject areas of their

offerings can enhance their academic achievement. To rely solely on the improvement of students' General academic self-concept may yield fruitless efforts.

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APPENDIX 1

TABLE FOR DETERMINING SAMPLE SIZE FROM A GIVEN POPULATION

N	S	N	S	N	S
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	327
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	333
75	63	400	196	3000	341
80	66	420	201	5300	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	382
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Called from Kreycie and Morgan (1971)

Note— N is population size
S is sample size

APPENDIX 2

ACADEMIC SELF-DESCRIPTION QUESTIONNAIRE (ASDQ)

Name.....School.....
Class..... Age..... Sex.....

Instructions—This questionnaire is intended to measure your self-perception of academic subjects. Many of the sentences are about school subjects (like Maths, English, History, etc.) you have studied or studying now. For these school subjects, try to state as honestly as you can how you felt or feel when studying the subjects.

The questionnaire is for research purpose. Please circle the appropriate Number Form 1-5 in the following manners:

1. Absolutely false.	2. False.	3. Undecided.	4. True.	5. Absolutely true.

Scale 1

1.	Compared to others of my age, I'm good at English language.	1 2 3 4 5
2.	I score good marks in English language.	1 2 3 4 5
3.	Work in English language is easy for me.	1 2 3 4 5
4.	I find it difficult learning English language.	1 2 3 4 5
5.	I learn things quickly in English language.	1 2 3 4 5
6.	I have always done well in English language.	1 2 3 4 5

Scale 2

1.	Compared to others of my age, I'm good at English literature.	1 2 3 4 5
2.	I score good marks in English literature.	1 2 3 4 5
3.	Work in English literature is easy for me.	1 2 3 4 5
4.	I find it difficult learning English literature.	1 2 3 4 5
5.	I learn things quickly in English literature.	1 2 3 4 5
6.	I have always done well in English literature.	1 2 3 4 5

Scale 3

1.	Compared to others of my age, I'm good at Hausa.	1 2 3 4 5
2.	I score good marks in Hausa.	1 2 3 4 5
3.	Work in Hausa classes is easy for me.	1 2 3 4 5
4.	I find it difficult learning Hausa.	1 2 3 4 5
5.	I learn things quickly in Hausa.	1 2 3 4 5
6.	I have always done well in Hausa.	1 2 3 4 5

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Scale 4

1.	Compared to others of my age, I'm good at History.	1 2 3 4 5
2.	I score good marks in History.	1 2 3 4 5
3.	Work in History classes is easy for me.	1 2 3 4 5
4.	I find it difficult learning History.	1 2 3 4 5
5.	I learn things quickly in History.	1 2 3 4 5
6.	I have always done well in History.	1 2 3 4 5

Scale 5

1.	Compared to others of my age, I'm good at Economics.	1	2	3	4	5
2.	I score good marks in Economics.	1	2	3	4	5
3.	Work in Economics classes is easy for me.	1	2	3	4	5
4.	I find it difficult learning Economics.	1	2	3	4	5
5.	I learn things quickly in Economics.	1	2	3	4	5
6.	I have always done well in Economics.	1	2	3	4	5

Scale 6

1.	Compared to others of my age, I'm good at Government.	1	2	3	4	5
2.	I score good marks in Government.	1	2	3	4	5
3.	Work in Government classes is easy for me.	1	2	3	4	5
4.	I find it difficult learning Government.	1	2	3	4	5
5.	I learn things quickly in Government.	1	2	3	4	5
6.	I have always done well in Government.	1	2	3	4	5

Scale 7

1.	Compared to others of my age, I'm good at Biology.	1	2	3	4	5
2.	I score good marks in Biology.	1	2	3	4	5
3.	Work in Biology classes is easy for me.	1	2	3	4	5
4.	I find it difficult learning Biology.	1	2	3	4	5
5.	I learn things quickly in Biology.	1	2	3	4	5
6.	I have always done well in Biology.	1	2	3	4	5

Scale 8

1.	Compared to others of my age, I'm good at Chemistry.	1	2	3	4	5
2.	I score good marks in Chemistry.	1	2	3	4	5
3.	Work in Chemistry classes is easy for me.	1	2	3	4	5
4.	I find it difficult learning Chemistry.	1	2	3	4	5
5.	I learn things quickly in Chemistry.	1	2	3	4	5
6.	I have always done well in Chemistry.	1	2	3	4	5

Scale 9

1.	Compared to others of my age, I'm good at Geography.	1	2	3	4	5
2.	I score good marks in Geography.	1	2	3	4	5
3.	Work in Geography classes is easy for me.	1	2	3	4	5
4.	I find it difficult learning Geography.	1	2	3	4	5
5.	I learn things quickly in Geography.	1	2	3	4	5
6.	I have always done well in Geography.	1	2	3	4	5

Scale 10

1.	Compared to others of my age, I'm good at Mathematics.	1	2	3	4	5
2.	I score good marks in Mathematics.	1	2	3	4	5
3.	Work in Mathematics classes is easy for me.	1	2	3	4	5
4.	I find it difficult learning Mathematics.	1	2	3	4	5
5.	I learn things quickly in Mathematics.	1	2	3	4	5
6.	I have always done well in Mathematics.	1	2	3	4	5

Scale 11

1.	Compared to others of my age, I'm good at Physics.	1 2 3 4 5
2.	I score good marks in Physics.	1 2 3 4 5
3.	Work in Physics classes is easy for me.	1 2 3 4 5
4.	I find it difficult learning Physics.	1 2 3 4 5
5.	I learn things quickly in Physics.	1 2 3 4 5
6.	I have always done well in Physics.	1 2 3 4 5

Scale 12

1.	Compared to others of my age, I'm good at Agricultural Science.	1 2 3 4 5
2.	I score good marks in Agricultural. Science.	1 2 3 4 5
3.	Work in Agricultural Science classes is easy for me.	1 2 3 4 5
4.	I find it difficult learning Agricultural Science.	1 2 3 4 5
5.	I learn things quickly in Agricultural Science.	1 2 3 4 5
6.	I have always done well in Agricultural Science.	1 2 3 4 5

Scale 13

1.	Compared to others of my age, I'm good at Metalwork.	1 2 3 4 5
2.	I score good marks in Metalwork.	1 2 3 4 5
3.	Work in Metalwork classes is easy for me.	1 2 3 4 5
4.	I find it difficult learning Metalwork.	1 2 3 4 5
5.	I learn things quickly in Metalwork.	1 2 3 4 5
6.	I have always done well in Metalwork.	1 2 3 4 5

Scale 14

1.	Compared to others of my age, I'm good at Woodwork.	1 2 3 4 5
2.	I score good marks in Woodwork.	1 2 3 4 5
3.	Work in Woodwork classes is easy for me.	1 2 3 4 5
4.	I find it difficult learning Woodwork.	1 2 3 4 5
5.	I learn things quickly in Woodwork.	1 2 3 4 5
6.	I have always done well in Woodwork.	1 2 3 4 5

Scale 15

1.	Compared to others of my age, I'm good at Electronics.	1 2 3 4 5
2.	I score good marks in Electronics.	1 2 3 4 5
3.	Work in Electronics classes is easy for me.	1 2 3 4 5
4.	I find it difficult learning Electronics.	1 2 3 4 5
5.	I learn things quickly in Electronics.	1 2 3 4 5
6.	I have always done well in Electronics.	1 2 3 4 5

Scale 16

1.	Compared to others of my age, I'm good at Auto-mechanics.	1 2 3 4 5
2.	I score good marks in Auto-mechanics.	1 2 3 4 5
3.	Work in Auto-mechanics classes is easy for me.	1 2 3 4 5
4.	I find it difficult learning Auto-mechanics.	1 2 3 4 5
5.	I learn things quickly in Auto-mechanics.	1 2 3 4 5
6.	I have always done well in Auto-mechanics.	1 2 3 4 5

Scale 17

1.	Compared to others of my age, I'm good at Technical Drawing.	1 2 3 4 5
2.	I score good marks in Technical Drawing.	1 2 3 4 5
3.	Work in Technical Drawing classes is easy for me.	1 2 3 4 5
4.	I find it difficult learning Technical Drawing.	1 2 3 4 5
5.	I learn things quickly in Technical Drawing.	1 2 3 4 5
6.	I have always done well in Technical Drawing.	1 2 3 4 5

Scale 18

1.	Compared to others of my age, I'm good at Commerce.	1 2 3 4 5
2.	I score good marks in Commerce.	1 2 3 4 5
3.	Work in Home Commerce classes is easy for me.	1 2 3 4 5
4.	I find it difficult learning Commerce.	1 2 3 4 5
5.	I learn things quickly in Commerce.	1 2 3 4 5
6.	I have always done well in Commerce.	1 2 3 4 5

Scale 19 General Academic Self-concept (GASC)

1.	Compared to others of my age, I'm good at most school subjects.	1 2 3 4 5
2.	I score good marks in most school subjects.	1 2 3 4 5
3.	Work in most school subjects' classes is easy for me.	1 2 3 4 5
4.	I find it difficult learning most school subjects.	1 2 3 4 5
5.	I learn things quickly in most school subjects.	1 2 3 4 5
6.	I have always done well in most school subjects.	1 2 3 4 5

APPENDIX 3

SUCCESS EXPECTATION ON DEFINED PROBLEMS (SEDP)

Name..... School.....
Class..... Age..... Sex.....

Instructions—This test is intended to measure your success expectation on some defined academic tasks (problems). It is meant for research purposes. You are required to indicate within 10 seconds as to whether you can truly be able to solve each problem or not. Please circle the appropriate number from 1-5 in the following manner:

1 if it is absolutely not true (i.e. absolutely false) you can solve the problem.
2 if it is not true (i.e. false) you can solve the problem.
3 if you are indecisive on the problem.
4 if it is true you can solve the problem.
5 if it is absolutely true you can solve the problem.

Project A

1. Which of the following crop is a biennial crop?
   a) Pepper.
   b) Onion
   c) Lettuce
   d) Cassava
   e) None of the above

1	2	3	4	5

2. Meat produced from sheep is generally known as
   a) Mutton
   b) Beef
   c) Steak
   d) Lamb
   e) pock

1	2	3	4	5

3. One of the methods of conserving soil moisture is by
   a) mulching.
   b) Crop rotation.
   c) closed season.
   d) fallowing.

1	2	3	4	5

4. A specialist in Agriculture who treats diseases of animals is called
   a) Veterinary Doctor.
   b) Animal Doctor.
   c) Plant Pathologist.
   d) Poultry Doctor.

1	2	3	4	5

5. Which of the following implements is best for weeding?

   a) Cutlass.
   b) Hoe.
   c) Machete.
   d) Shovel.

1	2	3	4	5

6. The type of soil which allows water to pass easily and has many large pore spaces is called
   a) Sandy soil.
   b) Clay soil.
   c) Humus.
   d) Toamy soil.
   e) Quarts.

1	2	3	4	5

Project B

1. The purpose of bleeding in a hydraulic braking system is to remove
   a) oil
   b) water
   c) sediments
   d) air

1	2	3	4	5

2. The side to side movement of a tyre noticeable at low speed is caused by
   a) Camber wear.
   b) high-speed wear.
   c) radial-tyre waddle.
   d) uneven tyre wear.

1	2	3	4	5

3. The number of revolution required of the crankshaft to complete the four-stroke cycle is
   a) one
   b) two
   c) three
   d) four

1	2	3	4	5

4. To fix a clutch assembly to the vehicle, the driven plate should be aligned with the aid of
   a) mandrel.
   b) piece of wood.
   c) input gear shaft.
   d) release bearing.

1	2	3	4	5

5. Propeller shaft section is
   a) tabular.
   b) channeled.
   c) boxed
   d) triangular.

1	2	3	4	5

6. The gearbox primary shaft is splined into the
   a) flywheel.
   b) clutch pressure plate.
   c) gearbox main shaft.
   d) clutch friction plate.

1	2	3	4	5

Project C

1. Which of the following does a virus have in common with animal cells?
   a) Nucleus
   b) DNA
   c) Glycogen
   d) Cytoplasm

1	2	3	4	5

2. Which of the following is transmitted through mosquito bite?
   a) Finalises
   b) Typhus.
   c) Plague.
   d) Schistosomiasis.

1	2	3	4	5

3. In which of the following vertebrates does the skin function as a respiratory surface?
   a) Rate
   b) Lizard
   c) Fish
   d) Frog

1	2	3	4	5

4. Secondary thickening in dicotyledonous stem is controlled by the
   a) Xylem
   b) Phloem
   c) Cambium
   d) Pericycle

1	2	3	4	5

5. Which vitamin plays an important role in blood clotting?
   a) Vitamin A
   b) Vitamin K
   c) Vitamin B_{12}
   d) Vitamin C

1	2	3	4	5

6. The mammalian organ which acts both as a digestive as an endocrine organ is the
   a) Oesophagus
   b) Liver
   c) Pancreas
   d) Spleen

1	2	3	4	5

Project D

1. Chromatography is used to separate components of mixtures which differ in their rates of:
   a) diffusion.
   b) migration.
   c) reaction.
   d) sedimentation.

1	2	3	4	5

2. What volume of oxygen will remain after reacting $8cm^3$ of hydrogen with $20cm^3$ of oxygen?
   a) $10cm^3$
   b) $12cm^3$
   c) $14cm^3$
   d) $16cm^3$

1	2	3	4	5

3. Which of the following is an example of a chemical change?
   a) Dissolution of salt in water.
   b) Rusting of iron.
   c) Melting of ice.
   d) Separating a mixture by distillation.

1	2	3	4	5

4. In the oil drop experiment, Millikan determined the
   a) charge to mass ratio of the electron.
   b) mass of the electron.
   c) charge of the electron.
   d) mass of the proton.

1	2	3	4	5

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5. Helium is often used in observation balloons because it is
   a) light and combustible (b) light and non-combustible.
   b) heavy and combustible (d) heavy and non-combustible.

1	2	3	4	5

6. Deliquescent substances are also
   a) efflorescent.
   b) anhydrous.
   c) Hygroscopic.
   d) Insoluble.

1	2	3	4	5

Project E

1. The ultimate objective of economics is to
   a) Make effort to understand how the economy works.
   b) Make the best use of scarce resources.
   c) Organise production at the lowest cost.
   d) Decide under what circumstances the government should intervene in the economy.

1	2	3	4	5

2. What to produce in any society is determine by the
   a) expenditure of the people on different commodities.
   b) competition among the different producers.
   c) competition among the different consumers.
   d) supply and demand in the factor markets.

1	2	3	4	5

3. The problems of conducting census include
   a) high rate of rural-urban migration.
   b) poor geographical distribution of population.
   c) high birth rate in the country.
   d) poor town planning in urban areas.

1	2	3	4	5

4. An ageing population is a population
   a) with a high dependency ratio.
   b) with many young people.
   c) in which the number of old persons is increasing.
   d) that is dominated by very old people.

1	2	3	4	5

5. The advantages which firms obtain directly from expanding their operations are referred to as
   a) internal economics of scale.
   b) external economics of scale.
   c) economics of localisation.
   d) economics of resource allocation.

1	2	3	4	5

6. Stocking small quantities of a variety of goods is a function of the
   a) manufacturer.
   b) wholesaler.
   c) retailer.
   d) consumer.

1	2	3	4	5

Project F

1. Read this passage carefully and answer the question that follows it:

> When I wonder how many people share my kind of mental experience, I realise that we must be very few. For not many have the slightest opportunity of absconding from the country; they do not have place to run to, nor do they have the means of escaping. Even among the elite who considers this possibility, the uncertainty of a future outside their fatherland intimates. And so we all end up staying and mumbling.

Question: This passage reveals that:

a) the write is a member of the elite which along indulges in this kind of thinking;
b) people in the country only end up arguing among themselves, while nobody does anything about the situation;
c) the majority of citizens in the country does not possess the ability to argue the way the writer does;
d) deciding to leave the country is as bad as deciding to stay.

1	2	3	4	5

In the following two questions, select the *Option* that *best explains* the information *conveyed* in the sentence:

1. Most of the time, their presence is a menace.
   a) Their presence is always meaningful.
   b) Their presence is seldom a bother.
   c) Their presence is usually a great concern.
   d) Their presence is frequently a threat.

1	2	3	4	5

3. My son, who is in the USA is studying Engineering.
   a) My only son is in the USA studying Engineering.
   b) One of my sons is in the USA studying Engineering.
   c) My sons are in the USA, but only one is studying Engineering.
   d) Only my son is in the USA studying Engineering.

1	2	3	4	5

From the following question, choose the most appropriate option *opposite in meaning* to the word in italic:

4 Many species in creation have *mutated* over the years into new forms of life.
   a) Stabilised.
   b) Manifested.
   c) Transformed.
   d) Standardised.

1	2	3	4	5

In the following two questions, fill-in the gaps with the most appropriate option:

5. The workers suffered a lot, toiling …….. the sun.
   a) in b) under c) underneath d) inside

1	2	3	4	5

6. Either Bello or you ..... to go.
   a) was b) are c) has d) is

1	2	3	4	5

Project G

1. A literary device used by poets for comparisons is
   a) Simile.
   b) Consonance.
   c) Hyperbole
   d) Pun.

1	2	3	4	5

2. A poem mourning the death of a person is
   a) an epic.
   b) an ode.
   c) a ballad.
   d) an elegy.

1	2	3	4	5

3. A dramatist is one who
   a) reviews a play.
   b) writes a play.
   c) acts a play.
   d) directs a play.

1	2	3	4	5

4. The message of a novel is known as
   a) setting.
   b) plot.
   c) theme.
   d) tone.

1	2	3	4	5

5. The logical sequence of events in a novel is known as
   a) motif.
   b) theme.
   c) unity.
   d) plot.

1	2	3	4	5

6. An imaginary story created by a writer is
   a) fiction.
   b) a memoir.
   c) an epitaph.
   d) a diary.

1	2	3	4	5

Project H

1. For an effective soldering to be carried out, it is necessary that the soldering lig is
   a) well timed.
   b) well cleaned.
   c) well insulated.
   d) well smeared with flux.

1	2	3	4	5

2. The type of joint commonly used to tee-off a service from an armoured cable is
   a) Marvid joint.
   b) Britannia joint.
   c) Telescope joint
   d) Tee joint.

1	2	3	4	5

3. Which circuit controls the gain of i.f. amplifier?
   a) a.g.c.
   b) a.f.c.
   c) d.c. bias
   d) h.a.f.c.

1	2	3	4	5

4. The two standard hacksaws generally used in electrical workshops are
   a) power and strength.
   b) wood and pin-shaped.
   c) glass and iron.
   d) junior and senior.

1	2	3	4	5

5. The following are materials used in electrical winding, except.
   a) bakelite.
   b) leatheroid.
   c) paper.
   d) rubber.

1	2	3	4	5

6. Which of the following is the standard length of cross arms used for high tension power supply?
   a) 1.0 metre.
   b) 1.5 metres
   c) 2.5 metres.
   d) 3.5 metres

1	2	3	4	5

Project I

1. The longitude dividing Africa into two equal parts is
   a) 15^0E
   b) 17^0W
   c) 20^0E
   d) 10^0W
   e) 50^0E

1	2	3	4	5

2. When stars are clustered, they form the
   a) Universe.
   b) Galaxy.
   c) Sky.
   d) Solar system.
   e) Satellite.

1	2	3	4	5

3. The equinoxes occur on
   a) March 21 and September 23.
   b) June 21 and September 23.
   c) March 21 and June 21.
   d) March 21 and December 22.
   e) September 23 and December 22.

1	2	3	4	5

4. The outermost layer of the earth's crust is the
   a) Sail.
   b) Sima.
   c) Mantle.
   d) Biosphere.
   e) Hydrosphere.

1	2	3	4	5

5. Which of the following rocks is stratified
   a) Marble.
   b) Slate.
   c) Graphite.
   d) Gneiss.
   e) Limestone.

1	2	3	4	5

6. All the following can be found in the upper course of a river except
   a) gorges.
   b) cataracts.
   c) waterfalls.
   d) rapids.

e) levees.

1	2	3	4	5

Project J

1. The concept of sovereignty can best be defined as the
   a) State of being supreme in authority.
   b) Power of the executive president.
   c) Supremacy of the legislature.
   d) Supremacy of the executive.

1	2	3	4	5

2. Power is understood to mean the
   a) right to compel obedience.
   b) capacity to compel obedience.
   c) relationship between the government and the people.
   d) desire to seize the state apparatus.

1	2	3	4	5

3 The institutions which constitute the main organs of the government of nation are the
   a) legislature, the executive, and the judiciary.
   b) judiciary and the civil service.
   c) trustee and the presidium.
   d) civil service and the senate.

1	2	3	4	5

4. The executive arm of government includes the
   a) Police.
   b) Courts.
   c) National Assembly.
   d) Senate President.

1	2	3	4	5

5. Unicameral legislature is often criticised for
   a) restricting the scope of participation.
   b) cheapening the opportunity for participation.
   c) condoning the participation of traditional rulers.
   d) narrowing participation to the military.

1	2	3	4	5

6. A legal document yet to be enacted into law, but still under debate in the legislature is known as
   a) an edict.
   b) a decree.
   c) a white paper.
   d) a bill.

1	2	3	4	5

Project K

1. Ana yin dauri da 'm' idan wannan bakin ya biyo bayanta
   a) f
   b) k
   c) t
   d) h
   e) c

1	2	3	4	5

2. Wajen raba doguwar jimla ana yin amfani da wannan alama
   a) ?
   b) .
   c) ,
   d) !
   e) "

1	2	3	4	5

3. Wanne ne bare a nan?
   a) Gaisuwa.
   b) Adireshi.
   c) Yabon farawa.
   d) Kwannan wata.
   e) Gabatarwa.

1	2	3	4	5

4. Daga cikin wadannan, wanne ne ake hadiye iska wajen furtawa?
   a) /b/
   b) /m/
   c) /k/
   d) /d/
   e) /r/

1	2	3	4	5

5. Ware bare daga cikin wadannan
   a) Delu
   b) Gambo
   c) Auta
   d) Kyauta
   e) Talle

1	2	3	4	5

6. Wanne ne 'aikatau' a nan?
   a) Fa
   b) Fo
   c) Fu
   d) Fe
   e) Fi

1	2	3	4	5

Project L

1. The site of the earliest remains of humans in Nigeria was in
   a) Lime-Hills.
   b) Iwo-Elem.
   c) Nok
   d) Benin

1	2	3	4	5

2. Which of the following attacked and drove out the Alafin from Oyo-Ile in the 16th century?
   a) Dahomey.
   b) Nupe.
   c) Ilorin
   d) Borgu

1	2	3	4	5

3. The Queen mother, Mariga, played a prominent role in the government of the
   a) Hausa states prior to the jihad.
   b) Kwararfa Empire.
   c) Kanem-Borno Empire.
   d) Sokoto caliphate.

1	2	3	4	5

4. The over all authority in the 19th century emirate system in Hausaland rested in the
   a) Caliph.
   b) Emir
   c) Alkali
   d) Waziri

1	2	3	4	5

5. The Royal Niger Company was a
   a) Project making chartered organisation.
   b) British military force in West Africa.
   c) body of frontier guards.
   d) company of French merchants.

1	2	3	4	5

6. The first military government in Nigeria was headed by
   a) General Yakubu Gowon.
   b) General Olusegun Obasanjo.
   c) Major-General Muhammadu Buhari.
   d) Major-General Johnson Aguiyi-Ironsi

1	2	3	4	5

Project M

1. Trade may be defined as
   a) buying and selling of goods and services.
   b) selling of goods only.
   c) marketing.
   d) distribution of goods.
   e) production of goods.

1	2	3	4	5

2. The government can fix the quantity of a particular commodity that could be imported through
   a) embargo.
   b) tariffs.
   c) ban.
   d) quota.
   e) exchange control.

1	2	3	4	5

3. A partner whose liability is restricted to the amount of capital he has invested in the business is a
   a) limited partner.
   b) general partner.
   c) dormant partner.
   d) nominal partner.
   e) secret partner.

1	2	3	4	5

4. Which of the following is a visible export item?
   a) Shipping.
   b) Lubricant.
   c) Banking.
   d) Insurance.
   e) Air freight.

1	2	3	4	5

5. If a businessman is paid N10,000 by an insurance company for a damage done to his property, this amount is known as
   a) premium.
   b) insurable interest.
   c) profit.
   d) indemnity.
   e) capital gain.

1	2	3	4	5

6. A person who employs another to perform duties on his behalf is
   a) a principal
   b) a broker.
   c) a factor.
   d) an agent.
   e) an actuary

1	2	3	4	5

Project N

1. Calculate $3310_5 - 1442_5$
   a) 1313_5
   b) 2131_5
   c) 4302_5
   d) 1103_5

1	2	3	4	5

2. Convert 3.1415926 to 5 decimal places.
   a) 3.14160
   b) 3.14159
   c) 0.31415
   d) 3.14200

1	2	3	4	5

3. Find the value of $(16)^{3/2} + \log_{10} 0.0001 + \log_2 32$
   a) 0.065
   b) 0.650
   c) 6.500
   d) 65.000

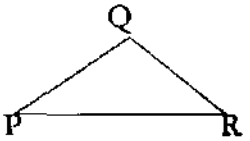
1	2	3	4	5

4. Factorise completely the expression: $ab\chi^2 + 6y - 3a\chi - 2by\chi$
   a) $(a\chi-2\gamma)(b\chi-3)$
   b) $(b\chi+3)(2\gamma-a\chi)$
   c) $(b\chi+3)(a\chi-2\gamma)$
   d) $(a\chi-2\gamma)(a\chi-b)$

1	2	3	4	5

5. Solve the following inequality $(\chi-3)(\chi-4) \leq 0$:
   a) $3 \leq \chi \leq 4$
   b) $3 < \chi < 4$
   c) $3 \leq \chi < 4$
   d) $3 < \chi \leq 4$

1	2	3	4	5

6. 

In the diagram above, find PQ if the area of the triangle PQR is $35cm^2$.

a) 7cm
b) 10cm
c) 14cm
d) 17cm

1	2	3	4	5

Project O

1. Which of the following does not employ shearing principles to shape metal to size?
   a) Tin snip.
   b) Bench shear.
   c) Centre punch.
   d) Chisel.

1	2	3	4	5

2. High carbon steel tools gain hardness at the expense of
   a) strength.
   b) brittleness.
   c) ductility.
   d) toughness.

1	2	3	4	5

3. For filing iron casting, use
   a) rough file.
   b) smooth file.
   c) dead smooth file.
   d) bastered file.

1	2	3	4	5

4. All these are protective devices when grinding except
   a) goggles.
   b) wheel guard.
   c) apron.
   d) face shield.

1	2	3	4	5

5. Another term for dimension cage is
   a) blocking-in.
   b) perimeter.
   c) development.
   d) box.

1	2	3	4	5

6. All the names below are gearing terms except
   a) pitch diameter.
   b) addendum.
   c) base circle.
   d) circular path.

1	2	3	4	5

Project P

1. Which of the following is the dimension of pressure?
   a) $ML^{-1}T^{-2}$
   b) MLT^{-2}
   c) $ML^{2}T^{-3}$
   d) ML^{-3}

1	2	3	4	5

2. The length of a displaced pendulum bob which passes its lowest point twice every second is
   a) 0.25m
   b) 0.45m
   c) 0.58m
   d) 1.00m

1	2	3	4	5

3. Which of the following is the exclusive property of a transverse wave?
   a) Diffraction.
   b) Refraction.
   c) Comprehension.
   d) Polarisation.

1	2	3	4	5

4. The difference between sound waves and light waves is that sound waves
   a) are transverse while light waves are longitudinal.
   b) require a medium to travel while light waves do not.
   c) can be diffracted, but light waves cannot.
   d) cannot be reflected, but light waves can.

1	2	3	4	5

5. Total eclipse of the sun occurs when the
   a) earth is between the moon and the sun.
   b) sun is between the moon and the earth.
   c) moon is between the sun and the earth.
   d) ozone layer is threatened.

1	2	3	4	5

6. What is the approximate critical angle for total interval reflection for diamond if the reflective index of diamond is 2.42?
   a) 21^0
   b) 22^0
   c) 23^0
   d) 24^0

1	2	3	4	5

Project Q

1. Which of the following statements in relation to lines as used in Technical Drawing is not conventionally correct?
   a) All chain lines should start and finish with a long dash.
   b) Centre lines should not terminate at another line on the drawing.
   c) Construction lines should be represented with thin continuous lines.
   d) Thin short dashes for hidden outlines and details should be consistent length and spaces.
   e) Cutting plane lines should be thick at the middle only.

1	2	3	4	5

2. A quadrant is defined as part of a circle bounded by
   a) two radii and an arc.
   b) an arc and a diameter.
   c) an arc and a chord.
   d) two perpendicular radii and an arc.
   e) a diameter and a chord.

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1	2	3	4	5

3. In which type of pictorial drawings are receding edges drawn half full size at 45^0?
   a) Axonometric.
   b) Cavalier.
   c) Cabinet.
   d) Perspective.
   e) Isometric.

1	2	3	4	5

4. The softest of the following grades of pencil is
   a) B
   b) H
   c) 2H
   d) HB
   e) 2B

1	2	3	4	5

5. In which of the following devices is the principle of the archimedean spiral applied in its construction?
   a) Gear teeth.
   b) Radar sets.
   c) Air screw spinner.
   d) Moto head lamp.
   e) Clockwise mechanism.

1	2	3	4	5

6. Which of the following quadrilaterals has all its sides equal, but the angles other than right-angles?
   a) Rhombus.
   b) Deltoid.
   c) Square.
   d) Rectangle.
   e) Trapezium.

1	2	3	4	5

Project R

1. The best saw for cutting across the grain of wood is
   a) rip saw.
   b) tenon saw.
   c) Pad or keyhole saw.
   d) cross cut saw.

1	2	3	4	5

2. Which timber will cause corrosion of iron fittings in damp situations?
   a) Mahogany.
   b) Obeche.
   c) Opepe.
   d) Afara.

1	2	3	4	5

3. Which of the following is not classified as Building board?
   a) Particleboard.
   b) bock board.
   c) plywood.
   d) laminated plastic.

1	2	3	4	5

4. The angle intersection between the common rafter aid the ridge board will give the
   a) vally angle.
   b) plumb cut.
   c) seat cut.
   d) backing bend.

1	2	3	4	5

5. One important part of the point that makes it adhere to the surface is
   a) thinner.
   b) pigment.
   c) binder.
   d) drier.

1	2	3	4	5

6 One of the following is not a type of finishes applied to wood
   a) polish.
   b) wax.
   c) evostik.
   d) lacquer.

1	2	3	4	5

ACADEMIC SELF-ESTEEM SCALE (ASES)

Instructions—This Scale is intended to measure your general feeling of doing well in school and your satisfaction with your achievement. Each item describes two different groups of students. Therefore, you are expected to indicate which group you are most like by ticking (✓) the box below each item. Furthermore, you are required to indicate your degree of resemblance by circling the appropriate number from 1-5 in the following manner:

1. Absolutely false.	2. False.	3. Undecided.	4. True.	5. Absolutely true.

1. Some students think that they are good at their school work, While Other students don't think they are any good.

	1	2	3	4	5	

2. Some students need a lot of time to do their school work properly, While Other students do their schoolwork both quickly and properly.

	1	2	3	4	5	

3. Some students often forget what they learn, While Other students easily remember what they learn.

	1	2	3	4	5	

4. Some students like school because they do well in their school work, While Other students do not particularly like school because they have trouble with their schoolwork.

	1	2	3	4	5	

5. Some students easily understand what they read, While Other students wish it were easier to understand what they read.

	1	2	3	4	5	

6. Some students have problems figuring out the answers, while doing school work, Whereas Other students have no trouble finding the answers while doing schoolwork.

	1	2	3	4	5	

APPENDIX 4

RESULTS OF THE PILOT STUDY

As indicated in the Methodology Section of this study, a pilot study was conducted in order to estimate the qualities of this study's measuring instruments. The sample of the pilot study comprised of 100 (50 male and 50 female) students selected from two Senior Secondary School (SSS) in Kano Metropolis. The schools were Rumfa College, Kano and Government Girls' Senior Secondary School, Shekara, Kano. It was from the scores obtained from this sample that reliability and validity estimates of the ASDQ and SEDP were ascertained. The results of the pilot study is given below:

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Reliability

The Internal consistency reliability of the two measuring instruments: ASDQ and SEDP were sought. Internal consistency method was chosen because it estimates the reliability of a test on the basis of the number of items in the test and the average correlations between pairs of items. Since the ASDQ and SEDP contained 19 scales each and each scale was made up of 6 items, then the internal consistency method was the suitable approach for the tests' estimate of reliability. Among the measures of internal consistency, the Cronbach's alpha was used. The choice of the procedure was based on the fact that it is the most widely used measure of internal consistency and furthermore, it is an estimate of the correlation to be expected between scores obtained on a scale and a "true score" (i.e. the score expected to be obtained from a perfect measure of a scale variable; Frude, 1993). In addition, Cronbach's alpha is the alternative procedure for

estimating the reliability of a test scored on more than two points of scale. (Gay, 1992)

The Cronbach's alpha estimates of the 19 ASDQ and 19 SEDP scales were computed using SPSS/PC+ computer package. In the analyses, the alpha including the standardised item alpha; inter-item correlation matrix, item means; and item variances were obtained for each of the 38 scales. These are presented in Tables 1.1 to 1.8 below.

Table 1.1

Inter-items correlation Matrix of ASDQ (Decimals have been omitted)

Scale	VAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
A	1																		
S	2	92																	
A	3	77	79																
G	4	45	47	55															
R	5	67	68	74	53														
	6	68	69	73	44	80													
A	7																		
S	8							93											
A	9							86	89										
U	10							51	57	67									
T	11							71	74	83	75								
	12							63	65	69	62	85							
A	13																		
S	14													80					
B	15													73	84				
I	16													42	55	51			
O	17													54	64	70	44		
	18													50	60	65	47	92	

Scale	VAR	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
A	19																		
S	20	90																	
C	21	78	85																
H	22	46	48	52															
E	23	64	70	71	55														
M	24	70	74	68	57	88													
A	25																		
S	26							89											
C	27							86	92										
O	28							73	81	85									
M	29							75	84	85	86								
	30							67	74	76	76	78							
A	31																		
S	32													89					
E	33													80	85				
C	34													69	67	81			
O	35													73	78	84	71		
	36													69	75	75	63	86	

Scale	VAR	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
A	37																		
S	38	66																	
E	39	46	53																
L	40	-04	-09	13															
A	41	57	55	41	49														
	42	57	58	49	57	61													
A	43																		
S	44							89											
E	45							88	88										
L	46							62	63	68									
E	47							79	71	84	70								
	48							72	68	71	60	88							
A	49																		
S	50													86					
E	51													76	90				
I	52													32	34	37			
T	53													75	72	69	56		
	54													62	70	70	51	83	

Scale	VAR	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
A	55																		
S	56	88																	
G	57	82	88																
E	58	34	37	39															
O	59	54	60	63	53														
	60	58	61	63	58	91													
A	61																		
S	62							90											
G	63							84	89										
O	64							60	60	63									
V	65							71	78	81	65								
	66							73	77	77	64	80							
A	67																		
S	68													76					
H	69													56	63				
A	70													19	19	25			
U	71													43	46	61	74		
	72													43	53	47	79	78	

Scale	VAR	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
A	73																		
S	74	88																	
H	75	74	83																
I	76	47	54	60															
S	77	64	71	73	55														
	78	62	70	66	41	83													
A	79																		
S	80							78											
M	81							72	84										
A	82							28	35	46									
T	83							53	65	62	54								
	84							49	62	66	60	87							
A	85																		
S	86													96					
M	87													88	88				
E	88													60	60	69			
T	89													73	74	83	66		
	90													76	78	80	69	89	

Scale	VAR	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108
ASPHY	91																		
	92	87																	
	93	82	89																
	94	30	37	47															
	95	73	74	80	43														
	96	73	76	81	42	95													
ASTEC	97																		
	98							88											
	99							87	89										
	100							63	63	73									
	101							82	84	87	64								
	102							78	72	83	59	91							
ASWOO	103																		
	104													48					
	105													46	65				
	106													-00	01	-01			
	107													59	40	41			
	108													57	46	52	73	72	

Scale	VAR	109	110	111	112	113	114
ASGEN	109						
	110	48					
	111	46	65				
	112	-00	01	-01			
	113	59	59	41	70		
	114	57	46	52	73	72	

Table 1.2

Item means, Item Variance, and Alpha estimate of ASDQ

Scale	Item X	Item S	Alpha	
			α	Stand. α
1	3.02	1.55	.92	.92
2	2.49	1.41	.94	.94
3	3.40	1.76	.90	.90
4	2.95	1.72	.90	.90
5	2.91	1.92	.96	.96
6	3.05	1.82	.95	.95
7	3.83	1.03	.70	.73
8	2.50	1.58	.95	.95
9	2.80	1.61	.91	.91
10	3.22	1.79	.90	.90
11	2.82	1.57	.94	.95
12	3.86	1.19	.82	.83
13	2.72	1.61	.92	.92
14	3.42	1.54	.88	.89
15	2.26	1.54	.95	.95
16	2.91	1.79	.92	.93
17	2.48	1.59	.95	.95
18	2.44	1.53	.94	.94
19	4.10	0.82	.66	.73

From Table 1.2., it can be observed that the coefficient alpha estimates for the 19 ASDQ scales ranged from .6631 to .9606 (Mdn = .9210). The standardised item alpha estimates of the 19 ASDQ scales were from .7323 to .9614 (Mdn = .9215). For the 19 SEDP scales, the alpha estimates ranged from .6650 to .9626 (Mdn = 9266). This is clearly indicated in Table 1.4.

Table 1.3

Inter-items correlation Matrix of SEDP (Decimals have been omitted)

Scale	VAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
S	1																		
E	2	79																	
A	3	65	62																
G	4	54	77	51															
R	5	46	67	56	89														
	6	57	68	62	74	75													
S	7																		
E	8							81											
A	9							75	88										
U	10							69	75	72									
T	11							75	77	76	54								
	12							58	70	65	79	58							
S	13																		
E	14													71					
B	15													82	72				
I	16													60	80	73			
O	17													74	62	83	68		
	18													72	62	78	66	86	

Scale	VAR	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
	19																		
S	20	87																	
E	21	83	92																
C	22	65	76	72															
H	23	75	81	78	77														
E	24	62	70	70	78	87													
S	25																		
E	26							79											
C	27							71	91										
O	28							76	86	81									
M	29							69	83	79	89								
	30							58	65	66	77	79							
S	31																		
E	32													82					
E	33													84	88				
C	34													76	83	85			
O	35													74	81	78	87		
	36													70	78	80	85	87	

Scale	VAR	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
S	37																		
E	38	54																	
E	39	41	52																
L	40	54	44	47															
A	41	52	57	64	56														
	42	78	76	58	50	81													
S	43																		
E	44							86											
E	45							83	83										
L	46							77	83	81									
E	47							79	82	80	88								
	48							81	77	74	77	86							
S	49																		
E	50													64					
E	51													58	72				
L	52													57	78	71			
T	53													51	73	77	80		
	54													47	65	70	76	81	

Scale	VAR	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
S	55																		
E	56	82																	
G	57	59	55																
E	58	50	58	55															
O	59	59	68	53	75														
	60	51	59	56	70	87													
S	61																		
E	62							83											
G	63							78	87										
O	64							63	77	77									
V	65							66	73	71	81								
	66							63	72	71	80	87							
S	67																		
E	68													48					
H	69													42	72				
A	70													59	62	78			
U	71													43	60	64	73		
	72													45	40	49	58	72	

Scale	VAR	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
S	73																		
E	74	76																	
H	75	73	86																
I	76	63	76	82															
S	77	53	69	62	68														
	78	47	44	47	63	77													
S	79																		
E	80							59											
M	81							68	75										
A	82							52	69	75									
T	83							47	66	66	74								
	84							51	64	71	72	79							
S	85																		
E	86													69					
M	87													70	85				
E	88													66	85	87			
T	89													61	82	84	94		
	90													64	79	82	86	87	

Scale	VAR	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108
S	91																		
E	92	76																	
P	93	68	83																
H	94	54	73	81															
Y	95	50	67	72	82														
	96	52	71	60	76	79													
S	97																		
E	98							79											
T	99							80	86										
E	100							57	52	57									
C	101							58	59	54	82								
	102							51	58	41	76	72							
S	103																		
E	104														77				
W	105														73	86			
O	106														66	78	87		
O	107														59	56	64	71	
	108														46	53	61	73	88

Scale	VAR	109	110	111	112	113	114
S	109						
E	110	87					
G	111	63	50				
E	112	50	41	42			
N	113	51	57	57	52		
	114	46	53	43	40	65	

Table 1.4

Item means, Item Variance, and Alpha estimate of SEDP

Scale	Item X	Item S	Alpha	
			α	Stand. α
1	3.22	2.03	.92	.92
2	2.50	4.31	.68	.89
3	3.32	2.02	.94	94
4	2.91	1.95	.95	95
5	2.99	2.20	.95	95
6	3.28	1.70	.96	96
7	3.99	0.87	.81	.82
8	2.46	1.50	.96	96
9	2.86	1.61	.93	.93
10	3.13	2.46	.83	.88
11	2.82	1.53	.95	95
12	4.12	0.85	.88	.89
13	2.72	1.59	.92	.92
14	3.36	1.64	.92	.92
15	2.29	1.42	.96	96
16	2.84	1.73	.93	.93
17	2.55	3.39	.76	.82
18	2.40	1.31	.93	.93
19	4.11	1.07	.67	.68

And the standardised item alpha estimates of the 19 SEDP scales varied from .6650 to .9626 (Mdn = .9266). These alpha values of the ASDQ and SEDP were high enough to assume the scales to be reliable.

An examination of Tables 1.1. and 1.3. reveal that almost all of the inter-item correlations in each scale were positive and high. Therefore, these are measuring the same traits. However, only one item which appears as variable 40, 106, and 112 in the ASDQ showed negative correlation with certain items. This suggests that the item is a 'Maverick' (i.e. does not belong in the scale). This item is the statement **I am hopeless when it comes to English language**. Frude (1993). Suggested that items that are 'maverick' should not be deleted completely

from the sale, but should be re-worded and included. Hence, the item was changed to **I find it difficult learning English language.**

4.2.2. Validity

Construct validity estimates of the ASDQ and SEDP were established. The Construct validity of a measurement instrument refers to the extent to which the instrument measures the theoretical construct or trait under consideration (Anastasi, 1990). Among the methods of construct validation, factor analysis was the one employed in the validation of this study's instrument . Factor analysis has been described as 'powerful' and 'indispensable' method of construct validation (Kerlinger, 1986). Factor analysis describes in effect what measures (i.e. scales) measure the same thing and to what extent they measure what they measure.

Factorial Validity of the ASDQ and SEDP scales were computed using SPSS PC+ computer package. In the principal component analyses of the ASDQ and SEDP scales, inter-scale correlation matrices and factor matrices; were computed. These analyses are presented in Tables 1.5 to 1.8 below.

Table 1.5

Inter-scale correlation Matrix of ASDQ (Decimals have been omitted)

Scale	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
ASAGR																			
ASAUT	06																		
ASBIO	60	04																	
ASCHE	66	05	64																
ASCOM	-03	05	01	-26															
ASECO	-16	12	-06	-36	85														
ASELA	19	09	25	21	48	40													
ASELE	-02	87	-03	01	03	16	06												
ASELT	-03	-15	-01	-01	44	38	50	-13											
ASGEN	29	20	36	17	28	27	52	12	12										
ASGEO	67	-03	60	75	-03	-14	30	-11	13	31									
ASGOV	-04	-17	-17	-24	75	72	34	-15	47	18	-02								
ASHAU	12	-15	12	08	52	42	38	-17	48	17	26	55							
ASHIS	01	-08	-00	-10	66	65	43	-01	56	16	04	80	62						
ASMATH	52	35	51	64	-11	-14	28	36	-14	39	58	-32	-08	-19					
ASMET	-13	36	11	09	14	15	07	37	-02	06	08	08	06	13	19				
ASPHY	63	17	58	86	-42	-47	07	12	-19	18	61	-38	-05	-25	69	14			
ASTEC	-02	77	09	15	-01	08	06	85	-20	11	-00	-19	-16	-05	40	42	24		
ASWW	03	77	-01	05	03	13	02	82	-12	04	-09	-17	-17	-01	35	37	18	83	

Key

Correlation <.26 is significant at 0.05 level (2 tailed)

Correlation >.26 is significant at 0.01 level (2 tailed)

Table 1.6

Rotated factor Matrix on ASDQ (Decimals omitted)

Scale	Factor 1	Factor 2	Factor 3	Comm.
ASCOM	88	-14	11	80
ASGOV	86	-17	-13	78
ASHIS	86	-06	-00	74
ASECO	82	-26	22	79
ASHAU	71	17	-17	56
ASELT	66	03	-16	47
ASELA	64	35	11	54
ASCHE	-14	90	01	83
ASGEO	12	86	-10	76
ASPHY	-32	85	14	84
ASAGR	04	81	-01	65
ASBIO	08	78	10	61
ASMATH	-12	75	41	74
ASELE	-04	-03	94	89
ASTEC	-09	09	91	85
ASAUT	-05	05	91	82
ASWW	-06	01	90	81
ASMET	-14	11	50	29
ASGEN	58	42	18	35

Key

Correlation <.26 is significant at 0.05 level (2 tailed)

Correlation >.26 is significant at 0.01 level (2 tailed)

Table 1.7

Inter-scale correlation Matrix of SEDP (Decimals have been omitted)

Scale	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
ASAGR																			
ASAUT	04																		
ASBIO	64	-05																	
ASCHE	78	17	61																
ASCOM	-17	-10	03	-23															
ASECO	-24	-09	-03	-33	73														
ASELA	09	12	33	24	56	43													
ASELE	-05	82	-14	05	-11	-02	04												
ASELT	02	-12	03	06	53	47	47	-10											
ASGEN	08	14	12	08	18	18	35	-01	25										
ASGEO	78	10	62	73	-13	-20	13	08	09	15									
ASGOV	-17	-21	-01	-20	66	63	43	-18	69	19	-06								
ASHAU	17	-28	30	12	51	52	47	-27	47	25	19	53							
ASHIS	-14	-07	-03	-15	64	64	48	-12	72	27	-09	81	56						
ASMATH	48	40	37	52	-12	-15	24	36	-16	36	57	-34	03	-20					
ASMET	-01	82	10	05	-14	-10	03	88	-16	-02	07	-23	-32	-16	38				
ASPHY	68	26	48	79	-35	-45	10	19	-12	14	67	-30	01	-22	57	27			
ASTEC	-01	71	-12	05	-1.6	-13	00	80	-29	03	04	-28	-18	-15	44	78	26		
ASWW	-09	72	-12	06	-08	-12	06	81	-16	00	02	-26	-24	-13	38	80	28	85	

Key

Correlation <.26 is significant at 0.05 level (2 tailed)

Correlation >.26 is significant at 0.01 level (2 tailed)

Table 1.8

Rotated Factor Matrix on SEDP (Decimals omitted)

Scale	Factor 1	Factor 2	Factor 3	Comm.
SEHIS	86	-07	-14	77
SEGOV	82	-21	-19	76
SECOM	82	-05	-19	71
SEECO	78	-03	-29	70
SEELT	77	-14	03	62
SEELA	72	13	26	61
SEHAU	71	-26	23	62
SEELE	-04	93	-01	87
SEMET	-10	92	03	86
SEWW	-07	90	-01	82
SETEC	-12	89	04	81
SEAUT	-02	88	11	79
SECHE	-05	04	90	82
SEAGR	-06	-08	88	78
SEGEO	04	03	87	76
SEPHY	-19	21	83	77
SEBIO	14	-16	76	63
SEMATH	-03	45	66	65
SEGEN	40	12	23	23

Key
Correlation <.26 is significant at 0.05 level (2 tailed)
Correlation >.26 is significant at 0.01 level (2 tailed)

The results of the factor analyses on the responses to both ASDQ and SEDP scales clearly identified 3 factors: Art/Academic self-concept; Science-academic self-concept; and Tech./Academic self-concept. That is, all scales measuring Art subjects; Science subjects; and Technical subjects in all the two measures—ASDQ and SEDP, correlated positively and significantly with each other. Tables 1.6. and 1.8. Present this clearly. Furthermore, a near zero and negative inter-correlations between Art, Science, and Technical subjects scales were revealed. Therefore, from the results of the factor analyses, ASDQ and SEDP scales were assumed to be valid.