



## Effects of 4 – Modes of Learning Styles on Students’ Learning Outcomes in Peace Education Aspect of Social Studies

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**ABSTRACT:** *The need to make instructional delivery suitable to students learning styles for maximum learning outcomes is of great concern all over the world. This study therefore investigated the effects of 4-modes of learning styles on students’ learning outcomes in peace education. Using two models of cooperative learning strategies and conventional method of teaching in 3-intact classes of a population of 99 students and testing three null-hypotheses which proved non-significant in effect; it was discovered that the kinaesthetic learners performed better ( $f(3, 78) = 0.684, P > 0.05$ ) than the visual, auditory and reading learners in post-test mean achievement test. On the otherhand, the auditory students performed better in post-test mean attitude ( $F(3, 78) = 1.203, P > 0.05$ ) and post-test mean conflict resolution skill ( $F(3, 78) = 0.705, P > 0.05$ ) scores respectively. The learning styles alone accounted for between 26.01% and 43.56% of the variance in the students learning outcomes. It was therefore recommended that the teaching of peace education should always involve the use of kinaesthetic and auditory learning activities in the classroom.*

### I. INTRODUCTION

Research outcomes on the significance of students preferred learning styles in learning outcomes have been very profound. This is why Renzulli and Dai (2001) submitted that the individual’s knowledge of how to learn made the first step to learn better and active in learning process. Learning style therefore refers to the individual most preferred way in gaining and processing information (Kolb, 1984) or the variations in individual’s ability to accumulate as well as assimilate information (Ldpride.net, 2008). Indeed as rightly observed by Rochford and Mangino (2006), many researches have demonstrated that the less academically successful college students are, the more important it is to accommodate their learning-style preferences. It has been noted that preferred learning style is genetically determined and present at birth (Erden & Altun, 2006) but can change and be developed through experiences (The Free Library, 2009). However, evidences from research suggest that apart from a dominant learning style, an individual has other learning styles at varying degrees (Temel, 2002). In the initial categorization of learning styles, Kolb (1984) identified the ‘Diverger’, ‘Assimilator’, ‘Converger’ and ‘Accommodator’ learners. On the other hand, the Felder Model of learning styles include sensing/intuition, active/reflective and visual/verbal categories with sequential/global dimensions of information processing (Zywno & Waalen, 2002). In this study, the Visual-Auditory-Reading-Kinaesthetic (VARK) model of learning styles as developed by The College Reading and Learning Association (2011) was adopted because of its simplicity and comprehensiveness. Using VARK in a study of gender preferences in learning styles among students in physiology, Wehrwein, Lujan and Dicarolo (2007) discovered that 54.2% of the female students preferred a single mode of learning style as against 12.5% among their male counterparts in Michigan State University, USA. Among the female students, 4.2% preferred the V, 0% preferred the A, 16% preferred the R, 33.3% preferred the K and 45.8% preferred the multimodal learning styles. In contrast, the male students were evenly distributed in their preferences with 4.2% preferring the A,R, or K; 0% for V and 87.5% preferring the multimodal learning styles. Earlier, Dunn and Dunn (1992) in a study of students’ preferences for learning styles in primary schools, discovered that less than 12% of the students preferred auditory learning while 40% preferred visual learning. In a survey of 50 college students, Lemire (1998) found that 62 percent of them preferred the visual learning modality as against 33 percent and 5 percent that preferred kinaesthetic and auditory learning styles respectively. Thus, along similar findings, Ldpride.net (2008) observed that 65 percent of the generality of students are visual learners, 30 percent in auditory category and 5 percent in kinaesthetic or tactile category. Contrarily however, Rochford and Mangino (2006), though not at a significant level found that

majority of the Education and Remedial students at a tertiary education level (40% and 36.8% respectively) preferred auditory learning styles as against less than 10% that preferred visual, tactual and kinaesthetic styles respectively. This suggests that perhaps most students at the primary levels were the ones that prefer visual modes of instruction.

At the quasi-experimental level, Adams (2008) discovered that the mean scores difference of 18.51 and 27.68 in the pre-test and post-test scores of undergraduate classes using the VARK learning inventory were not statistically significant at 2-way ANOVA level ( $F(2,87) = 0.035, p > 0.05$ ). However, in a recent correlational study of learning style, school environment and test anxiety, Ogundokun (2011) found that learning style predicted learning outcomes ( $\beta = 0.242, t = 3.234, P < 0.05$ ) next to test anxiety but better than the school environment. Arising from the various reports by Wittenberg (1984), Jenkins (1991), Ritchey (1994), Giordano and Rochford (2005), Rochford and Mangino (2006), College Reading and Learning Association (2011) and Adetoro (2014); the visual learners are known to love reading magazine, books, graphs, maps, flashcards etc; very photographic, likes verbal directives and watching video, good in spelling as well as prefer essay type tests and diagramming. On the otherhand, the auditory learners were observed to be talkative in the class, like memorization, enjoys listening to news and music, prefer speaking and singing as well as other forms of oral presentations. The reading learners are found to share the characteristics of both the visual and auditory learners. However, the kinaesthetic learners are noted for action learning and experiential discovery; enjoy playing musical instruments, computer gaming, arts and crafts, love collecting items and manipulating them but weak at spellings and handwriting. Consequently, the question that arises in a rhetorical format is: Are we teaching the way our students learn? Definitely, the answers will be controversial. However, as rightly suggested by Sze and Cowden (2009), it is important to teach students how to make what they are learning fit to their learning style rather than the general assumption that takes place in the classroom. The objective of this paper therefore was to investigate which of the Visual-Auditory-Reading-Kinaesthetic learning styles would promote higher learning outcomes in peace education aspect of social studies.

### **Research Question**

- Using two models of cooperative learning and conventional strategy, which of the four learning styles (VARK) will produce higher learning outcomes in Peace Education?

### **Research Hypotheses**

- There is no significant difference in the post-test mean achievement scores of students with different learning styles.
- There is no significant difference in the post-test mean attitude scores of students with different learning styles.
- There is no significant difference in the post-test mean conflict resolution skills' scores of students with different learning styles.

## **II. METHODOLOGY**

This investigation used both descriptive and quasi-experimental designs for data analysis. Using Learning Together, Constructive Controversy and Conventional methods of teaching on three intact Junior Secondary School (JSS) II students' classes with a sample size of 99, the students' knowledge (achievement), attitude and conflict resolution skills in Peace Education were tested after five weeks of teaching. The VARK learning styles served as one of the moderator variables. A 16-item VARK instrument by College Reading and Learning Association (2011) was adapted for use after the consideration of two test experts. Along their recommendations some English wordings like 'websites', 'hook-up', 'preview', 'brochure' and 'movie' were substituted with the words 'computer', 'open', 'to see it before', 'textbook' and 'film' respectively to suit the language ability of the students. Subsequently, a test-retest ratio of 0.62 was obtained after using Pearson Product Moment Correlation statistic. The concepts used for teaching the students were drawn from the 2007 JSS social studies curriculum and include meaning and types of peace; meaning, types and examples of conflict; meaning, types and examples of global/international cooperation, ways of promoting peace and non-violent methods of resolving conflicts. In the final classification using the validated VARK instrument therefore, out of 99 students, 7 students belonged to the visual learners, 16 were auditory learners, 60 were reading learners and the remaining 16 were kinaesthetic learners. The instruments used for testing the learning outcomes of the students were the Peace Education Achievement Test (PEAT) of 30 questions (scored 1 mark each) with item difficulty index averaging 0.52 and reliability ratio of 0.63; a 30-item Attitude Towards Peace Education Questionnaire (ATPEQ) based on four-point Likert scale (Strongly Agreed = 4 points, Agreed = 3 points, Disagreed = 2 points and Strongly Disagreed 1 point) with a reliability coefficient of 0.68; a 34-item conflict Resolution Skill Test (CRST) based on a projective rating scale (Very Necessary = 3 points, Necessary = 2 points and Not Necessary = 1 point) that yielded a split-half reliability index of 0.59. The data collected were coded and analyzed using the 14.0 version of the Statistical Package for Social Sciences (SPSS). The analyses involved the

descriptive analysis of the research question and the use of Analysis of Covariance (ANCOVA) to test the three hypotheses with the pre-test scores as covariates.

**Results and Interpretations**

**2.1 Descriptive Analysis of Learning Styles**

**Table 2.1.1:** Learning styles factors in students’ learning outcomes in Peace Education

Treatment Groups	Learning Styles	Achievement		Attitude		Conflict Resolution Skill	
		Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test
Learning Together	V = 3	11.67	12.67	90.33	83.00	62.00	62.67
	A = 6	10.67	13.33	86.83	92.17	69.67	72.83
	R = 23	10.74	13.30	84.48	85.57	67.39	65.70
	K = 2	12.00	12.50	76.00	78.50	60.50	62.00
Constructive Controversy	V = 2	10.50	13.50	88.50	90.50	80.00	66.50
	A = 6	13.67	14.33	91.67	88.00	65.83	68.33
	R = 16	11.44	13.69	83.06	89.94	70.31	64.75
	K = 8	10.38	13.88	89.88	88.00	64.63	63.63
Conventional Strategy	V = 2	16.00	13.00	88.00	82.50	63.00	68.50
	A = 4	8.50	11.75	83.00	83.25	67.25	65.00
	R = 21	11.62	13.05	87.33	88.38	64.33	65.67
	K = 6	10.00	13.50	92.50	86.00	61.00	64.33

As can be seen in table 2.1.1, using learning together, the auditory learners performed best in all the three domains of learning. That is, 13.33 in post-test achievement scores, 92.17 in post-test attitude scores and 72.83 in post-test conflict resolution skill scores. In constructive controversy also, the students in auditory group equally had the best mean scores of 14.33 in the post-test achievement and 68.33 in the post-test conflict resolution skill test. It was only while using the conventional method that the students in the kinaesthetic style group had the best result of 13.50 post-test achievement mean score with those in reading and visual styles groups scoring 88.38 in the post-test attitude and 68.50 in the post-test conflict resolution skills respectively. In a matrix of efficiency of 9 items therefore, the auditory learners secured 55.56 percent of best fittings followed by the visual groups with 22.22 percent. The Reading groups scored 11.11 percent with the remaining 11.11 percent also secured by the kinaesthetic learners. This supports the submission of Frazee and Ayers (2003) as echoed by Adetoro (2014) that direct instruction which emphasizes auditory learning is ‘the backbone’ of good teaching.

**2.2: Hypotheses Testing on Learning Styles**

**Table 2.2.1:** Summary of ANCOVA of Students’ Post-Test Achievement Scores with different Learning Styles

Source of Variance	Sum Squares	Df	Mean squares	F.sig
Treatment Groups	15.792	2	7.896	1.429
Learning styles	11.337	3	3.779	0.684
Treatment X Learning styles	20.706	6	3.351	0.625

Rsquared = .408 (Adjusted R squared = .256)

The result in table 2.2.1 revealed no significant difference in the post-test mean achievement scores of the students with different learning styles (VARK) in peace education ( $F(3, 78) = 0.684, P > 0.05$ ). However, the result reveals that learning styles alone accounted for 26.01%  $(0.15)^2$  of the variance in the student achievement scores in peace education. This variance is therefore sufficient enough for teachers to ensure that they adapt their teaching strategy to the students’ best learning styles as suggested by Rochford and Mangino (2006) as well as Sze and Cowden (2009).

**Table 2.2.2:** Summary of ANCOVA of Students Post-Test Attitude Scores with Different Learning Styles

Source of Variance	Sum Squares	Df	Mean squares	F.sig
Treatment Groups	178.039	2	89.020	1.720
Learning styles	186.854	3	62.285	1.203
Treatment X Learning styles	300.635	6	50.106	0.968

Rsquared = .251 (Adjusted Rsquared = .059).

Table 2.2.2 reveals that there was no significant difference in the post-test mean attitude scores of students with different learning styles (VARK) in peace education ( $F(3, 78) = 1.203, P > 0.05$ ). Nevertheless, learning styles of the students accounted for 43.56%  $(0.66)^2$  of the variance in the students’ attitude to peace education. This high degree of variance also suggests that teachers’ attention must be seriously drawn to the impact of learning styles on students’ learning outcomes.

**Table 2.2.3:** Summary of ANCOVA of Students’ Post-test conflict Resolution Skill scores with different learning styles

Source of Variance	Sum Squares	Df	Mean squares	F.sig
Treatment Groups	2.545	2	1.273	0.021
Learning styles	129.794	3	43.265	0.705
Treatment X Learning styles	329.359	6	54.893	0.894

Rsquared = .319 (Adjusted Rsquared = .144).

As can be seen in table 2.2.3, there was no significant difference in the post-test mean conflict resolution skill scores of students with different learning styles (VARK) in peace education ( $F(3,78) = 0.705$ ,  $P > 0.05$ ). However, the analysis further revealed that the learning styles alone accounted for 26.01% ( $0.51^2$ ) of the variance in the students’ conflict resolution skill scores. This outcome as earlier submitted points to the need to teach the students in accordance to their preferred learning styles and their best ways of information processing as suggested by Kolb (1984).

### III. DISCUSSION

In this study, majority (60.6 percent) of the students from the three intact classes were reading learners who combined the attributes of both the auditory and visual learners together. However, judging by the descriptive analysis, it is the auditory learners who represent 16.2 percent in the three classes that performed better than the other three groups of learners especially using learning together and constructive controversy as teaching methods in peace education. Although the treatment showed no significant effect of learning styles on learning outcomes contrary to the findings of Ogundokun (2011), but the variant contributions of VARK on the students learning outcomes ranging between 26 and 43 percents also calls for concern and needs intervention measures. Indeed, the Multiple Classification Analysis showed that the students using kinaesthetic learning style recorded the highest adjusted post-test mean achievement score of 15.006 ( $12.976 + 2.03$ ) followed by visual learners with 14.156, reading learners with 14.026 and the auditory learners with 13.896. In the order of post-test mean attitude scores and post-test mean conflict resolution skill scores however, the auditory learners had the highest adjusted scores of 92.068 ( $86.648 + 5.42$ ) and 72.71 ( $66.060 + 6.65$ ) respectively. These results may be a reflection of the observation that auditory learning which is the most formidable means of information processing in most Nigerian public classrooms (Adetoro, 2014) is a veritable means of ‘cognitive coaching’, ‘social scaffolding’, ‘authoritative learning’ and ‘substantive knowledge giver’ (Schug, 2003).

### IV. RECOMMENDATIONS

- The non-significant outcome of this study indicates the need for further researches on the effect of different learning styles on students learning outcomes in various subjects.
- Kinaesthetic learning activities such as practical classes, simulation, case studies and dramatisation should be combined together with auditory learning activities when teaching peace education aspect of social studies.
- Teachers should note that the first step is to assess their students’ preferred learning styles and adapt their instructional strategies to their preferred learning styles.
- Teachers should be flexible, dynamic and democratic in their teaching such that their instructional strategies can accommodate many diversified learning styles of the students.

### V. CONCLUSION

Researches have proved that the less successfully students are in learning, the more it is important to adapt instructional mode to their preferred learning styles. In this study, while the auditory learning style had the highest influence on the learning outcomes of the students in attitudinal and conflict resolution skill dispositions, the kinaesthetic learners had the upper hand in achievement test scores. It should therefore be noted that no single method of teaching can accommodate the students varied learning styles in the classroom. Hence, the need for teachers’ knowledge on students’ different learning styles (VARK) and their resourcefulness and innovativeness to adapt their instructions to accommodate the varied students’ learning styles is a necessity in the classroom.

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