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TEACHER'S PERCEPTION OF AN INTEGRATED SCIENCE CURRICULUM

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1 Introduction

The philosophy of science and science teaching together with the aims and objectives of science have undergone rapid changes over the years with changes in awareness of the necessity for mass literacy in science and better understanding of the subjects. These changes have taken place in order to produce a scientifically literate society and the required work force in the fields of science and technology to sustain the present and also for future generations. Recommendations of science educationists for such changes are usually based on research findings of numerous researchers, all over the world.

It is probably in recognition of this fact that led the Federal Government of Nigeria to introduce the 6-3-3-4 system of education in the country (Sec. 11, N.P.E, 1998). One of the improvement features of the policy is the compulsory teaching of integrated science and technology at junior secondary schools. The STAN (1970) *Curriculum Newsletter No 1* stipulated that the use of integrating principles in science produced a course (integrated science) which is relevant to student needs and experiences; stresses the fundamental unity of science; lays adequate foundations for subsequent specialist study; and adds a 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.

In an attempt to achieve these objectives, many science educators, governmental and non-governmental organizations, and professional bodies had made efforts towards improving the quality of integrated science teaching and learning in Nigerian junior secondary schools. Efforts have been made in the following areas: production of students' textbooks, workbooks and teachers' guides (STAN, 1984; Bajah, 1986 & Okebukola, 1990); conducting of researches that could facilitate integrated science teaching and learning (Udoh, 1998, and Ibole, 1999) and the provision of facilities for integrated science teaching and learning by STAN, UNESCO/UNICEF and government Ministries.

It is thus 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 (Odubumi, 1986 and Olarewaju, 1999). Researches in Nigeria have also shown that science teachers in Nigerian secondary schools do not show much commitment to their profession (Okpala and Onocha, 1990, and Olarewaju, 1999). Parents of students even think that the decline in science achievement of students in secondary schools might be traceable to deficiencies in teacher preparation (Okpala and Onocha, 1995).

There is no doubt the fact that the science teacher is the backbone and chief intermediary of any science program (Merrill & Butts, 1969). His classroom activities, understanding, attitudes, and interest among other things, determine to a large extent, the quality and level of his students' learning of science (Ramsey & Howe, 1969; Brown & Clark, 1960). The role of teachers in curriculum development and implementation has been well documented in literature (Connely & Ben-Peretz, 1980; Mc Cormick, 1992; Keiny, 1993,). For instance, Cornelly and Ben-Peretz (1980), described the teachers as "active implementers of the curriculum" and as "adapters of curriculum ideas". According to Sotonwa (1999), the extent to which teachers identify themselves with the curriculum ultimately determines whether the curriculum will benefit children in the school or not. In view of the above, it is clear that teachers have a more important role to play in the school system. Therefore, a deeper level of understanding is needed on how the integrated science teachers perceived the philosophy, objectives, contents, teaching materials, teaching methods of integrated science curriculum and the effect of Government policy on the implementation of the curriculum. A clearer picture of the ways they look at the integrated science curriculum will be of help in solving the problem of low achievement in integrated science.

It is thus necessary that the present investigators conduct a factor analytic research on the teachers' perception of integrated science curriculum. According to Kerlinger (1986) the factor– analytic procedure produces categories of items that result from empirically obtained relationships. These categories are produced because the factor-analytic procedure (1) identifies those questionnaire items that measure the same construct and (2) indicates the degree of association of the items with the constructs. The factor–analytic procedure thus allows for the least number of discreet variables to be identified.

2 Research design

An *ex-post-facto* survey design was adopted for the study. It involved the collection of data on teachers' perception of integrated science curriculum using an appropriate questionnaire. This design was used because there was no manipulation of independent variables.

2.1 Sample

The study sample consisted of junior secondary school integrated science teachers in Ekiti State, Nigeria. However, all junior secondary school integrated science teachers in the State were purposively selected. This consisted of 192 males and 111 females to make a total sample of 303.

2.2 Instrumentation

The only instrument for the study was a *Likert type questionnaire*, which was used for the purpose of data collection. The questionnaire was divided into two sections: Section A sought for personal information of the respondents (Qualifications, Area of Specialization, Gender, Teaching Experience, Name of school and Local government area of the school). Section B, was made up of 32 statements on integrated science curriculum based on philosophy, objectives, contents and concepts, government policy, instructional procedure, teaching materials and teaching methods being used, on a *4-point Likert scale* in which the teachers were to indicate the extent of their agreement or disagreement with each of the statements.

Three experts in curriculum studies validated the instrument and their suggestions and criticisms were taken into consideration when the final draft of the instrument was being prepared. The questionnaire was field-tested and the result was used to determine the reliability of the instrument, and it produced a *Cronbach coefficient alpha* of 0.75.

.3 Data collection

The data were collected through the administration of the questionnaire on ie respondents through the Area Education Officers in the 16 Local iovernment Areas of Ekiti State. Names were not requested so that anonymity vas maintained throughout the study. Adequate returns of the questionnaire vere, however, observed from the integrated science teachers.

!.4 Data analysis

Data collected were subjected to *factor analysis* by utilizing principal components factor extraction and orthogonal rotation by the varimax criterion. Factor analysis can simultaneously manage over a hundred variables, compensate for random error and invalidity, and disentangle complex interrelationships into their major and distinct regularities. It makes explicit and more precise the building of factor – linkages going on continuously in the human mind.

3 Results

What are those peculiar factors perceived by the integrated science teachers?

Table 1 shows a preliminary factor analysis of the teachers' responses to the items on the questionnaire, which was conducted to determine the minimum number of factors that accounted for the maximum amount of variance. In effect, this analysis was carried out to establish the number of meaningful factors. This was also in agreement with the scree plot (see figure 1), a procedure that consists of plotting the characteristic roots (Eigenvalue) against component factors that can be extracted from the correlation matrix, and then testing for a break in the resultant curve.

The preliminary application of the principal component factor extraction procedure revealed that 32 factors accounted for all the variances of the correlation matrices (table 1part a). However, from table 1 part b, the application of rotation by Varimax criterion, and figure 1, the scree plot, only 9 factors were nontrivial or meaningful. It was therefore concluded that 9 factors represented the minimum number of factors that accounted for the maximum amount of variance. These are the factors considered as peculiar

Component	(a) Initial Eigenvalues Total	% of Variance	Cumulative %	(b) Rotation Sum of Squared Loadings Total	% of Variance	Cumulative %
1	5.593	17.480	17.480	2.991	9.345	9.345
2	3.134	9.793	27.273	2.690	8.406	17.751
3	2.267	7.085	34.357	2.376	7.426	25.177
4	1.731	5.411	39.768	2.162	6.755	31.933
5	1.532	4.789	44.557	2.050	6.405	38.338
6	1.420	4.437	48.994	1.925	6.014	44.352
7	1.246	3.894	52.888	1.806	5.643	49.995
8	1.086	3.391	56.279	1.681	5.253	55.248
9	1.048	3.274	59.553	1.377	4.305	59.553
10	.990	3.095	62.648			
11	.868	2.713	65.361			
12	.825	2.577	67.938			
13	.805	2.515	70.453			
14	.782	2.444	72.897			
15	.745	2.328	75.225			
16	.724	2.262	77.487			
17	.693	2.165	79.652			
18	.628	1.962	81.614			
19	.617	1.930	83.544			
20	.534	1.667	85.211			
21	.503	1.570	86.782			
22	.493	1.541	88.322			
23	.462	1.443	89.765			
24	.458	1.430	91.195			
25	.444	1.388	92.583			
26	.416	1.299	93.883			
27	.405	1.267	95.150			
28	.379	1.183	96.333			
29	.334	1.043	97.376			
30	.304	.950	98.326			
31	.287	.896	99.223			
32	.249	.777	100.000			

Table 1: Total Variance Explained for Teachers of Integrated Science

factors perceived by the integrated science teachers. This result is in line with Blankenship and Moore (1977) who used the factor–analytic procedure to reduce 117 – science teacher need responses to 11 specific science teacher needs. This is also in agreement with Fraser, Okebukola and Jegede (1992) who used a factor–analytic approach to reduce 52 items for analyses involving individual students to 34 items. The result is also consistent with the advantage derived from using the factor–analytic procedure as reported by Kerlinger (1986). The advantage results from the analysis of the degree of association between all pairs of items and the number of discreet variables identified as a result of analysis of empirical data rather than as a result of intuition.

Table 1 part b shows that 9 principal component factors were extracted from the correlation matrices and rotated by the varimax criterion. The resultant 9 factors together, accounted for 59.55% of the total variance on the perception profile. Analysis of the high– loading variables on each of the 9 factors was undertaken from table 2 to determine which factors were interpretable and the underlying relationships that exist among the loaded items on factors. Those items or variables having a factor loading of 0.345 or greater were judged interpretable. The choice of these parameters as minimum loading automatically sets about 10% as minimum total variance in a variable accounted for by a factor before that factor can be regarded as being important to the variable. This indicates that any factor with a correlation matrix less than 0.345 with a variable is not significant to that variable. Fraser, Okebukola and Jegede (1992) had all their items with factor loadings greater than 0.30 for analysis while Onibokun (1981) also recorded only loadings of 0.30 and above for his items.

Table 2 presents the terminal solution of orthogonally rotated factors. Since it is an orthogonal factor matrix, it represents both pattern and structure matrix. That is, the coefficients in the table represent both regression weights and correlation coefficients. It is obvious from this table that most important determinant of variable 1 is factor 2 and that of variable 26, variable 27, variable 28, variable 29 and variable 30 is factor 1. Interestingly too, 68.75% (22) of the variables indicate factorial complexity of 1.

There are 8 variables (25%) that loaded moderately on two factors, indicting factorial complexity of 2, while only variable 12 indicates factorial complexity of 3. Two variables, variables 22 and variables 31 have no significant correlation with any of the 9 identified factors. This makes the identification and naming of the factors simple (Norman, Hull, Jean, Karin & Bent, 1975).

Component	1	2	3	4	5	6	7	8	9
VAR 1		.573							
VAR 2		.397	.364						
VAR 3		.737							
VAR 4					.545				
VAR 5		.526	.418						
VAR 6			.751						.473
VAR 7		.670				.748			
VAR 8			:445			.619			
VAR 9									
VAR 10									
VAR 11		.421	.436						
VAR 12			.398	.358	.415				
VAR 13				.388	.427				
VAR 14							.796		
VAR 15							.571		
VAR 16			.711						
VAR 17				.495			.411		
VAR 18								.479	
VAR 19								.761	
VAR 20		.472		.546					
VAR 21									.653
VAR 22									
VAR 23				.363					
VAR 24					.761				
VAR 25								.390	
VAR 26	.641								
VAR 27	.717								
VAR 28	.817								
VAR 29	.683								
VAR 30	.667								
VAR 31									
VAR 32				.715					

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization
Figures indicate Factor Loadings

Table 2: Rotated Component Matrix

What are the underlying relationships among the loaded variables on factors as perceived by the integrated science teachers?

Variable	Loading	Statement of items on the instrument
26	.641	The curriculum is adequately structured to equip the students to carefully observe and report the results of their observations
27	.717	The curriculum can build the students to organize scientific information and make predictions
28	.817	The curriculum is adequate to equip the students on designing experiments including controls where necessary
29	.683	With the contents of integrated science curriculum, students can be properly trained in explaining Phenomena where appropriate using models.
30	.667	The curriculum can build solid foundation for sound knowledge and techniques for further enquiry

Table 3a: Factor 1 Development of Basic Skill in Science

Variable	Loading	Statement of items on the instrument
1	.573	The objectives of integrated science curriculum are well stated
2	.397	The integrated science curriculum is more meaningful and significant to students and can improve their academic and vocational skills.
3	.737	The Nigeria philosophy and values for science and technology are well reflected in integrated science curriculum
5	.526	I understand various concepts, theories, principles and generalizations state in the integrated science curriculum
7	.670	The contents of integrated science curriculum are relevant to the students and well conceptualized by the developers.
11	.421	Teacher have the theoretical and practical knowledge and ability to teach the integrated science curriculum content.
20	472	The learning materials/equipment selected are of good standard.

Table 3b: Factor 2 Philosophy with Meaningful Objectives and Relevant Contents

Variable	Loading	Statement of items on the instrument
2	.364	The integrated science curriculum is more meaningful and significant to students and can improve their academic and vocational skills
5	.418	I understand various concepts, theories, principles and generalizations stated in the integrated science curriculum
6	.751	Teachers find it difficult to teach integrated science curriculum contents
8	.445	Students find it difficult to understand the contents of integrated science curriculum
11	.436	Teachers have the theoretical and practical knowledge and ability to teach the integrated science curriculum contents
12	.398	Teachers are not well prepared and motivated to teach integrated science
16	.711	I don't understand the method I could use to teach integrated science most of the time.

Table 3c: Factor 3Integrated Science Teaching Methodology

Variable	Loading	Statement of items on the instrument
12	.358	Teachers are not well prepared and motivated to teach integrated science
13	.388	Teachers always make use of teaching materials/equipment during the teaching of integrated science
17	.495	Teachers are involved in the selection of learning materials/equipment for teaching integrated science
20	.546	The learning materials/equipment selected are of good standard
23	.363	Government usually provides fund for the implementation of the integrated science curriculum
32	.715	There are adequate teachers for teaching Integrated science

Table 3d: Factor 4 Availability of Resources for Teaching Integrated Science

Variable	Loading	Statement of items on the instrument
4	.545	Teachers of integrated science are always involved in the curriculum planning process
12	.415	Teachers always make use of teaching materials/equipment during the teaching of integrated science
24	.761	Parents are not involved in curriculum implementation

Table 3 e: Factor 5 Involvement of Teachers and Parents in Integrated Science Curriculum Planning & Implementation

Variable	Loading	Statement of items on the instrument
9	.748	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.

Table 3f: Factor 6 Cooperative Attitude of Integrated Science Teachers

Variable	Loading	Statement of items on the instrument
9	.796	Teachers should be ready to accept blames or correction when the need arises during the implementation of integrated science curriculum
15	-.571	Teachers are ready to change or improve when the need arises.
17	.411	Teachers are involved in the selection of learning materials/equipment for integrated science.

Table 3g: Factor 7 Integrated Science Teachers' Attitude to Correction and Change

Variable	Loading	Statement of items on the instrument
18	.479	Schools always provide the learning materials/equipment for teaching integrated science.
19	.761	Students are ready to learn the integrated science contents
25	.390	Teachers always make their observations on integrated science known to appropriate authority (ies)

Table 3h: Factor 8 Students' Readiness to Learn and Adequate Provision of Instructional Materials

Variable	Loading	Statement of items on the instrument
8	.473	Students find it difficult to understand the content of integrated science
21	.653	Teaching period for the integrated science are not adequate

Table 3i: Factor 9 Allotted Time and Students' Understanding

An analysis of each of the 9 factors' cluster of items resulted in factor names being assigned, which best conceptualized each factor's high loading items. The resulted factors names are presented in tables 3, a - i.

4 Discussion

A components matrix is one of the results of factor analysis and this is shown in the table of coefficients that expresses the relationship between the measures and underlying variables. The entries in the matrix are called factor loadings as can be seen in table 2.

Factor 1: Development of basic skill in science

This factor accounted for 9.3% of the total explained variance, thereby producing the highest percentage of the total variance. The heavily loaded variables on factor 1 deal with skills expected to be acquired by a child exposed to integrated science. Each of the five variables that load high on this factor has a correlation ($0.641 \leq r \leq 0.817$) with the factor. In addition, factor 1 accounted for between 41% and 66.75% of the variance in each variable. This finding indicates that basic scientific skills must be well introduced in the integrated science curriculum in order to develop more scientifically literate students. This is in agreement with Okebukola (1983) who stated that students understand the way of the scientist through engagement in activities that are consistent with goals of science teaching and it is in line with the submission of Udofia (2002).

Factor 2: Philosophy with meaningful objectives and relevant contents

This factor accounted for 8.4% of the total variance. Most of the variables under this factor lean towards the philosophical foundation and the objectives of an integrated science curriculum. The heavily loaded variable 1 (0.573), variables 3 (0.737) and variable 7 (0.670) are concerned with the objectives, philosophy and the contents of integrated science curriculum respectively. Each variable has factorial complexity of 1 and has at least correlation $r = 0.573$ with factor 2. This result shows that the teachers perceived integrated science as a course which should promote scientific literacy among the young ones and this is measurable in terms of knowledge of the subject matter; acquisition of process skill; attitude to science as well as application to life situations. This finding corroborates the finding of Rutherford (2000) who enumerated four properties a science course content should have.

Factor 3: Integrated science teaching methodology

This factor explained 7.4% of the total variance. The two highly loaded variables (variable 6 (0.751) and variable 16 (0.711) on this factor centered on teacher's understanding of integrated science methodology. The implication of this finding is that, teachers as agents of change, because of their position in the school system must possess good knowledge of the pedagogy required for the implementation of integrated science curriculum. This is in line with the findings of Kathy (2000) and Gideon (2002) who claimed that integrated science curriculum at the JSS level is academic, vocational and comprehensive. Therefore, teachers with sufficient exposure and training in both content and pedagogy are required. The result also confirmed that the ultimate success or failure of integrated science lies in the hands of the classroom teachers. The finding of this study corroborate the research results of Udobia (2002) who reported that good pedagogical approach has a very positive and fruitful effect on the product as it assists the learners to learn well. Manouchechri (1997) and Schulman (1986) also asserted that knowledge of good pedagogy is complementary to rich knowledge of the subject matter or optimal performance of the learners and their teachers alike. This also corroborates the findings of

Oludotun (1981), Ivowi (1986), Grossman (1991), and Brown and Borko (1972).

Factor 4: Availability of resources for teaching integrated science

This factor accounted for 6.75% of the total variance; the variables that are grouped together under this factor measure both material, and human resources in integrated science teaching. All the 6 variables that loaded on this factor loaded moderately on more than one factor except variable 32 that deals with adequacy of teachers for teaching integrated science. Variables 32 and 20 have loadings of 0.715 and 0.546 on the factor respectively while the factor itself accounted for 51.12% and 31.25% of the variances in the variables respectively. This finding showed that both human and material resources must be available if the objective on which integrated science curriculum is based would be achieved. This is line with Ireyefoju (2002) who reported that the outcome of effective teaching learning process is determined by the quality, adequacy and appropriateness of the input resources. The highest loaded variable 32 also showed inadequacy of the teaching resources. This is in agreement with Balogun (1983) who reported that the major constraints to effective teaching of integrated science have been material resources and the quantity and quality of human resources available to teach the subject. This also corroborates the findings of Osobonye (1988), Nwosu (1993), (1998), (2000), Agusiobo, (1994), Soyibo, (1986), and Bassey (2002).

Factor 5: Involvement of teachers and parents in integrated science curriculum planning and implementation

The factor accounted for 6.4% of the total variance. It consisted of two heavily loaded variables bothering on teachers and parents involvement in integrated science curriculum planning and implementation. The two variables (variable 4, and variable 24) variances accounted for by this factor are 29.7% and 57.91% respectively. The loading of variable 24 showed that parents are not involved in curriculum implementation while the involvement of teachers in curriculum planning process (variable 4) is not encouraging. The implication of this finding is that teachers should be involved in curriculum planning and parents should also be involved in the implementation process. Teacher's involvement in curriculum planning would enable him to understand the curriculum better and this would lead to its successful implementation. This corroborates the findings of McCormick (1992), Keiny (1993), and Connely and Ben–Peretz (1980). The finding of this study also supports that of Sotonwa (1999) who said that the classroom teacher occupies that frontline position in the curriculum development and they should be involved in curriculum development and evaluation. This finding also revealed that parents should not be overlooked in the implementation of the curriculum. This corroborates the finding of Onocha (1985).

Factor 6: Cooperative attitude of integrated science teachers

This factor accounted for 6.0% of the total explained variance. The highly loaded variables have reflected the importance of cooperation among the teachers of integrated science and their relationship with other teachers in related subjects. This factor showed that cooperative work in class and research among integrated science teachers would make them more effective in their chosen profession. This result corroborates the views expressed by Bajah (1988) and Dogara and Ahmadu (2002). They claimed that scientific knowledge can always be sought from specialized science book and science specialists.

Factor 7: Integrated science teachers attitude to correction and change

Variables heavily loaded on this factor described teacher's attitude to correction and their flexibility to change. The factor has a correlation, $r = 0.796$ with variable 14 and it accounts for 63.38% of the variance in the variable. Variable 15 (teacher's readiness to change) also have a correlation of 0.541 with the factor. This result shows that teachers are not readily flexible to correction and change. Implementation of integrated science requires change in teachers particularly in the areas of knowledge, skills, attitudes and teaching strategies. Olagunju, Adesoji, Iroegbu and Ige (2003) opined that innovation in the classroom requires teachers with special skills and high level commitment who will teach with purpose and dedication. This finding is in agreement with the result of Adeyegbe (1986), who assessed teachers' performance in mole concept and found that teachers have basic but outdated knowledge of the mole concept. This finding also confirms the finding of James (1998) who reported that science teachers have to become accustomed to change and discontinuity

Factor 8: Student's readiness to learn and adequate provision of instructional materials

The highly loaded variables centered on students' readiness to learn the contents of integrated science curriculum (var.19, .761) and the availability of instructional materials/equipment (var.18, .479). This finding shows that availability of instructional materials/equipment for integrated science would definitely prepare student's mind for learning. This is in line with the finding of Ogunleye (1999) who reported that students develop negative attitudes to science due to absence of career incentives and opportunities to appreciate the role of Scientists. It is also in agreement with Akale and Usman (1993), who examined the effect of intensive practical activities on students' achievement in integrated science. The results of their findings showed that experimental group performed significantly better than the control group.

Factor 9: Allotted time and students' understanding

The highly loaded variable (var.22) has to do with teaching periods for integrated science with correlation (0.653). The second variable (var.8) that loaded on this factor has do with students understanding of the contents of integrated science. This result shows that the teaching periods for Integrated Science have a direct influence on students' understanding of the content of Integrated Science. This implies that if adequate period is given to the teaching of integrated science, definitely, students understanding will improve. This finding corroborates the finding of Onocha and Okpala (1985), who showed that achievement in integrated science is influenced by the amount of time spent on the learning task.

5 Conclusion and recommendation

The study has revealed that the perception that teachers have for the integrated science curriculum brought out nine factors that need to be seriously considered for effective planning and implementation of the curriculum. The teachers perceived that curriculum is adequately structured to equip the students with basic scientific skills, and that the contents of the curriculum are well conceptualized and relevant to the students. However, the problem of teaching integrated science is related to methodology, materials etc. It was also revealed that sometimes, teachers do not understand the methodology to be used in the teaching of the subject and they do not use adequate teaching materials and equipment during their teaching. As professional science teachers, they are expected to use appropriate methods, materials and equipment during their teaching if they want to achieve the objectives of the curriculum. Students learn better if appropriate methods, materials and equipment are used during teaching. The teaching of integrated science must therefore be done in an atmosphere where teacher understands the curriculum; he is motivated, knows the kind of method to use and uses appropriate learning materials. In such an environment, the quality of teaching would improve, and that would invariably affect the performance of students in Integrated Science.

The following recommendations are made based on the above findings:

1. If we sincerely want the spirit of scientists to be inculcated in the learners, both the government and the curriculum developers must seriously address the factors perceived by the teachers of integrated science curriculum.
2. Workshops, seminars and conferences should be organized for integrated science teachers, since teachers need to be exposed to various methodology, new strategies and new developments in the teaching of the subject.
3. There is the need to provide adequate qualified teachers, learning materials and equipment, textbooks etc. for the schools.
4. The teaching periods for integrated science in the schools should be increased from the present four periods (for both theory and practical) to a minimum of six periods per week. This would allow teachers to teach every aspect of integrated science effectively.
5. The attitude of teachers should change towards the teaching of integrated science. They need to be flexible to correction and change, if they are to make any impact on the students, since effective teaching and learning depends on the attitude of the teacher in the classroom.

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Abstract

The study was designed to factor analyze the integrated science teachers' perception of the integrated science curriculum. Data were collected from 303 junior secondary school integrated science teachers in all the secondary schools in Ekiti State, Nigeria through the area education officers using a questionnaire. Analysis of the data was carried out using a principal component factor analytic approach. The findings of the study revealed that, nine factors were extracted as peculiar factors as perceived by the integrated science teachers. The factors are: Development of basic skill in science, Philosophy with meaningful objectives and relevant contents, Integrated science teaching methodology, Availability of resources for teaching integrated science, Involvement of teachers and parents in integrated science curriculum planning and implementation, Cooperative attitude of integrated science teachers, Integrated science teachers attitude to correction and change, Students' readiness to learn and adequate provision of instructional materials, and Allotted time and students' understanding. Based on the findings, it was recommended that both the government and the curriculum

developers should seriously address factors perceived by those teachers if the spirit of scientists is to be inculcated in the learners.

Résumé

L'article reproduit les résultats d'une étude factorielle analytique (*principal component*) portant sur la perception de 303 enseignants en sciences nigériens en ce qui concerne un curriculum en sciences intégré. Les données de base ont été récoltées sur base d'un questionnaire. Les facteurs suivants ont pu être extraits: Développement de compétences de base en sciences, Philosophie pédagogique avec objectifs et contenus relevants, Didactique d'enseignement des Sciences intégré, Disponibilité de moyens et de supports didactiques, Implication des parents et des enseignants lors du planning et de sa mise en application, Focus sur la collaboration, Attitude en ce qui concerne l'évaluation et le changement, Niveau d'apprentissage des élèves et présence de matériel didactique, Temps d'étude acceptable et compréhension des élèves. Les auteurs adressent la recommandation suivante aux responsables du développement du curriculum et de la gestion : s'il était décidé de former les élèves de manière scientifique, il serait utile de tenir compte de ces facteurs, perçus comme relevants par les enseignants.

Samenvatting

In dit artikel wordt verslag gedaan van een factor-analytisch (*principal component*) onderzoek naar de percepties van 303 Nigeriaanse leerkrachten wetenschappen m.b.t. een geïntegreerd curriculum wetenschappen. Basisgegevens hiervoor werden verzameld door middel van een vragenlijst. De hiernavolgende factoren werden geëxtraheerd: Ontwikkeling van basisvaardigheden in wetenschappen, Onderwijsfilosofie met betekenisvolle doelen en inhouden, Didactiek van geïntegreerd wetenschapsonderwijs, Beschikbaarheid van onderwijshulpmiddelen, Betrokkenheid van ouders en leerkrachten bij planning en uitvoering, Gerichtheid op samenwerking, Attitude ten aanzien van evaluatie en verandering, Leerniveau van de leerlingen en aanwezigheid van leermateriaal, Toegestane leertijd en inzicht van de leerlingen. Aan curriculum ontwerpers en beleidsverantwoordelijken wordt de aanbeveling geformuleerd om, indien men bij de leerlingen wetenschappelijk wil vormen, met deze door leerkrachten gepercipieerde factoren rekening te houden.

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