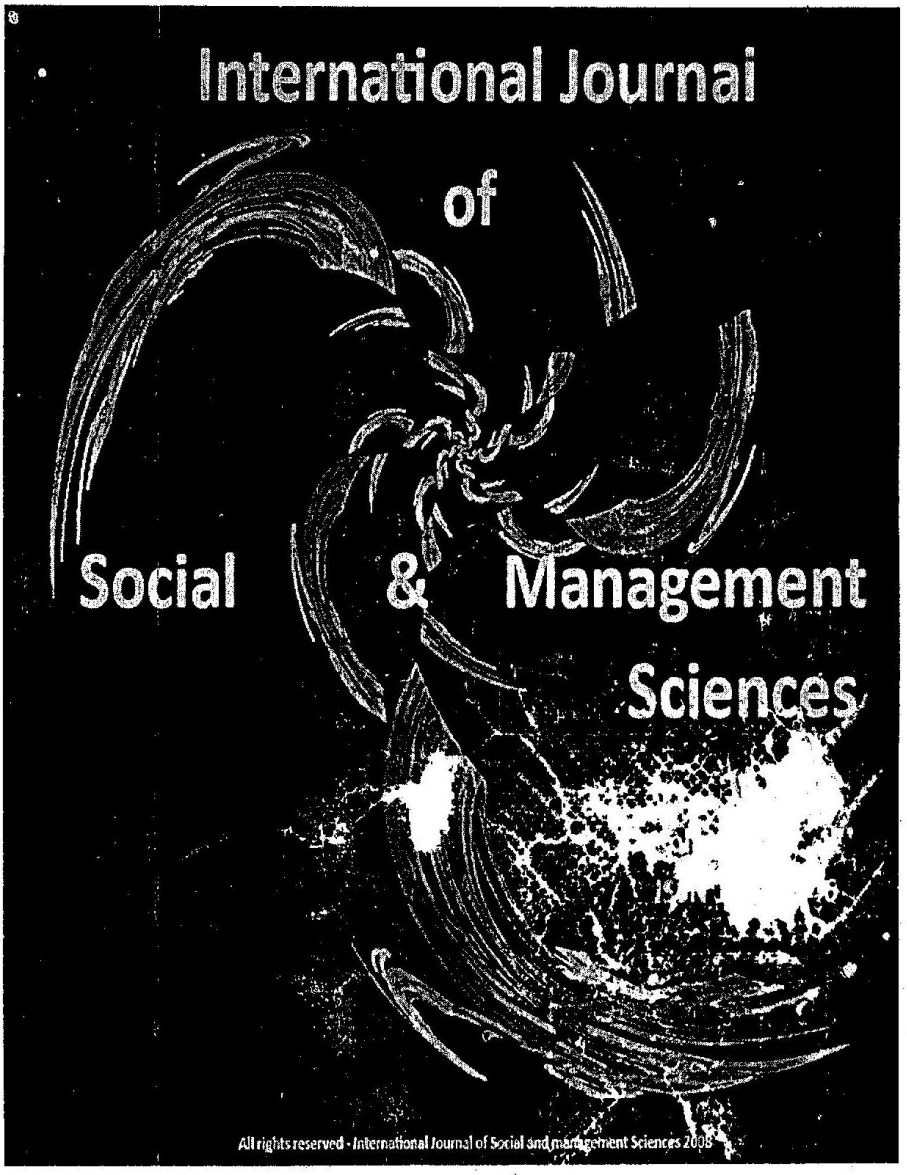
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The editorial Board

Contents

TEACHERS' PERCEPTION OF INTEGRATED SCIENCE CURRICULUM IN NIGERIA: DOES GENDER MATTER?

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Abstract

The influence of gender in the understanding of scientific concepts has been receiving the attention of many scholars all over the world. In particular, the need to address the under-representation of females in science subjects and to identify appropriate methods of improving female instruction, as well as their learning of science seems to have received greater attention. This paper contributes to knowledge on science curriculum by using factor analytic approach to investigate teachers' perception of integrated science curriculum in Nigeria. Data were collected from 303 (192 males and 111 females) Junior Secondary School Integrated Science Teachers of Integrated Science Curriculum in Nigeria. The results showed that nine and ten principal component factors were extracted from correlation matrices rotated by the varimax criterion for male and female teachers respectively. The resultant nine factors from male teachers' responses accounted for 62.2% of the total variance on the perception profile while ten factors identified for female responses accounted for 69.0% of the total variance on the perception profile. The results indicate that gender disparity exists in the teaching and learning of science in Nigeria.

Introduction

Science is the basis of technology. For effective living in this modern age of science and technology, it is essential that every child is given an opportunity to acquire at least the basic knowledge and process of science. It is probably in recognition of this that led the Federal Government of Nigeria to introduce the 6-3-3-4 system of education in the country (Sec, II, N.P.E., 1998). One of the features of the policy is the compulsory teaching of science and technology at the Junior Secondary Schools. This is in form of Integrated Science.

The need to emphasis science teaching and learning in schools made UNESCO to organize the first International Conference on the use of integrated approach in science teaching held in Bulgaria in 1968. Thereafter, the result of various curriculum improvement conferences and workshops led Nigerian science educators and teachers to the decision that the then shallow General Science should be a culturally relevant programme, and was named Integrated Science. As a result, the Science Teachers Association of Nigeria (STAN) in 1970 published a curriculum Newsletter No 1, which contained a statement of the Philosophy, Methodology, Content and Evaluation of integrated science.

The concept of integration in school science subject lays emphasis on both concepts and teaching methods. The Newsletter also stipulated that the use of integrating principle in science produced a course, which is relevant to student needs and experiences; stresses the fundamental unity of science: lays adequate foundations for subsequent specialist study, and adds cultural dimension to science education. Furthermore, the National Policy on Education (1998) stipulated that an integrated approach be used in devising and in teaching science for the first nine years of formal education system in the country. According to the policy document, education of students in science within the first nine years should be aimed at "preparation for useful living within the society and for higher education" (section 4, page 23). In an attempt to achieve these objectives, many science educators, government and non- governmental organization and professional bodies have made efforts towards improving the quality of integrated science teaching and learning in Nigeria Junior Secondary Schools (STAN, 1984; Okebukola, 1990; Udoh, 1998 and Ibole, 1999). Thus, it is expected that learning outcomes in integrated science should be very encouraging. However this has not been the case as reported by Balogun (1992), Olagunju (1995) and Olarewaju (1999). The reasons for such low achievement and negative attitude include, among others, shortage of qualified teachers who are associated with high quality instruction (Olarewaju, 1999) and lack of commitment to the profession by the teachers (Okpala and Onocha, 1990 and Olarewaju, 1999). Parents of students even think that the decline in science achievement of students in secondary schools may be traceable to the deficiencies in teacher preparation (Okpala and Onocha, 1995).

There is no doubt that the science teacher is the backbone and chief intermediary of any science programme. The role of teachers in curriculum development and implementation has been well documented in literature

(McCormick, 1992; and Keiny, 1993). According to Sotonwa (1999), it is the extent to which teachers identify themselves with the curriculum that ultimately determines whether the curriculum will benefit children in the school or not. However, Skelton and Hanson (1989) report on the need for teacher education to address gender issues, suggesting that methods and course contents are important factors as these are viewed as being more directly linked to what goes on in classrooms. Sandra Harding (1989, 1991) has also written extensively on gender and science and argues that increasing the voices of women in science will enrich science. Therefore, there is an urgent need for gender issue to be addressed in teacher education and especially in science education.

Aim of the paper

The paper is aimed at factor analyzing the perception of integrated science teachers of Integrated Science Curriculum on the basis of gender. This would give room for appropriate recommendation on how to improve on the contents and methods of implementing the curriculum.

Research questions

1. What are the factors perceived by male and female Integrated Science teachers of integrated Science Curriculum?
2. What are the underlying relationships among the loaded variables with factors as perceived by the male and female Integrated Science teachers of the Integrated Science Curriculum?

Method of Data Collection

Research Design

An ex-post facto research type and survey design was adopted for the study. It involved collection of data on teachers' perception of Integrated Science curriculum using appropriate questionnaires. This design was suitable because there was no manipulation of the independent variables.

Sample and Sampling Techniques

The study sample consisted of 303 (192 males and 111 female) Junior Secondary School Integrated Science teachers in all the secondary schools in the 16 Local Government Areas in Ekiti State, Nigeria.

Instrumentation

A Likert type teacher questionnaire was used for data collection. It consists of two sectors. Section A sought for personal information of the respondents such as, qualification area of specialization, teaching experience, name of school, town and local government area of the school. Section B is made up of 32 statements, which border on philosophy, objectives, contents and concepts, government policy, instructional procedure, and teaching methods for Integrated Science Curriculum. The respondents are to indicate their agreement or disagreement on a 4-point scale of strongly Agree, Agree, Disagree and Strongly Disagree.

Validity and Reliability of the Instrument

Four experts in science education and three experts in curriculum evaluation criticized the items and offered useful suggestions. The suggestions and criticism were taken into consideration when the final draft of the instrument was being prepared. The questionnaire was field-tested using 50 integrated science teachers from Akure North and South Local Government Areas of Ondo State, which is a state different from the state of study. The responses were used to determine the reliability coefficient of the instrument, which was found to be 0.75 using Cronbach alpha method.

Procedure for Data Collection

The purpose of the questionnaire was narrated to the respondents before they were made to complete it. They were immediately collected in order to ensure that the entire questionnaires were collected back.

Method of Data Analysis

Data collected were subjected to factors analysis by utilizing principal components factors extraction and orthogonal rotation by the varimax criterion. Factor analysis can simultaneous manage over a hundred variables, compensate for random error and invalidity, and disentangle complex inter-relationships into their major and distinct regularities.

Factor analysis can be applied in order to explore a content area, structure a domain, map unknown concepts, classify or reduce data, define relationships, test hypothesis, formulate theories, control variables or make inference.

Result Discussion

Research question 1:

What are the factors perceived by male and female Integrated Science teachers of Integrated Science Curriculum?

Table 1: IDENTIFIED FACTORS' NAMES FROM FEMALE INTEGRATED SCIENCE TEACHERS' PERCEPTION PROFILE

Table 1a: FACTOR 1: Availability of resources for teaching of integrated science

Variable Loading		Statement of items on the instrument
13	.432	Teachers always make use of teaching materials/equipment during the teaching of

		integrated science
17	.413	Teachers are involved in the selection of learning materials/equipment for teaching integrated science
18	.800	Schools always provide the learning materials/equipment for teaching integrated science.
19	.475	Students are ready to learn the integrated science contents
20	.733	The learning materials/equipment selected are of good standard
21	.348	Teaching period for the integrated science are not adequate
23	.597	Government usually provides fund for the implementation of the integrated science curriculum
26	.641	The curriculum is adequately structured to equip the students to carefully observe and report the results of their observations

Table 1b: FACTOR 2: Integrated Science Teaching Methodology

Variable	Loading	Statement of items on the instrument
2	.388	The integrated science curriculum is more meaningful and significant to students and can improve their academic and vocational skills
5	.498	I understand various concepts, theories, principles and generalizations state in the integrated science curriculum integrated
6	.857	Teachers find it difficult to teach integrated science curriculum contents
8	.514	Students find it difficult to understand the contents of integrated science curriculum
12	.680	Teachers are not well prepared and motivated to teach integrated science
16	.562	I don't understand the method I could use to teach integrated science most of the time.

Table 1c: FACTOR 3: Development of Basic Skill in Science

Variable	Loading	Statement of items on the instrument
28	.380	The curriculum is adequate to equip the students on designing experiments including controls where necessary
29	.778	With the contents of integrated science curriculum, students can be properly trained in explaining Phenomena where appropriate using models.
30	.731	The curriculum can build solid foundation for sound knowledge and techniques for further enquiry

Table 1d: FACTOR 4: Conceptualization of integrated science curriculum

Variable	Loading	Statement of items on the instrument
3	.561	The Nigeria philosophy and values for science and technology are well reflected in integrated science curriculum
5	.447	I understand various concepts, theories, principles and generalizations state in the integrated science curriculum
11	.443	Teachers have the theoretical and practical knowledge and ability to teach the integrated science curriculum content.
26	.825	The curriculum is adequately structured to equip the students to carefully observe and report the results of their observations

Table 1e: FACTOR 5: Philosophy with Meaningful Objectives

Variable	Loading	Statement of items on the instrument

1	.549	The objectives of integrated science curriculum are well stated
7	.611	The contents of integrated science curriculum are relevant to the students and well conceptualized by the developers.
11	.443	Teachers have the theoretical and practical knowledge and ability to teach the integrated science curriculum content.

Table 1f: FACTOR 6: Providing realistic science experiences

Variable	Loading	Statement of items on the instrument
2	.519	The integrated science curriculum is more meaningful and significant to students and can improve their academic and vocational skills.
27	.828	The curriculum can build the students to organize scientific information and make predictions
28	.622	The curriculum is adequate to equip the students on designing experiments including controls where necessary.

Table 1g: FACTOR 7: Teachers cooperation and parents involvement in curriculum implementation

Variable	Loading	Statement of items on the instrument
4	.592	Teachers of integrated science are always involved in the curriculum planning process
10	.682	Teachers always share experience, materials, ideas etc. among themselves in the teaching of integrated science.
24	.711	Parents are not involved in curriculum implementation

25	.615	Teachers always make their observations on integrated science known to appropriate authority(ies)

Table 1h: FACTOR 8: Integrated science Teachers' attitude to correction and change

Variable	Loading	Statement of items on the instrument
9	.376	Teachers in related subject areas work as a team to teach the integrated science (either in part or whole) in schools
14	.821	Teachers are interested in attending workshops/seminars to be informed about the latest development in the teaching/learning of integrated science
15	.481	Teachers are ready to change or improve when the need arises.
17	.501	Teachers are involved in the selection of learning materials/equipment for integrated science

Table 1i: FACTOR 9: Effect of Government policy

Variable	Loading	Statement of items on the instrument
10	.375	Teachers always share experience, materials, ideas etc. among themselves in the teaching of integrated science.
11	.364	Teachers have the theoretical and practical knowledge and ability to teach the integrated science curriculum contents
22	.805	Government policy changes often affect integrated science curriculum implementation
32	.385	There are adequate teachers for teaching integrated science

Table 1j: FACTOR 10: Students' readiness to learn

Variable	Loading	Statement of items on the instrument
16	.399	I don't understand the method I could use to teach integrated science most of the time.
19	.580	Students are ready to learn the integrated science contents.

Table 2: IDENTIFIED FACTORS' NAMES FROM MALE INTEGRATED SCIENCE TEACHERS' PERCEPTION PROFILE

Table 2a: FACTOR 1: Philosophy with Meaningful Objectives

Variable	Loading	Statement of items on the instrument
1	.606	The objectives of integrated science curriculum are well stated
2	.506	The integrated science curriculum is more meaningful and significant to students and can improve their academic and vocational skills.
3	.758	The Nigeria philosophy and values for science and technology are well reflected in integrated science curriculum
5	.525	I understand various concepts, theories, principles and generalizations stated in the integrated science curriculum.
7	.734	The contents of integrated science curriculum are relevant to the students and well conceptualized by the developers.
11	.389	Teachers have the theoretical and practical knowledge and ability to teach the integrated science curriculum content.

20	.519	The learning materials/equipment selected are of good standard.

Table 2b: FACTOR 2: Cooperative attitude of integrated science teachers

Variable	Loading	Statement of items on the instrument
4	.664	Teachers of integrated science are always involved in the curriculum planning process
9	.754	Teachers in related subject areas work as a team to teach the integrated science (either in part or whole) in schools
10	.619	Teachers always share experience, materials ideas etc. among themselves in the teaching of integrated science
25	.380	Teachers always make their observations on integrated science known to appropriate authority (ies)
26	.562	The curriculum is adequately structured to equip the students to carefully observe and report the results of their observations

Table 2c: FACTOR 3: Teachers' motivation

Variable	Loading	Statement of items on the instrument
6	.745	Teachers find it difficult to teach integrated science curriculum contents
12	.730	Teachers are not well prepared and motivated to teach integrated science
13	.625	Teachers always make use of teaching materials/equipment during the teaching of integrated science
18	.432	Schools always provide the learning materials/equipment for teaching integrated scienc

23	.353	Government usually provides fund for the implementation of the integrated science curriculum
24	.539	Parents are not involved in curriculum implementation

Table 2d: FACTOR 4: Integrated science Teachers' attitude to correction and change

Variable Loading		Statement of items on the instrument
Availability of resources for teaching of integrated science		
14	.710	Teachers are interested in attending workshops/seminar to be informed about the latest development in the teaching/learning of integrated science
15	.571	Teachers are ready to change or improve when the need arises.
17	.495	Teachers are involved in the selection of learning materials/equipment for teaching integrated science

Table 2e: FACTOR 5: Development of basic skills in science

Variable	Loading	Statement of items on the instrument
26	.373	The curriculum is adequately structured to equip the students to carefully observe and report the results of their observations
27	.369	The curriculum can build the students to organize scientific information and make predictions
28	.428	The curriculum is adequate to equip the students on designing experiments including controls where necessary
29	.726	With the contents of integrated science curriculum, students can be properly trained in

		explaining Phenomena where appropriate using models.
30	.773	The curriculum can build solid foundation for sound knowledge and techniques for furthe enquiry

Table 2f: FACTOR 6: Integrated Science Teaching Methodology

Variable	Loading	Statement of items on the instrument
16	.685	I don't understand themethod I could use to teach integrated science most of the time.
18	.344	Schools always provide the learning materials/equipment for teaching integrated science.

Table 2g: FACTOR 7: Allotted time and students' understanding

Variable	Loading	Statement of items on the instrument
8	.745	Students find it difficult to understand the contents of integrated science curriculum
21	.758	Teaching period for the integrated science are not adequate

Table 2h: FACTOR 8: Student readiness to learn

Variable	Loading	Statement of items on the instrument
19	.742	Students are ready to learn the integrated science contents
22	.591	Government policy changes often affect integrated science curriculum implementation

Table 2i: FACTOR 9: Providing realistic science experiences

Variable Loading		Statement of items on the instrument
27	.717	The curriculum can build the students to organize scientific information and make predictions
31	.716	The curriculum can build the student to draw logical conclusions

Table 3: Total Variance Explained for Male Teachers

	Initial Eigen values			Rotation Sum of Square Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative
1	5.423	16.947	16.947	2.998	9.368	9.368
2	3.943	12.32	29.270	2.978	9.309	18.675
3	2.233	6.979	36.249	2.949	9.208	27.884
4	1.948	6.089	42.338	2.218	6.930	34.814
5	1.582	4.943	47.281	2.145	6.704	41.517
6	1.335	4.173	51.454	2.059	6.435	47.952
7	1.255	3.921	55.374	1.600	5.500	52.952
8	1.154	3.607	58.982	1.509	4.717	57.669
9	1.041	3.253	62.234	1.461	4.565	62.234
10	.997	3.115	65.349			
11	.939	2.943	68.283			
12	.859	2.934	68.283			
13	.803	2.511	73.480			

14	.747	2.336	75.816
15	.696	2.175	77.991
16	.649	2.024	80.015
17	.621	1.940	81.955
18	.597	1.865	83.820
19	.575	1.797	85.617
20	.540	1.688	87.305
21	.501	1.566	88.871
22	.474	1.481	90.352
23	.417	1.303	91.654
24	.403	1.258	92.913
25	.359	1.123	94.036
26	.353	1.105	95.185
27	.334	1.044	96.185
28	.310	.970	97.155
29	.267	.833	97.989
30	.259	.810	98.799
31	.228	.712	99.511
32	.156	.489	100.00

Table 4: Total Variance explained for female Teachers

	Initial Eigen values	Rotation Sum of Square Loadings

Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative
1	6.511	20.347	20.347	3.083	9.635	9.635
2	3.318	10.368	30.715	2.772	8.662	18.297
3	2.247	7.021	37.736	2.336	7.300	25.598
4	2.155	6.735	44.472	2.299	7.189	32.783
5	1.610	5.033	49.504	2.243	7.010	39.793
6	1.443	4.510	54.015	2.243	7.009	46.802
7	1.361	4.252	58.267	2.172	6.786	53.589
8	1.219	3.808	52.075	1.874	5.856	59.445
9	1.188	3.711	65.787	1.726	5.395	64.840
10	1.024	3.201	68.988	1.327	4.147	68.988
11	.924	2.887	71.874			
12	.839	2.623	74.497			
13	.768	2.391	79.436			
14	.688	2.151	81.587			
15	.654	2.044	83.632			
16	.604	1.887	85.519			
17	.543	1.697	87.216			
18	.509	1.590	88.806			
19	.509	1.590	88.806			
20	.471	1.472	90.278			

21	.428	1.339	91.616
22	.392	1.225	92.841
23	.344	1.074	93.915
24	.319	.996	94.911
25	.273	.854	95.765
26	.267	.835	96.600
27	.256	.835	97.400
28	.211	.658	98.663
29	.193	.604	98.663
30	.164	.512	99.174
31	.150	.469	99.644
32	.114	.356	100.00

In order to answer research question 1, reference was made to tables 3 and 4.

The responses of the teachers were separated according to gender and their perceptions based on gender were factor analyzed. Tables 3 and 4 showed that nine and ten principal component factors were extracted from the correlation matrices, and rotated by the varimax criterion for male and female integrated science teachers respectively. The resultant 9 factors from male teachers' responses accounted for 62.23% of the total variance on the perception profile while 10 factors from female teachers' responses accounted for 68.99% of the total variance in the perception profile.

Research question 2:

What are the underlying relationships among the loaded variable with factors as perceived by the male and female Integrated Science teachers of Integrated Science Curriculum?

In order to answer the question, reference was made to tables 5, 6 and 7

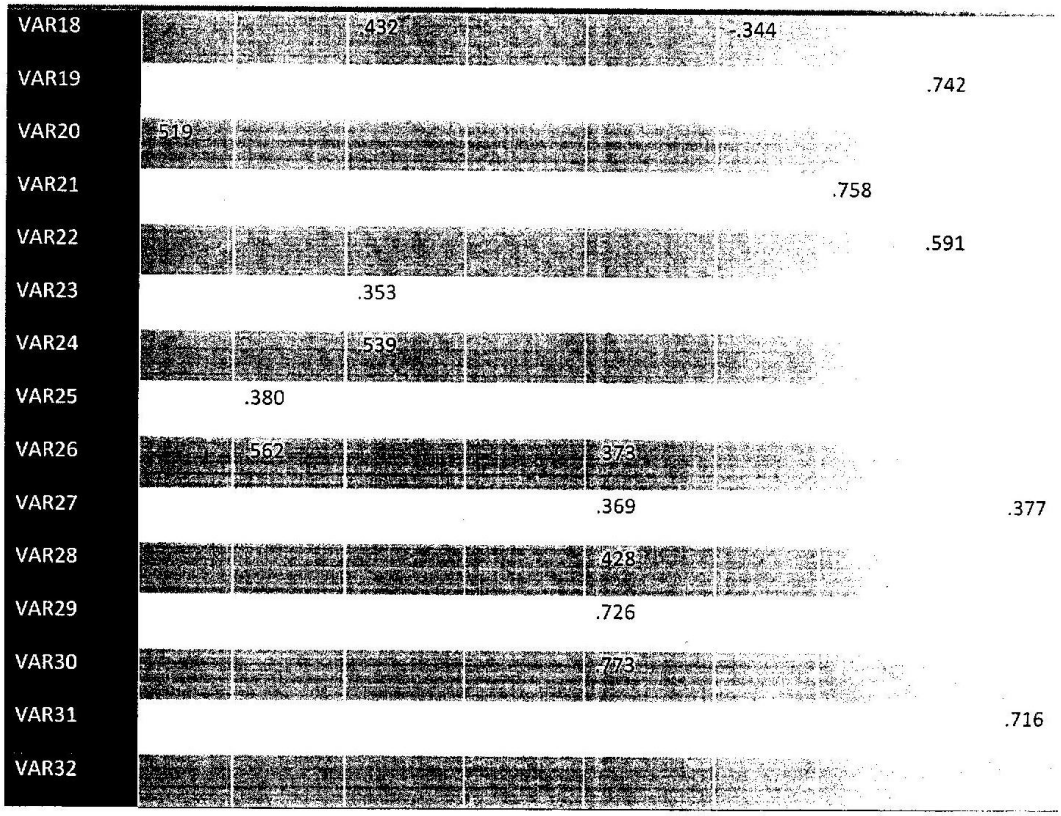
Tables 5 and 6 showed the rotated factors matrices of the male and female integrated science teachers.

The tables also indicated the factors interpretable and the underlying relationship that exist among the loaded items on factors. Apart from the fact that the number of variables that loaded on each factor are differing from

one another, a new construct with different name emerged completely from both the male and female perception profiles. Out of 9 factors identified from the male data only 6 factors were similar to that extracted from the female data as it can be seen in table 7. It was also observed that there were variability and inconsistencies in pattern of loading in the female data as against the male data, despite the fact that six factors were similar.

Table5: Rotated Component Matrix for Male

	Component								
	1	2	3	4	5	6	7	8	9
VAR1	.606								
VAR2	.509								
VAR3	.758								
VAR4		.664							
VAR5	.525								
VAR6			.745						
VAR7	.734								
VAR8							.745		
VAR9		.754							
VAR10		.619							
VAR11	.389								
VAR12			.730						
VAR13			.625						
VAR14				.710					
VAR15				.646					
VAR16						.685			
VAR17				.588					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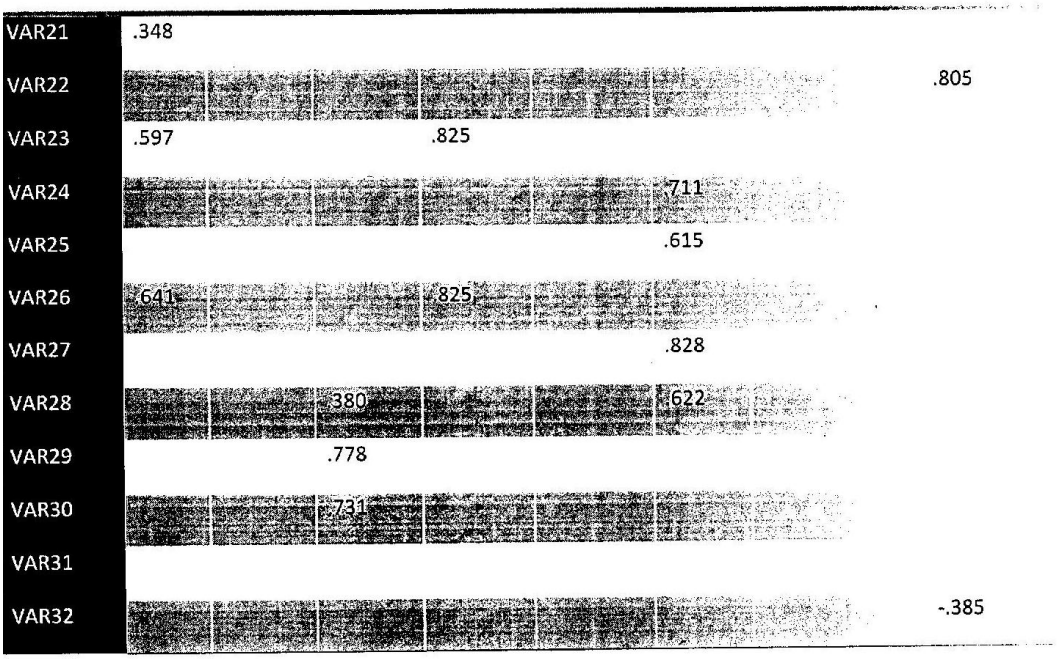
.432
-.344
VAR19
.742
VAR20
519
VAR21
.758
VAR22
.591
VAR23
.353
VAR24
539
VAR25
.380
VAR26
562
373
VAR27
.369
.377
VAR28
428
VAR29
.726
VAR30
773
VAR31
.716
VAR32

Table 6: Rotated Component Matrix for Female

	Component									
	1	2	3	4	5	6	7	8	9	10
VAR1					.549					
VAR2		.388				.519				
VAR3				.561						
VAR4							.592			
VAR5		.498		.447						
VAR6		.857								
VAR7					.611					
VAR8		.514								
VAR9								.376		
VAR10							.682		.375	
VAR11				.443	.366				-.364	
VAR12		.680								
VAR13	.432									
VAR14								.821		
VAR15								.481		
VAR16		.562								.399
VAR17	.413							.501		
VAR18	.800									
VAR19	.475									.580
VAR20	.733									


VAR21
.348
VAR22
.805
VAR23
.597
.825
VAR24
.711
VAR25
.615
VAR26
.641
.825
VAR27
.828
VAR28
.380
.622
VAR29
.778
VAR30
.731
VAR31
VAR32
-.385

	FEMALE			MALE	
Factor	Name	%Variance	Factor	Name	%Variance
1	Availability of resources for teaching of integrated science	9.6	1	Philosophy with meaningful objectives	9.4
2	Integrated science teaching methodology	8.7	2	Cooperative attitude of integrated science teachers	9.3
3	Development of basic skills in science	7.3	3	Teachers motivation	7.3
4	Conceptualization of integrated science curriculum	7.2	4	Integrated science teachers attitude to correction and change	6.9
5	Philosophy with meaningful objectives	7.0	5	Development of basic skills in science	6.7
6	Providing realistic science experiences	7.0	6	Integrated science teaching methodology	6.4
7	Teachers cooperation and parents in curriculum implementation involvement	6.8	7	Allotted time and students understanding	5.0
8	Teachers' attitude to correction and change	5.9	8	Students' readiness to learn	4.7
9	Effect of government policy	5.4	9	Providing realistic science experiences	4.6
10	Students' readiness to learn	4.1			

Table 7: COMPARISON OF TOTAL VARIANCE EXPLAINED FOR FEAMEL AND MALE TEACHERS

Table 7 shows the comparison of the total variance explained for male and female teachers' perception profile. There are nine and ten factors in male and female teacher's perception profile respectively.

Factors 1," philosophy with meaningful objectives and relevant contents" is the most important factor in the male profile and it accounted for 9.4% of the total variance, whereas the importance of the factor is relegated to the 5th position in the female data. In addition, it accounted for 7.0% of the total variance. Moreover, the three principal variables that define the construct in the female profile were variables 1, 7 and 11 (see table 6). These variables also surface among four others to define the same construct in the male profile. However, the correlation of these variables, var1 (0.549), var.7 (0.611) and var. 11 (0.366) for females has less correlation with the construct while variables, var.1 (606). Var.7 (0.734) and var. 11 (0.389) have higher correlation with the construct in the case of the male. These factors accounted for 36.72%, 53.87%, 15.13% variances for male variables1, 7 & 11 and 30.14%, 37.33% and 13.39% variances in variables 1, 7 and 11 in female variables respectively. The other common factors that appeared in both male and female profiles, but with different percentage total variance and correlations are," Integrated science teachers' attitude to correction and change", which is factor 4 in male but factor 8 in female. "Development of basic skills in science ", which factors 5 in male but factor 3 in female. "Integrated science teaching methodology", which is factor 6 in male but factor 2 in female. "Students' readiness to learn", which is factor 8 in male but factor 10 in female and "Providing realistic science experience", which is factor 9 in male but factor 6 in female. Even though these factors are similar there are some emerging differences as earlier pointed out. In male profile, it could be observed that var.18 (school always provide learning material/equipment for teaching integrated science) has inverse relationship (-0.344) with factor 6 that is "integrated science teaching methodology", factor. This could be explained to mean that male teachers perceived provision of learning materials/equipment for teaching integrated science as a very serious handicap for the choice of method for teaching integrated science. This finding is in agreement with Nwosu (1993, 2003) and Bassey (2002).

In male factors, factor 7 (Allotted time and students' understanding) explained about 5.0% of the total variance but this factor does not appear in the female profile. The factor explained 57. 46% of the total variance in var. 21, which is "Teaching period for the integrated science are not adequate" and 32.15% of the total variance in var. 8, which are the only two variables that loaded on this factor. Interestingly, there is a moderately high correlation (0.567) between the factor and var. 8. This finding revealed that effective teaching and learning could only take place when there is adequate time allotted to such activity. This finding is in line with that of Bankefa (1983), who reported that the periods for teaching integrated science were not adequate. In the same vein, factors 1, 4 and 5 emerged in female profile but did not come up in male profile as it could be seen in table 7.

Factor 1, "Availability of resources for teaching Integrated Science " takes precedence over all other factors in the case of female profile and accounted for 9.6% of the total variance explained but do not appear in male profile. This implies that female teacher perceived strongly that resources for teaching integrated science must be available before any other thing could be given consideration for effective implementation of integrated science curriculum. This finding is in agreement with the finding of

Balogun (1983) who said that the major constraint to effective teaching of integrated science subject has been material resources and the quantity and quality of human resources.

Factor 4 explained 7.2% of the total variance in the data for female. The factor has a correlation (r) ($0.443 \leq r \leq 0.825$) with variables 3,5,11 and 26. The factor also explained 68.06% of the variance in variable 26 and 31.47% of the variance in variable 3. These findings reveal that female teachers placed more premiums on the conceptualization of integrated science curriculum and this corroborates the finding of Asun (1983) who said that Integrated Science Curriculum is well conceptualized. Factor 9, "Effect of government policy" also featured in female profile with 5.4% variance but did not appear in the male profile. Variable 22 (Government policy changes often affect integrated science curriculum implementation) has a high correlation (0.805) with factor 9, while variable 32 (There are adequate teachers in my integrated science area) has inverse correlation (-0.385) with the same factor 9. Variable 11,"Teachers have the theoretical and practical knowledge and ability to teach integrated science curriculum" also correlates inversely(-0.364) with factor 9, which implies that government policy does not support adequate training and retraining of teachers of integrated teachers, according to the perception of female teachers.

The conclusion one could draw from this findings is that the female teachers perceived that government policy did not favour provision of adequate and retraining of the teachers of integrated science. This result corroborates Nwosu (2000) who reported that government has a big say on the operations of the schools and on how the schools are being run. An adage says that he who plays the piper dictates the tune.

One other interesting feature of the result is that, some variables combined with another to define some construct in male profile and the same variable combined with different variable to define a new construct in the female profile. From table 7, factor 2, which explained 9.3% of the total variance in male profile, is an integral part of factor 7 (Teachers' cooperation and parents involvement in curriculum implementation), which explained 6.8% of the total variance in the female profile.

The study revealed that male and female teachers of integrated science perceived the curriculum differently. This is in agreement with the finding of Tucker and McCollum (1997) who reported that basic characteristics of individual such as innate abilities, age sex etc and external influence such as education, experience and cultural effect, represent the sources and dynamics, which give rise to common, specific and errors of measurement factors.

Conclusion and recommendations

It could be observed that six out of all the factors perceived by male and female integrated science teachers of integrated science curriculum are similar, while some factors appeared only on the male

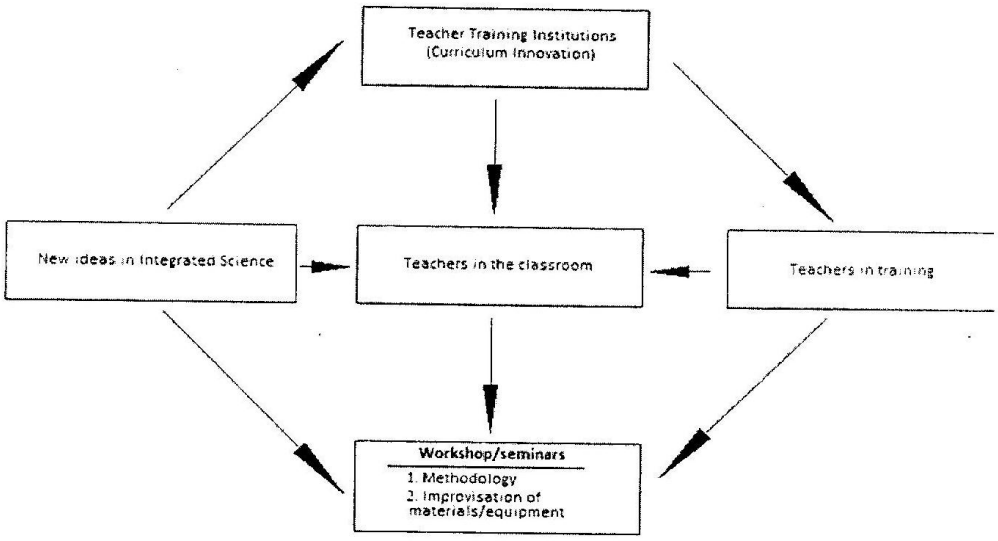
profile; others came up in the female profile. Among the factors, which were identified by both male and female teachers, are: philosophy with meaningful objectives and relevant contents, integrated science teachers' attitude to correction and change, integrated science teaching methodology and development of basic skills in science. The integrated science curriculum was brought to light in order to give an opportunity to every child to acquire at least, the basic knowledge and processes of science. Therefore, the teachers, the curriculum developers and the government are expected to play their roles in order to see that students understand the way of the scientist through engagement in activities that are consistent with these factors.

For the fact that nine and ten factors were identified from male and female perception profiles respectively is a pointer to the fact that gender disparity is still in existence in the teaching and learning of science in Nigeria. Therefore, the differences in the perception of both female and male teachers should be addressed by government policy and those changes in the policy that had not favoured effective implementation of integrated science curriculum should be reviewed.

The following practical recommendations are provided:

1. There is no gainsaying the fact that integrated science curriculum is not properly implemented by the teachers of the subject. In the light of this, effort should be geared towards improving on the training of teachers in our teacher training colleges and universities. The implication of this is that the curriculum of these institutions would have to be modified to include the methods of instruction recommended in the integrated science curriculum and how to carry out simple demonstrations by making use of appropriate materials and equipment.
2. The Professional Associations like Science Teachers Association of Nigeria (STAN) and the Ministries of Education have an important role to play in the organization of workshops and seminars for teachers in the field so as to update their knowledge particularly in the area of methodology and also in the use of relevant materials and equipment.
3. Parents, teachers and others stakeholders should be involved whenever integrated science curriculum is to be reviewed. This could be done by organizing public forum where all the stakeholders would be able to air their views on the on the curriculum. These views could then be collated and used to modify the contents of the curriculum.
4. All available science textbooks would need to be reviewed in line with the contents of the modified curriculum. Indigenous authorship should be encouraged and the use of local examples is likely to facilitate easy implementation and understanding of the concepts.
5. The teachers would need to be trained in the art of improvising some essential materials. Many schools in Nigeria are not adequately funded; this culminated into non-availability of materials and equipment needed to carry out demonstrations. If teachers could be trained on how to explore resources in their environment, this problem would be solved to some extent.

Suggested Training and Retraining Model



The above model would be useful in changing the professional status of male and female Integrated Science teachers. The new ideas in the integrated science curriculum would have to be incorporated into the curriculum of the teacher training institutions whose duties include graduation of these crops of teachers. Integrated science teachers already in the field would need to update their knowledge through workshops and seminars, which are to be organised by professional associations like the Science Teachers' Association of Nigeria (STAN) and the Ministries of Education.

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