DEVELOPMENT OF A RATING SCALE FOR MEASURING TEACHER CLASSROOM AUTONOMY IN SECONDARY SCHOOLS IN SOUTHWESTERN NIGERIA

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ABSTRACT

The study developed Teacher Classroom Autonomy Scale (T-CARS) and estimated the validity and reliability of the scale as well as establishing the scale factor structure. The study adopted a survey design. The population comprised secondary school teachers in southwestern Nigeria and a sample of 1440 teachers that were selected from 72 secondary schools using multistage sampling procedure. Two instruments, T-CARS and School Participant Empowerment Scale (SPES) were used for data collection. Data were analysed using factor analysis and reliability analysis. The results showed that the 40-items T-CARS have seven factors of teacher classroom autonomy that accounted for 91.46% of the total scale variance and significantly converge with the SPES (r = 0.611). The internal consistency of the scale was r=0.913 (Cronbach), and r=0.736 (Spearman Split-half), p< 0.05. The study concluded that the T-CARS developed in this study is reliable, valid and suitable to measure teacher classroom autonomy in Southwestern Nigeria.

Keywords: Rating scale, Classroom autonomy, Teacher autonomy, Teacher classroom autonomy scale, Validity, Reliability, Scale convergence, Internal consistency, Teacher classroom autonomy scale.

Contribution/ Originality

The study generated appropriate, valid and reliable items with which teacher classroom autonomy can be measured. It also provided information on ways through which school administrators; teachers and other stakeholders can ensure that teachers have good institutional knowledge in order to effectively address imagined constraints on teaching and learning.

1. INTRODUCTION

Teachers are generally regarded as an important factor in education, as they are the providers and facilitators of teaching and learning in schools. They have several responsibilities in schools, involving both classroom and other activities that make learning wholesome for students and build in them, optimum intellectual, physical, social and emotional capacities. Teacher classroom autonomy refers to the degree of control that teachers have over their work. It is related to the authority they possess to impact knowledge, opportunity for independent thought action and creativity, and the freedom to organize the learning process. Teacher classroom autonomy also embodies the liberty that teachers have to initiate and operate collaborations with their peers, and relate with students not only to reinforce and support positive behaviour, but also to disapprove and sanction improper behaviour in an attempt to make teaching/learning process in the classroom effective and efficient.

The school environment today, more than ever before, calls for increasing teacher classroom autonomy in schools. In recent times, there has been rapid changes in the school core curriculum, with the introduction of many and varied subjects, including craft and entrepreneurial subjects. There is also the increasing incidence of cult activities in schools. The decline and fluctuating performance of students in both West African Examination Council (WAEC) and National Examinations Council (NECO) results in Senior School Certificate Examination (SSCE) puts pressure on teachers to take increasing responsibilities. Furthermore, these, among other factors, make the recognition and exercise of teacher classroom autonomy imperative.

Many reasons can be given as to why classroom autonomy is important and most of them are related to the question of teachers' work. Are teachers technicians who implement other people's decisions or are teachers 'professionals', people capable of deciding for themselves? The answer to this question affects how teachers' work is designed and what tasks teachers are expected to perform. These expectations in turn can influence teachers' performance and their perceptions of their work. Examining the features of a profession in more detail, Hoyle (1980) provides the following list; a body of theoretical knowledge on which members of the profession base their practice, a relatively long time spent in training, a code of ethics regulating members behaviour, a means of controlling the admission of new members, - a high degree of autonomy in their work.

These characteristics are shared by the teaching profession as a whole and the individual practitioner. Thus both the profession and the practitioner are able to regulate their own work free from external controls. In the concern over quality in education, one strategy has been to call for the greater professionalization of teaching and the continual professional development of teachers. Attempts have been made to improve the status of teaching in general and in language teaching.

Besides being necessary to encourage development, two further reasons can be advanced for the importance of teacher classroom autonomy in teaching. First, perceptions of autonomy relate to job satisfaction (Pearson and Hall, 1993). Work is perceived as more enjoyable if there is felt to be some influence over it. This is consistent with theories of motivation at work advanced by Maslow (1943) and Porter (1963) where autonomy is seen as a need people will attempt to satisfy. A second reason concerns congruence between the goals of education and how teachers' work is organized to accomplish these goals. Student autonomy is an important goal of education. This is outlined in Kenny (1993) who sees autonomy as empowering and emancipating. However, the end result of learner autonomy is more likely to be accomplished in an environment that supports teacher classroom autonomy. In order to achieve this goal all parties should behave consistently. So for teachers to be confident in working with autonomous students the training that the teachers receive should use methods and techniques to foster autonomy (Little, 1995). For this training to be sustained, the conditions of teaching should also support autonomous teaching beliefs and practices.

Many authors have indicated the need teachers and workers in general have for autonomy and the assertion that autonomy is an innate human need (Deci and Ryan, 1985; Wilson, 1993; Erpelding, 1999; Jones, 2000). Many experts in the field of educational reform report that empowering teachers is an appropriate place to begin in solving the problems of today's schools (Melenyzer, 1990; Short, 1994). Autonomy refers to thinking for oneself in uncertain and complex situations in which judgment is more important than routine. For teachers, the nature of their work and its social context complicates this definition. Teaching involves placing one's autonomy at the service of the best interests of children (Pitt and Phelan, 2008). Teacher classroom autonomy vacillates between being portrayed as a mark of a robust professionalism and as a sign of the difficulty other educational stakeholders have in influencing or believing they have influenced what teachers do behind classroom doors. Whether cast as earned or stolen, bestowed by professional membership or diminished by external forces, autonomy is generally may be perceived as a quantifiable characteristic of an individual. As such autonomy is equated with freedom to act in accordance with one's personal beliefs and, most dangerously, in one's own interest (Pitt and Phelan, 2008).

A common trend that appears when one researches teacher motivation, teacher empowerment, and teacher stress and burnout is teacher autonomy. Like the constructs of teacher motivation, teacher empowerment, teacher stress, and teacher burnout, attempts to dissect teacher classroom autonomy and identify the underlying theoretical dimensions have met with varied results and conclusions. Difficulties in developing an adequate concept of teacher classroom autonomy have resulted in problems developing appropriate measures of teacher classroom autonomy. Unlike the concept of ability, teacher classroom autonomy is a difficult concept to operationalize. Nevertheless, government officials, school board members, and principals must recognize and meet the need for teacher autonomy if they wish to motivate and empower teachers, minimize teacher stress, and prevent teacher burnout. Perception of autonomy has also been found to be related to factors within the work environment and teacher attitudes (Erpelding, 1999). Natale (1993) reported that although teachers have various reasons for leaving the teaching profession, they most often leave the classroom because of the lack of professionalism, lack of recognition, or lack of autonomy afforded them. If teachers are to be empowered and exalted as professionals, then, like other professionals, teachers must have the freedom to prescribe the best treatment for their students as doctors or lawyers do for their clients. This freedom is teacher classroom autonomy and is not restricted to the classroom but also must include decisions that impact the classrooms such as (a) school structure and organization, (b) disciplinary procedures, (c) curriculum content, (d) academic standards. It is also important to measure the level of teacher classroom autonomy and the impact it is having on teaching learning process. Thus, there is the need for a measuring instrument which is the focus of this study.

The basis of attitude measurement is that there are underlying dimensions along which individual attitudes can be ranged. A scaling procedure permits a person to be assigned a numerical score indicative of his/her position on the attitudinal dimension. The issue of scale types is important to the measuring that can be attached to such scores. Coombs et al. (1970) noted the variations on the four basic scales originally enunciated by Stevens (1946) namely; nominal, ordinal, internal and ratio scales. A nominal scale of measurement is one in which numbers are used to classify and identify a person. In their measurement, numbers are substituted for names or verbal labels. An ordinal scale of measurement, on the other hand, is one that assigns numbers to individuals so that the rank order of the numbers corresponds with the rank order of the individuals in terms of the attribute(s) being measured. The third type of scale, the interval scale has the defining characteristic of the size of the difference between the numbers assigned to two persons or objects corresponds to the degree to which the persons or objects differ on the attribute being measured. They also defined a ratio scale of measurement as one in which ratios between the numbers assigned to persons or objects correspond to ratios between the attributes measured in these persons or objects. Ratio scale is particularly different from interval scale in that the unit of measurement in an interval scale is arbitrary, especially the zero point; whereas, in the ratio scale, the zero point is a true value, always having the same measure. The Likert scale used in this study is considered to be interval scale.

Despite a number of research articles including perceived autonomy support as an independent predictor of motivation and psychological and behavioral outcomes, few studies have provided a systematic evaluation of the measures of teacher classroom autonomy especially in Nigeria. Numerous measures have been developed, such as the teacher efficacy scale (Adewolu, 2006) teacher efficacy scale (Gibson and Dembo, 1984) and teacher effectiveness (Kumar and Mutha, 1976). While such measures have exhibited acceptable internal consistency statistics, none have been evaluated using a rigorous, hypothesis-testing approach such as confirmatory factor analyses (CFAs) to establish the factor structure of the teachers classroom autonomy scale construct in Nigeria. Studies in education have identified academic leaders (Reeve et al., 1999) as important sources of autonomy support. Yet sufficient empirical study have not provided evidence that varying the source of teacher classroom autonomy within such measures has an effect on the validity of the measure and the perceived understanding of the teacher classroom autonomy construct by respondents. The present investigation resolved these issues by developing a measure of teacher classroom autonomy scale based on an exhaustive review of previous measures of perceived autonomy

support using a rigorous, hypothesis-testing approach with CFA. Such an approach is often considered the gold standard in the development of psychological instruments as it permits a priori specification of a proposed model which is then tested against observed data. Further, it used latent variables which explicitly model the random error associated with the questionnaire items that made up the construct, thereby making the latent variable representing the construct ostensibly error free.

The fact that teacher classroom autonomy varies across the different domains due to internal and external factors means that if teachers are expected to exert their decision making skills in teaching and assessment, designing curricula, participating in different school committees, and engaging in professional development, among other tasks, they need to be provided with the appropriate conditions for this to happen. If they are not, they may end up rejecting new responsibilities or not performing at the expected level due to a lack of professional competence, low motivation to accepting new responsibilities, or adverse working or personal conditions to accept new challenges. Teacher classroom autonomy is not an omnipresent attribute of certain teachers; it manifests itself differently in every teacher, and at the same time, every teacher perceives and exercises his/her professional classroom autonomy across different domains in different ways. This variable condition must be acknowledged by administrators and policy makers in order that they might respect teachers' interests and areas of expertise, and provide appropriate conditions for them to succeed in every task. Teacher classroom autonomy or the lack thereof, seems to be a critical component in the motivation of teachers to stay or leave the teaching profession and, therefore, should be explored in more detail before decisions affecting the autonomy of teachers in the classroom are implemented. However, in Nigeria, the nature and factors that can contribute to teacher classroom autonomy have not been empirically ascertained and there is no known locally designed instrument with which teacher classroom autonomy can be measured. This study filled this gap.

1.2. Objectives of the Study

The major objective of this study was to develop a valid instrument for the measurement of teacher classroom autonomy in Nigeria. Specifically, the study was conducted to:

1. develop appropriate items on teacher classroom autonomy;
2. estimate the validity of the scale;
3. determine the reliability indices of the scale.

1.3. Research Questions

In order to realize the objectives stated above, the following questions were raised:

1. What items would adequately measure teacher classroom autonomy?
2. What is the validity of the teacher classroom autonomy scale?
3. What is the reliability of the scale?

2. METHOD

The design employed for the study is the descriptive survey design. This is because the researcher was only interested in developing valid and reliable instrument with which teacher classroom autonomy can be measured. This technique enabled the researcher to obtain accurate data and high response rate from selected member (sample) of a population. In this study appropriate items with which teachers' classroom autonomy can be measured was developed and the developed items were used to collect information from teachers of selected secondary schools in the study area.

The study population comprised secondary school teachers in Southwestern Nigeria. This included teachers from both public and private schools in all subject areas. The study sample consisted of 1440 teachers that were selected from 72 secondary schools in three states using multistage sampling procedure. The three states (Osun,

Ekiti and Ogun) were randomly selected from the six states of the Southwestern Nigeria and from each of the three senatorial districts of the selected states, two Local Government areas (LGAs) were selected randomly to give a total of 18 LGAs. Four schools were selected from each of the selected 18 LGAs using stratified random sampling technique to make a total of 72 secondary schools, where school ownership (public and private) served as strata. Twenty teachers were then selected from each of the 72 secondary schools using random sampling.

2.1. Research Instruments
2.2.1. Two Instruments Were Used in the Study Namely
(a) Teacher Classroom Autonomy Rating Scale (T-CARS)

The first stage of item development was the generation of initial items on teacher classroom autonomy. A pool of 65 items was generated from the literature (Charters, 1974; Gnecco, 1983; Nero, 1985; Losos, 2000) and from ideas of experience teachers. It covered aspect of teacher classroom autonomy such as teacher satisfaction, teaching information, selecting textbooks and other instructional materials, selecting content, topics and skills to be taught, teaching technique, evaluating and grading students, disciplining students, determining the amount of homework to be assigned, teacher responsibility, opportunity to participate in decision which affect the teacher, opportunity for independent and creative thought and action. These items were moderated and reviewed by experts in the fields of Tests and Measurement and Psychology to determine the appropriateness, relevance and adequacy of the items (content validity). This was then reduced to 60 items. The response pattern adopted was Likert format with four option range from SA= strongly Agree, A = Agree, D = Disagree and SD = Strongly Disagree.

2.2. Pilot Testing the Initial Items

The 60 items were administered on 50 teachers who were not part of the final sample size used for the study. This was done to ascertain some salience, variance, phraseology, ordering, and ambiguity of items, as well as possible item burden with a view to refining and ensuring its suitability and stability. Item responses were evaluated for variability, and discriminant value (in relation to classroom teacher autonomy). After the pilot study, the items were re-examined by statistics educators at the second stage for possible adjustment, replacement and addition as appropriate. The final version contained a total of 46 items, 6 selection of instructional materials, 5 content selection, 4 selecting teaching styles, 10 students evaluation process, 8 students discipline, 5 decision making, and 8 teacher independence.

(b) The School Participant Empowerment Scale (SPES)

The School Participant Empowerment Scale (SPES) was developed by Short and Rinehart (1992). The SPES is a 38-item instrument that measured teacher empowerment on six dimensions: (1) decision-making, (2) professional growth, (3) status, (4) self-efficacy, (5) autonomy, and (6) impact. The SPES used a five-point Likert-type rating scale for each of the 38 items (1=strongly disagree to 5=strongly agree). Cronbach's coefficient alpha reliabilities for the subscales measuring the dimensions were reported as: decision-making, .79; professional-growth, .66; status, .84; self-efficacy, .83; autonomy, .83, and impact, .91. Alpha reliability for the total scale was .94 (Short and Rinehart, 1992). The scale was adapted in this study. The 38 items were used as it is in the original scale but the response pattern was changed from 1=strongly disagree - 5=strongly agree to 1=strongly disagree - 4=strongly agree. That is in this study three- point was not be assigned to "Undecided".

The data analysis was based on the structural components of the scale; the underlying factors and subscales (selection of instructional materials, content selection, selecting teaching styles, students evaluation process, students discipline, decision making, and teacher independence) and psychometric (reliability and validity) properties of the Teacher Classroom Autonomy Rating Scale. Responses to the T-CARS were subjected to factor analysis procedures, orthogonal rotation to a single structure through the varimax method. Exploratory Factor

Analysis (EFA) was conducted to identify the factors on which the scale items loaded. Reliability of the subscales and total instrument was determined using Cronbach Alpha (for internal consistency coefficient) and Pearson Product Moment Correlation analysis (for Stability coefficient). SPSS version 20 was utilized to show the theoretical underpinnings of the T-CARS, inter-item correlation, the relatedness of the items to each of the factors of the EFA and their homogeneity.

3. RESULTS

Research Question 1: What items would be adjudged to measure teacher classroom autonomy?

To resolve this question, the 60 items used in the pilot study moderated and edited based on expert judgment for content relevance were subsequently reduced to 46 (see Appendix IV). The 46 items were then subjected to psychometric analyses. The items of the second version were grouped into seven factors as indicated in Table 1.

Table-1. The T-CARS second version subscales and corresponding items

S/N	SUBSCALE	ITEMS
1	Selection of Instructional Materials	14, 28, 29, 30, 40, 41
2	Content Selection	2, 6, 8, 18, 22
3	Selecting Teaching Styles	1, 9, 16, 46
4	Student Evaluation Process	15, 21, 23, 24, 27, 33, 34, 35, 36, 37
5	Students Discipline	3, 25, 26, 31, 32, 38, 39, 45
6	Decision Making	19, 20, 44, 43,7
7	Teacher Independence	4, 5, 10, 11, 12, 13, 17, 42

Source: Field Survey

The item means, of the 46 item was 1.988 while the inter-item correlation was 0.150 with a Cronbach Alpha coefficient 0.879. The reduction of the second T-CARS version was based on Govaerts and Gregoire (2008) item reduction criteria which stipulated that any item affected by the three or any two of the conditions below should be expunged

i. Items with Low Item Mean (LIM) 1.988 or less.

ii. Items with Low Item total Correlation (LITC) of 0.150 and below.

iii. Items having a High Cronbach's Alpha if Item Deleted (HCAID) of 0.897 or more.

The application of the three conditions led to the removal of six items (4, 10, 21, 23, 37 and 42) from the 46-item version (i.e. second version) of the T-CARS. After the removal of the six items from the T-CARS, the remaining items were grouped into the seven factors (subscales) were as presented in Table 2.

Table-2. The T-CARS third version subscales and corresponding items

S/N	SUBSCALE	ITEMS
1	Selection of Instructional Materials	14, 28, 29, 30, 40, 41
2	Content Selection	2, 6, 8, 18, 22
3	Selecting Teaching Styles	1, 9, 16, 46
4	Student Evaluation Process	15, 24, 27, 33, 34, 35, 36,
5	Student Discipline	3, 25, 26, 31, 32, 38, 39, 45
6	Decision Making	19, 20, 44, 43,7
7	Teacher Independence	5, 11, 12, 13, 17

Source: Field Survey

Table 2 showed that "Selecting Instructional Materials" subscale has 6 items, "Content Selection" and "Teacher Independent and Creativity" has five items each, "Teaching Techniques" and "Decision Making" has 4 items each while "Evaluation Process" and "Discipline" has seven items each. Finally, 40 items were retained on the T-CARS.

Thus, the 40 items on Table 3 were considered suitable and adequate to measure teacher classroom autonomy in Southwestern Nigeria.

Table-3. Teacher Classroom Autonomy Rating Scale (Third and Final Version)

S/N OLD	S/N NEW	STATEMENT	SA	A	SD	D
1	1	The expectation of my school is that I should be creative in my teaching approach				
2	2	Selecting student-leaning activities is my sole responsibility				
3	3	I set the standard of behaviour students should exhibit in my classroom				
5	4	In my teaching, I use my own guidelines and procedure				
6	5	The decision in the content that is selected for teaching is the sole responsibility of the teacher				
7	6	I should not have control of the scheduling of use of time in my classroom				
8	7	I only concentrate on the goals and objectives I set for my teaching				
9	8	I seldom use alternative procedures in my teaching				
11	9	I am actively involved in proffering solutions to problems that occur in my classroom				
12	10	The decision on what to teach is my responsibility				
13	11	Classroom space usage is beyond my control				
14	12	The school gives the opportunity of selecting instructional materials of my choice				
5	13	The selection of assessments activities is considered my responsibilities by the school				
16	14	The school allows me to selecting the teaching method of my choice in my lessons				
17	15	I am not control of allocation of time to be used in my choice				
18	16	The skills taught in my class are those I select				
19	17	In my school monitoring the school programs is the responsibility of the teachers				
20	18	Teachers in my school are saddled with making decision about the implementation of new programs in the school				
22	19	I am expected to be involved in breaking down the curriculum of my subject				
24	20	I select the type of test to be used in assessing students				
25	21	I am free to promote class spirit in my lesson				
26	22	I am to allowed to use intra-class competitions to foster students after assessment				
27	23	I determine the type of feedback appropriate to students after assessment				
28	24	I take decision on instructional materials to support struggling learners				
29	25	The decision on materials that could provide pathways to accelerate students learning is left to me to make				
30	26	I make plans on how instructional materials are used in improving students learning style				
31	27	I am allowed to arrange project like award schemes for classes with good classroom discipline				
32	28	As a teacher, I am involved in the observation of students' behaviour inside the classroom				
33	29	I am responsible for structuring my classroom assessment				
34	30	As a teacher, I am involved in the observations students' behaviour outside the classroom				
35	31	I am involved in the formulation of the school evaluation and assessment policies				
36	32	I am given free hand in the implementation of school assessment policies in relation to my subject				

38	33	The school allows me to adhere to the limit I set for tasks giving to the students				
39	34	Clear rules on disciplines are constantly enforced in my class				
40	35	The school allows me to set criteria for selecting instructional materials				
41	36	The school allows me to evaluate the appropriateness of instructional materials supplied to the school that are relevant to my subject				
43	37	My school principal usually put into consideration my opinion on matters that directly affects my students				
44	38	The school principal usually involves me in the development of school policy that affects my lessons				
45	39	Clear rules on discipline that are laid by me in my class				
46	40	I execute on how instructional materials are used in improving students' learning style				

Source: Field Survey

Research Question 2: What is the validity of the teacher classroom autonomy rating scale?

To answer this question, construct and convergent validity of T-CARS third version (final version) was ascertained. The construct validity was determined using two methods. The first was Kaiser or eigenvalues greater-than-one criterion (K1), (Kaiser, 1960). The second was Cattell (1966) scree test, which involves an examination of a plot of the eigenvalues for breaks or discontinuities. In doing this, Exploratory Factor Analysis (EFA) a good technique for studying the dimensionality of a scale (Spector, 2006) was applied so as to explore the dimensionality of T-CARS with the aim of determining (a) the number of factors that best represent the items and (b) the interpretation of the factors. Thus, principal components factor analytic model was adopted. It was followed by an oblique rotation since. Tables 5 and 6 present eigenvalues greater-than-one criterion and standardized item loadings of TPES final version respectively.

Table-4. Eigenvalues and total variance on the T-CARS

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	9.525	23.814	23.814
2	6.044	15.109	38.922
3	5.969	14.922	53.845
4	4.737	11.843	65.688
5	3.977	9.943	75.631
6	3.475	8.687	84.318
7	2.858	7.145	91.463
8	.962	2.405	
9	.791	1.976	
10	.493	1.233	
11	.306	.764	
12	.229	.572	
13	.205	.513	
14	.188	.471	
15	.103	.257	
16	.067	.168	
17	.018	.044	
18	.015	.038	
19	.010	.026	
20	.006	.016	
21	.006	.015	
22	.004	.010	
23	.003	.007	
24	.003	.007	

25	.002	.006	
26	.002	.005	
27	.001	.003	
28	.001	.001	
29	2.027E-016	5.069E-016	
30	4.317E-017	1.079E-016	
31	2.388E-017	5.971E-017	
32	7.094E-018	1.774E-017	
33	1.334E-018	3.335E-018	
34	4.865E-034	1.216E-033	
35	-8.224E-033	-2.056E-032	
36	-2.180E-019	-5.451E-019	
37	-3.110E-018	-7.775E-018	
38	-1.710E-017	-4.275E-017	
39	-3.624E-017	-9.060E-017	
40	-6.793E-017	-1.698E-016	

Extraction Method: Principal Component Analysis.

From the initial eigenvalues as presented in Table 4, seven factors of teacher classroom autonomy emerged, which accounted for 91.46% of the total scale variance on the T-CARS. The factor solution was in line with the initial assumption of the researcher (which was seven).

Table-5. Standardized item loadings of T-CARSS (Final version)

Items No.	Component						
	1	2	3	4	5	6	7
1						.983*	
2					.981*		
3	.983*						
4		.996*					
5					.981*		
6		.997*					
7					.981*		
8						.982*	
9		.997*					
10		.997*					
11		.997*					
12				.987*			
13			.969*				
14						.997*	
15		.935*					
16					.961*		
17							.961*
18							.926*
19					.973		
20			.985*				
21	.740*						
22			.973*				
23			.985*				
24				.985*			
25				.309*			
26				.885*			
27	.985*						
28	.967*						
29			.967*				
30			.356*				
31			..867*				
32			.985*				

33	.985*						
34	.987*						
35				.986*			
36				.961*			
37							.861*
38							.981*
39	.980*						
40						.982*	

* Significant at 0.05 level

The standardized factor loadings for the 40 item presented in Table 5 were statistically significant at p < .05. Thus, the standardized item loadings of the T-CARS items showed that the instrument is valid. From Table 6, eight of the 40 items of the T-CARS loaded on factor 3 (Students Evaluation). It could therefore be concluded that student evaluation is the most important of the factors. Seven items loaded on factor 1 (Student Discipline), which makes it next most crucial to the first factor on T-CARS. Six items loaded on factor 2 and 4 (Teacher independence) and (Selection of Instructional Materials), five items loaded on factor 5 and four items loaded on each of factors 6 and 7 (Selecting Teaching Technique) and (Participating in Classroom Decision Making).

Scree plot was also employed to further confirm the number of factors on which the TPS items would load. The plot is as presented in figure 1.
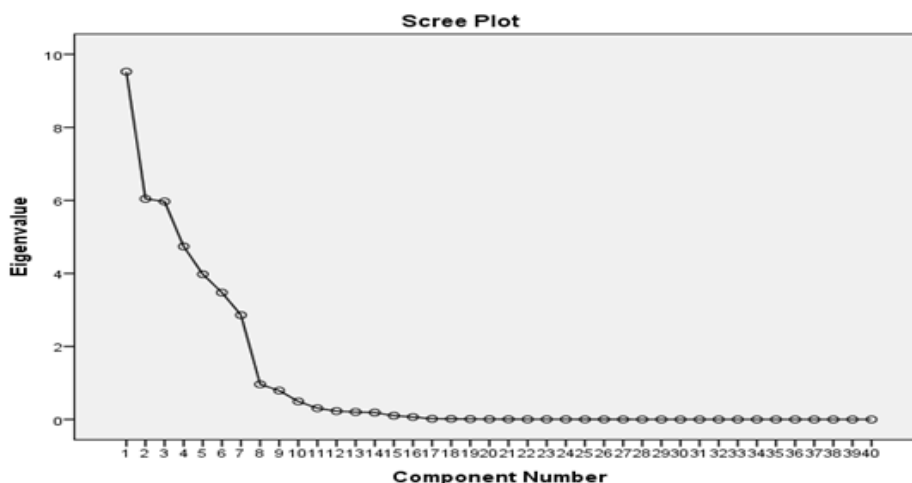

Figure-1. Scree plot showing seven factors on T-CARS

Source: Field Survey

The Scree plots in Figure 1 showed also seven factors on the T-CARS and thus, confirm the number of factors in Table 6. Thus, there are seven factors on the developed Teacher Classroom Autonomy Rating Scale (T-CARS) for measuring teacher classroom autonomy in Southwestern secondary schools in Nigeria.

To determine the convergent validity, scores from the T-CARS were correlated with those from the "The School Participant Empowerment Scale" (SPES), a related construct. Table 6 presents the result.

Table-6. Convergent validity of T-CARS

Source of Variation	N	Mean	SD	r	p
T-CARS	1326	77.97	15.33	0.611	<.05
SPES	1326	71.70	15.76		

Source: Field Survey

From Table 7, the correlation coefficient between the two scales, T-CARS and SPES, was 0.611, which is significant at 0.05 level of significance. Since the SPES is a widely used scale with a significant alpha (α) reliability of r= 0.94, a high and positive correlation with it by the T-CARS thus establishes the validity of the latter. That is, the T-CARS does measure teacher classroom autonomy of secondary school teachers in Southwestern Nigeria.

Table-7. Inter-Item Correlation Matrix

	T-CARS	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
T-CARS	1							
Factor 1	.691*	1						
Factor 2	.748*	.302*	1					
Factor 3	.849*	.561*	.709*	1				
Factor 4	.795*	.575*	.714*	.854*	1			
Factor 5	.607*	.466*	.485*	.446*	.307*	1		
Factor 6	.799*	.638*	.570*	.511*	.492*	.447*	1	
Factor 7	.844*	.688*	.643*	.691*	.523*	.592*	.699*	1

* Significant at 0.05 level

Table 7 showed that the seven factors correlated significantly at (p <.05) with the T-CARS. Also all the factors correlated significantly with each other suggesting that they are responsible for teacher classroom autonomy.

Research Question 3: What is the reliability of the scale?

Table-8. Internal consistency estimates of the T-CARS

Scale Items	Guttman Coefficient	Cronbach Alpha	Spearman Brown Split Half	Guttmann Split Half Coefficient	Common inter-item correlation	Item Variances
N=46	0.867	0.879	0.665	0.663	0.150	0.783
N=40	0.905	0.913	0.736	0.733	0.212	0.671

Source: Field Survey

Table 8 shows that the reliability of the final 40-item T-CARS was consistently greater than that of the initial 46 item scale in each of the three reliability measures, namely Guttmann, Cronbach Alpha and Split-Half. Moreover, the item variances of 0.783 of the initial items reveals the homogeneity of the items that had relatively lower mean scores. This is also corroborated by the inter-item correlation values of 0.150 and 0.212 for the initial and final scale items respectively. Thus, the T-CARS is considered very reliable in terms of the internal consistency of its items.

Table-9. Teacher Classroom Autonomy Rating Scale Sub-scales Reliability

Sub-scale	Cronbach Alpha	No of Items
Students' Discipline	0.994	7
Teacher's Independence	0.999	6
Student Evaluation	0.914	8
Selection of Instructional Materials	0.998	6
Content Selection	0.983	5
Selecting Teaching Style	0.998	4
Decision Making	0.973	4

Source: Field Survey

The result as presented in Table 24 showed that T-CARS sub-factors estimated reliabilities are very high, indicating that the items were internally consistent and can be used to measure teacher classroom autonomy consistently.

4. DISCUSSION OF FINDINGS

The reliability of an instrument is the consistency with which it could elicit responses when administered once (and investigated through internal consistency method) or more than once (when tested for stability). The 40 items on the T-CARS were found to be reliable when tested through internal consistency. It was not only tested for reliability but also tested for validity as the items showed evidence of validity through the coefficients. The submissions of measurement experts were uniform concerning the reliability and validity of measurement instrument. Before an instrument can be depended upon as having the strength to elicit the desired information from respondents, its reliability coefficient should be at acceptable level.

In this study the initial items generated for Teacher Classroom Autonomy Rating Scale (T-CARS) were 60 items. The items through moderation and editing by experts in Tests and Measurement, Educational Psychology and teachers of not less than 20 years teaching experience were later reduced to 46 items. The 46 items were then subjected to psychometric properties analyses. The 46-item T-CARS was reduced to 40-item final version of T-CARS based on Govaerts and Gregoire (2008) item reduction criteria. The application of Exploratory Factor Analysis (EFA) using Principal Components (PC) approach with eigenvalues greater-than-one on the 40-item T-CARS gave rise to seven factors of the teacher classroom autonomy. With the use of scree plot the seven factors on which T-CARS loaded was confirmed. The seven factors are; Students' Discipline, Teacher's Independence, Student Evaluation, Selection of Instructional Materials, Content Selection, Selecting Teaching Style and Decision Making.

The items on the T-CARS showed evidence of validity as the initial factor loadings on the data collected using T-CARS were statistically significant. These were good enough for declaring the T-CARS usable for measuring the invisible believe that teacher classroom autonomy is capable of enhancing (or impeding) the success with which teaching task would be discharged. It should be reminded that perceptions of autonomy relate to job satisfaction (Pearson and Hall, 1993). Work is perceived as more enjoyable if there is felt to be some influence over it. This is consistent with theories of motivation at work advanced by Maslow and Porter where autonomy is seen as a need people will attempt to satisfy. Also, concerns congruence between the goals of education and how teachers' work is organized to accomplish these goals. This is outlined in Kenny (1993) who sees autonomy as empowering and emancipating. Therefore, the T-CARS has shown that the level of an individual teacher's capability to achieve educational goals through the teaching task activities could be demonstrated through adequate; Students' Discipline, Teacher's Independent, Student Evaluation, Selection of Instructional Materials, Content Selection, Selecting Teaching Style and Decision Making.

The estimated reliability coefficients of T-CARS (Guttman Coefficient = 0.905, Cronbach Alpha = 0.913, Spearman Brown Split Half = 0.736 and Guttmann Split Half Coefficient = 0.733) was very good as asserted by Devellis (1991) as cited by Adewolu (2006). The reliability of any measuring instrument (T-CARS inclusive) is affected by a number of factors. These include group homogeneity and the length of the instrument (Popham, 2002). The differences in the values of classroom autonomy of the sampled teachers in the study could have arisen from the number of sample involved as well as the long length of T-CARS. This is in agreement with the recommendation of Sarantakos (2005) that large samples be involved in the survey so as to reduce sampling error and obtain a more reliable result. Although, quite a number of other factors capable of affecting the reliability of scales have been confirmed by researchers, the influence of many of these factors have not been tested for T-CARS.

5. CONCLUSION

The 40-item T-CARS, based on the analyses that were carried out could be adjudged to be reliable and valid for the measurement of teacher classroom autonomy. A high factorial validity was also obtained from the scale. Teacher autonomy to select teaching styles and instructional materials remains the two most important factors. School administrators, government and every other stake holders in the educational system should consequently

give the teachers freedom to select instructional materials and teaching styles of their choice in order to achieve the objectives of their teaching.

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