

# Effects of Pauk's OK4R and Concept-Mapping Study Techniques On Students' Academic Self-Efficacy in Ogun State, Nigeria

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## Abstract

The study investigated effects of Pauk's OK4R and Concept-Mapping study techniques on students' academic self-efficacy. Using a 3x2 pre-test, post-test experimental design, three postulated hypotheses were tested at 0.05 level of significance. The sample consisted of 108 students randomly selected from three senior secondary schools. The Academic Self-Efficacy Scale (ASES) by Caban (2004) was adopted in the study. Data were analysed using the Factorial Analysis of variance. Results revealed that there were no significant main effects of: (i) treatment ( $F_{(2,103)} = 1.026$ ;  $p > 0.05$ ) and (ii) gender ( $F_{(1,103)} = 3.307$ ;  $p > 0.05$ ) on participants' academic self-efficacy. There were also no significant interaction effects of treatment and gender ( $F_{(2,103)} = 1.063$ ;  $p < 0.05$ ) on participants' academic self-efficacy. It is recommended that students should be exposed to study skills/ techniques especially Pauk's OK4R and Concept-Mapping in order to improve their academic self-efficacy. It is therefore necessary for schools to organize periodic seminars and workshops in this regard.

**KeyWords:** Pauk's OK4R; Concept-Mapping; Study Techniques; Academic Self-Efficacy

## 1. Introduction

Education is one of the main factors that facilitate and foster effective attainment of social, economic and national development. Through education, individuals acquire knowledge, skills and self-confidence to be competitive in a world that requires them to be more productive economically. The World Conference on Education for All (EFA) observed that despite notable efforts by countries around the globe, realities persisted that (a) out of a hundred million children who have no access to primary education worldwide, 60% are girls, (b) more than 960 million adults, two thirds of whom constitute women, are illiterate; and (c) more than one third of the world's adults have no access to printed knowledge, new skills and technologies that could improve the quality of lives (Momanyi, Ogoma and Misigo, 2010).

Self-efficacy is a construct that has been found to be significantly related to academic achievement as it is the perception of one's own ability to perform a task successfully (Weiten, 2001). When self-efficacy is high, individuals feel confident that they can execute responses necessary to earn re-inforcers. Self-efficacy is the belief that one can master a situation and produce favourable outcomes. Bandura (2000) believed that self-efficacy is a critical factor in whether or not adolescents achieve. Self-efficacy has much in common with mastery motivation and intrinsic motivation. Self-efficacy is the belief that "I can", while helplessness is the belief that "I cannot" (Stipek, 2002). Adolescents with high self-efficacy endorse such statements as "I know that

I will be able to learn the material in this class” and “I expect to be able to do well at this activity” (Santröck, 2005).

Schunk (2004), Schunk & Zimmerman (2003), Zimmerman & Schunk, (2004) have applied the concept of self-efficacy to many aspects of students’ achievements. In their views, self-efficacy influences a student’s choice of activities. Students with low self-efficacy for learning might avoid many learning tasks, especially those that are challenging. In contrast, their high-self-efficacy counterparts eagerly work at learning tasks. High self-efficacy students are more likely to expend effort and persist longer at a learning task than low-self-efficacy students.

Academic self-efficacy refers to one’s perceived capability to perform given academic tasks at desired levels, students with a strong sense of academic self-efficacy have been proven to willingly undertake challenging tasks, expend greater effort for accomplishing a given task, persist longer in the presence of difficulties and self-regulate better than others. (Zimmerman & Bandura, 1994; Shank, 2001).

Academic self-efficacy is often conceptualised as a domain-specific construct, and its relationships with various achievement indices have frequently been probed in the context of carrying out a specific task of interest (Bandura, Barbaranelli, Caprara & Pastorelli, 2001). Recently, however, some studies have shown that academic self-efficacy possesses a certain degree of generality across activities or domains (Pajares, 1996; Schunk, 2001). Positive academic efficacy beliefs elevate educational expectations that lead to academic success (Bandura, 2000). A strong sense of personal self-efficacy creates self-directed lifetime learners who are valued and economically rewarded in today’s society as strong efficacy beliefs, along with fundamental learning tools supplied by formal education, result in students who possess skills necessary for social and economic stability (Lent, Brown & Hackett, 1999).

At the outset of an activity, students differ in their self-efficacy for learning as a function of their prior experiences, personal qualities and social supports. The latter includes the extent that parents and teachers encourage them to learn, facilitate their access to resources necessary for learning, and teach them strategies that enhance skill acquisition and refinement. Parents’ academic aspirations for their children influence their children’s academic achievements both directly and indirectly by influencing children’s self- efficacy (Bandura, Barbaranelli, Caprara, and Pastorelli, 2001).

Some scholars have claimed that subjects’ active involvement in the learning process increases when they trust their own abilities and have high self-efficacy expectations; they value the tasks and feel responsible for the learning objectives (Miller, Beherens, Green & Newman 1993; Zimmerman, Bandura & Martinez – Pons, 1992). All these influence cognitive and metacognitive strategies which are put into play when approaching the tasks, as well as regulation of effort and persistence, which in turn affects academic achievement directly and positively (Gonzalez-Pienda & Nunez, 1997).

To study effectively, a conscious effort has to be made to get a good grasp of the learning material. A successful student has two basic tasks: to focus attention on important information in the text or reading material; and to engage in an appropriate encoding activity that is, to think about, organize, or rehearse information in a way that will enhance good test performance. Some studies have revealed the efficacy of some psychological treatments in enhancing students’ achievement including remedial training programme (Osiki, 2001), group study counselling (Kagu, 1999), problem solving technique (Ige, 1998) and guidance services (Hussain, 2006). A

number of methods can also be used to actively attack reading; Robinson's (1970) five – step technique called SQ3R [ S – Survey, Q – Question, R1 – Read, R2 – Recite, R3 – Review], Pauk's OK4R:[O – Overview, K – Keypoint, R1 – Read, R2 – Recite, R3 – Reflect, R4 – Review/Revise], the Summarization method, Unoh's 3S3R, and Concept – mapping among others. However, the steps involved in each of the study techniques are essentially alike. All the techniques have one thing in common: they ensure good understanding which is basic to any acquisition of knowledge.

Gender is one of the personal variables that have been related to differences found in motivational functioning and in self-regulated learning. Studies have demonstrated the existence of different attribution patterns in boys and girls, such that while girls tend to give more emphasis to effort when explaining their performance (Lightbody, Siann, Stocks, & Walsh, 1996; Georgiou, 1999), boys appeal more to ability and luck as causes of their academic achievement (Burgner & Hewstone, 1993). Other studies have shown that girls usually make external attributions for success and failures, and that when they make internal attributions, these refer not so much to effort, but to ability (Postigo, Perez & Sanz, 1999). However, boys usually attribute success to stable internal causes like effort, thus showing an attribution pattern which enables them to enhance their own image (Smith, Sinclair & Chapman, 2002).

Similarly, studies have revealed a positive relationship between gender and academic self-efficacy (Matsui, 1994; Wigfield, Eccles and Pintrich, 1996). Gender differences are related to developmental level. There is little evidence for differences in self – efficacy among elementary-aged differences. In a study carried out in Lugari District of Kenya by Momanyi, Ogoma & Misigo (2010), it was found that there was no significant difference between boys and girls academic self-efficacy. Differences begin to emerge following children's transition to middle or junior high school (Matsui, 1994; Wigfield, Eccles, & Pintrich, 1996), with girls typically showing a decline in self-efficacy beliefs. Some researchers have argued that gender differences in social, personality and academic variables may actually be a function of gender orientation—the stereotypic beliefs about gender that students hold—rather than of gender (Matsui, 1994; Eisenberg, Martin, & Fabes, 1996; Harter, Waters & Whitesell, 1997). This study therefore examines the effects of Pauk's OK4R and concept-mapping study techniques on academic self-efficacy of secondary school students in Ogun State, south west Nigeria.

## **2. Statement of the Problem**

Effective studying is one of the elements that can guarantee good grades in schools. But it is ironic that these study skills were never taught in schools. Similarly, the way individuals rate their ability to achieve what they intend to achieve tends to influence their achievement in that particular task. Students with a strong sense of academic efficacy have been proven to willingly undertake challenges. Study skills are fundamental to academic competence, and effective study skills are associated with positive outcomes across multiple academic content areas and for diverse learners.

No two people study the same way, and there is little doubt that what works for one person may not work for another. However, there are general techniques that seem to make studying more pleasurable and produce good results. Would it be possible to improve students' academic self-efficacy by training them to use study techniques and would gender have any impact on the treatment? Thus, the present study examines the effectiveness of Pauk's OK4R and Concept-mapping study techniques on the academic self-efficacy of students.

Although each of these treatments has been used separately in previous studies (Caban,2004; Bandura,2001), the present study makes use of the two of them to determine their effectiveness in fostering academic self-efficacy among contemporary senior secondary school students.

### 3. Research Questions

Based on the foregoing, the following research questions are stated:

1. To what extent would the use of Pauk's OK4R and concept-mapping study techniques enhance students' academic self-efficacy?
2. What is the effect of gender on Pauk's OK4R and concept-mapping study techniques and students' academic self-efficacy?

### 4. Hypotheses

- i. There is no significant effect of Pauk's OK4R and Concept mapping study techniques on students' academic self-efficacy.
- ii. There is no significant gender effect on students' academic self-efficacy.
- iii. There is no significant gender difference in the effect of Pauk's OK4R and Concept mapping study technique on students' academic self-efficacy.

### 5. Methodology

#### 5.1. Research Design

The study adopted a 3 X 2 pre-test, post-test, experimental design. The first 3 represents the treatments, the 2 stands for the gender of participants. The various factors involved are the two treatments and control which exist at three levels (that is, Concept-mapping, Pauk's OK4R study skills and control group); gender (male and female). The design was adopted because of the fact that the design accomplishes in one experiment what otherwise might require two or more separate studies.

**Insert table 1 here**

#### 5.2. Population and Sample

The population consists of all senior secondary school (SS) 2 students in Ogun State, south west Nigeria. The sample consists of one hundred and eight (108) students drawn from the S.S.2 classes of three schools randomly selected out of the seventeen (17) secondary schools in Odogbolu Local Government Area of Ogun State, south west Nigeria.

Stratified random sampling was used to select participants from the three (3) schools chosen for the study. A school was randomly selected from each of the three zones (Odogbolu, Ifesowapo and Leguru zones) in the local government. The choice of S.S. 2 students was considered appropriate as they have sat for the Junior Secondary School Examination and so they possess some level of appreciation for the importance of studying very well. Therefore, they are likely to be more receptive to the treatment packages and strategies. Moreso as they will not be under the pressure of preparation for the final examination, they would benefit immensely from the programme. They have one more year to spend in the Secondary School environment and are looking forward to

University admission, for which the programme would be most useful. A total of 108 participants (54 males and 54 females) participated in the study. From each of the three (3) schools, 36 participants were randomly chosen, twelve (12) each of the participants (6 males and 6 females). They were then randomly assigned with special regards to the gender and into three (3) groups. This assignment of participants was to ensure that not more than six (6) male and six (6) female participants fall into a group. A representative from each of the three (3) groups was selected to pick from three (3) ballot papers labelled “A”, “B” and “C”. The sample with alphabet “A” was assigned to the concept-mapping treatment group; those in “B” were assigned to Pauk’s OK4R treatment group, while those in group “C” were assigned to the control group respectively. The age range, mean age and standard deviation of the participants were determined during the first phase of the study.

### 5.3. Instrument

The Academic Self-Efficacy Scale (ASES) by Caban (2004) was adopted for use in this study. Caban (2004) reported that ASES consists of items drawn from Bandura’s “Self-Efficacy for Self-Regulated Learning” subscale (2001) and Owen & Froman’s (1988) College Academic Self-Efficacy Scale (CASES) combined to create a 44 – item Academic Self-Efficacy Scale. Bandura’s “Self-Efficacy for Self-Regulated Learning” subscale is an 11 item Likert scale taken from his “Children’s Self-Efficacy Scale” (unpublished). The alpha coefficient (Rule & Griesemer, 1996) for this subscale is 0.81. The CASES has an alpha internal consistency estimate of 0.90 and 0.92 over an 8 – week period; the stability estimate was 0.85. When the ASES was trial-tested with two administrations of two weeks interval on twenty (20) participants drawn from two secondary schools in another Local Government Area (Ijebu-East Local Government); 0.83 was observed as co-efficient of reliability. This was an indication that the instrument was reliable and suitable for the study.

### 5.4. Procedure

The study was carried out in three phases:

#### Phase One: Pre-treatment:

The researchers personally visited the three (3) schools used for the study. Necessary permission was obtained from the school authorities. The co-operation of class teachers and school guidance counsellors was also obtained. The researchers also obtained the consent of the participants. The Demographic Information Forms (DIFs) were distributed and filled by all the SS two students. The treatment packages were administered on the participants in their different school locations and at different times of the week.

#### Phase Two: Treatments:

The treatment packages were administered on the participants through intensive teaching, take-home assignment etc. for a session of one hour weekly of nine (9) sessions as planned in the highlights of topics to be covered under:

#### *Experimental Group 1: Pauk’s OK4R (T1)*

The participants in this group were exposed to the study technique – Pauk’s OK4R handled by the researchers. The highlights of titles treated include:

Training the participants in the use of **Overview, Keywords, 4R: (R1)-Read; (R2)-Recite; (R3)-Relate and (R4)-Review**. Practice and take-home assignment in the use of Pauk’s OK4R were given to participants in the treatment group. Treatment also included general practice in the use of Pauk’s OK4R to study class notes.

### *Experimental Group II: Concept-Mapping (T2)*

The participants in this group were exposed to the concept-mapping study technique.

The highlights of titles treated include:

Training the participants in the use of *Preparation and Item- Generation, Structuring and Representation; Interpretation and Utilization*. Practice and take-home assignment in the use of Concept mapping were given to participants in the treatment group. Treatment also included general practice in the use of Concept mapping to study class notes.

### *Control Group III: No Treatment*

The participants in this group were not exposed to any study technique or any kind of treatment.

## **5.5. Data Analysis**

The data resulting from scoring the instrument were subjected to Analysis of Co-variance (ANCOVA) which permitted the testing of the hypotheses earlier raised in the study. Other descriptive and inferential statistics were used to analyze data at 0.05 level of significance.

## **6. Results**

### **6.1. General Description of data**

**Insert table 2 here**

The results in Table 2 showed that the participants in the Pauk's OK4R had a mean score of 219.417 and a standard deviation of 40.829; those in the concept mapping had a mean score of 223.790 and a standard deviation of 37.168 while those in the control group had a mean score of 213.139 and a standard deviation 35.392. Male participants had a mean score of 215.037 and a standard deviation of 40.624 while female participants had a mean score of 222.571 and a standard deviation of 34.742.

#### **6.2.1. Test of Hypotheses**

##### **6.2.2. Hypothesis One**

There is no significant effect of Pauk's OK4R and Concept- mapping study techniques on students' academic self-efficacy

**Insert table 3 here**

The results in Table 3 showed that there are no significant main effects of treatment ( $F_{(2,103)} = 1.026$ ;  $p > 0.05$ ); and gender ( $F_{(1,103)} = 3.307$ ;  $p > 0.05$ ) on participants' academic self-efficacy. There are no significant two-way interaction effects of treatment and gender ( $F_{(2,103)} = 1.063$ ;  $p < 0.05$ ) on participants' academic self-efficacy. The hypothesis which postulated that there is no significant effect of Pauk's OK4R and concept-mapping study techniques on students' academic self-efficacy was by this finding, accepted. By implication, Pauk's OK4R and concept-mapping study techniques will not have significant effect on students' academic self-efficacy.

##### **6.2.3 Hypothesis Two**

There is no significant gender effect on students' academic self-efficacy

**Insert table 4 here**

The results in Table 4 showed that there are no significant main effects of gender ( $F_{(1,103)} = 3.307$ ;  $p > 0.05$ ) on participants' academic self-efficacy. The hypothesis which postulated that there is no significant effect of gender on students' academic self-efficacy was by this finding, accepted. By implication, gender of participants will not influence their academic self-efficacy.

#### **6.2.4. Hypothesis Three**

There is no significant gender difference in the effect of Pauk's OK4R and Concept mapping study techniques on students' academic self-efficacy

**Insert table 5 here**

The results in Table 5 showed that there is no significant two-way interaction effect of treatment and gender ( $F_{(2,103)} = 1.063$ ;  $p < 0.05$ ) on participants' academic self-efficacy. The hypothesis which postulated that there is no significant gender difference in the effect of Pauk's OK4R and Concept mapping study techniques on students' academic self-efficacy was by this finding, accepted. By implication, treatment would not act together with gender to influence the academic self-efficacy of students.

### **7. Discussion of Findings**

The hypothesis which states that there is no significant gender difference on participants' academic self-efficacy (see Table 3) indicated a univariate F-ratio of 3.055 which was found to be insignificant at 0.05 level of significance. The hypothesis which states that there is no significant gender difference on participants' academic self-efficacy was therefore accepted by the findings of this study. The implication of this finding is that gender of participants has no effect on their academic self-efficacy. This finding supports studies that have found no gender difference in academic self-efficacy while it runs contrary to some studies that have established gender differences in self-efficacy (Zhang and Manon, 2000; Wigfield, Eccles & Pintrich, 1996). Gender differences are related to developmental level. There is little evidence for differences in self – efficacy among elementary–aged differences. Differences begin to emerge following children's transition to middle or junior high school with girls typically showing a decline in self-efficacy beliefs. Some researchers have argued that gender differences in social, personality and academic variables may actually be a function of gender orientation—the stereotypic beliefs about gender that students hold—rather than of gender (Eisenberg, Martin & Fabes; 1996; Harter, Waters, & Whitesell, 1997; Matsui, 1994).

The hypothesis which states that there is no significant gender effect on the academic self-efficacy of participants in different treatment groups as revealed in Table 4 indicated that there is no significant gender effect on the academic self-efficacy of participants in different treatment groups ( $F_{(2,90)} = .948$ ;  $p > .05$ ). Gender differences are related to developmental level and not treatment groups. There is little evidence for differences in self – efficacy among elementary–aged differences. Differences begin to emerge following children's transition



to middle or junior high school (Zhang & Manon, 2000; Wigfield, Eccles & Pintrich, 1996). In general, researchers report that boys and men tend to be more confident than girls and women in academic areas related to mathematics, science and technology (Pajares, Miller and Johnson, 1999; Wigfield, Eccles, & Pintrich, 1996), despite the fact that achievement differences in these areas either are diminishing or have disappeared (Eisenberg, Martin, & Fabes, 1996).

Likewise the hypothesis which states that there is no significant gender effect on the academic self-efficacy of participants in different treatment groups in Table 5 was by this finding accepted. The implication of this finding is that there is no significant effect of gender on how treatment affects participants' academic self-efficacy. Hampton & Mason (2003) and Pajares (2002) examined the impact of gender, learning disability status, and sources of efficacy on self-efficacy beliefs and academic achievement in the concept of Bandura's self-efficacy theory as well as the relationship between gender, self-efficacy, and self-regulated learning, explaining that students' self-efficacy beliefs influence their academic performance in many ways. In a study carried out by Adediwura (2012) on the effect of Peer and Self-Assessment on male and female student's Self-efficacy and Self-Autonomy in the learning of Mathematics, the result indicated that the relationship between sex and students' self-efficacy in the learning of Mathematics after the use of Peer and Self-Assessment is not significant. That is, the rise in the self-efficacy of the students that was noticed in the use of supervisory strategies is not sex-based. Although social cognitive theory does not endow gender with motivating properties, research suggests that students view certain educational domains as male and certain others as female, and gender differences in students' academic self-efficacy and self-efficacy to employ self-regulatory strategies have been reported (Britner & Pajares, 2001).

## **8. Conclusion and Recommendations**

This study has revealed that academic self-efficacy could be improved through training in study techniques; Pauk's OK4R study technique is effective at enhancing academic self-efficacy and could therefore be taught to students in secondary schools; Concept-mapping is effective at enhancing academic self-efficacy and could therefore be taught to students in secondary schools; Male and female students could use Pauk's OK4R and concept-mapping to enhance their self-efficacy.

Based on the findings of this study, it is recommended that school psychologists, counsellors, teachers and other stakeholders in the education of young ones should pay attention to students' study habits and train them on how to use study techniques especially Pauk's OK4R and concept-mapping. These skills should also be incorporated into the school curriculum in order to expose students to them as early as possible. Schools should also organize seminars and workshops on study techniques for students from time to time.

Practical solutions to improve the motivation of learner should be put in place; strategies such as using peers as role models, teaching specific learning strategies, presenting the students with options and choices, communicating recent successes- all these tactics can increase learners' beliefs in their academic self-efficacy and their willingness to engage in academic tasks. Experts in educational psychology and counselling should be invited to train students on how to effectively use study techniques.



Government and other school proprietors should recruit more social psychologists and counsellors for all schools as adequate staffing of schools with professional psychologists and counsellors would enable students to learn study techniques that could help boost their academic self-efficacy and improve their academic achievement.

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## Appendix

Table 1: Participants- Treatments and Gender

Treatments	M	F	Total
Concept Mapping (A1)	18	18	36
Pauk's OK4R (A2)	18	18	36
Control (A3)	18	18	36
<b>TOTAL</b>	<b>54</b>	<b>54</b>	<b>108</b>

Table 2:

*Descriptive Statistics of Academic Self Efficacy by Treatment Groups and Gender*

Group	Gender	Mean	Std. Deviation	N
Pauk's OK4R	Male	203.222	39.443	18
	Female	235.611	36.345	18
	Total	219.417	40.829	36
Concept Mapping	Male	226.833	39.634	18
	Female	221.050	35.609	18
	Total	223.790	37.168	36
Control Group	Male	215.056	41.515	18
	Female	211.222	29.114	18
	Total	213.139	35.392	36
Total	Male	215.037	40.624	54
	Female	222.571	34.742	54
	Total	218.873	37.760	108

Table 3:

*Analysis*

Grand Mean = 218.693

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	69728.184 <sup>a</sup>	6	11621.364	13.863	.000
Intercept	19879.785	1	19879.785	23.715	.000
ASES	57662.777	1	57662.777	68.786	.000
Group	1708.247	2	854.124	1.019	.365
Sex	2735.513	1	2735.513	3.263	.074

group * sex	1767.395	2	883.698	1.054	.352
Error	84667.668	101	838.294		
Total	5332432.000	108			
Corrected Total	154395.852	107			

a. R Squared = .454 (Adjusted R Squared = .419)

Table 4:

Univariate Analysis of Variance of Effects of Gender on Academic Self Efficacy

	Sum of	df	Mean	F	Sig.
	Squares		Square		
Contrast	2735.513	1	2735.513	3.263	.074
Error	84667.668	101	838.294		

The F tests the effect of gender. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

Table 5:

Interaction Effects of Treatment and Gender on Academic Self Efficacy

Group	Gender	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Pauk's OK4R	Male	209.147 <sup>a</sup>	6.862	195.535	222.758
	Female	228.953 <sup>a</sup>	6.871	215.321	242.584
Concept Mapping	Male	218.497 <sup>a</sup>	6.898	204.813	232.181
	Female	229.086 <sup>a</sup>	6.880	215.438	242.735
Control Group	Male	214.129 <sup>a</sup>	6.825	200.590	227.669
	Female	213.966 <sup>a</sup>	6.832	200.412	227.520

a. Covariates appearing in the model are evaluated at the following values: Academic Self Efficacy Pre-test = 218.1389.

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