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TRENDS IN SECONDARY SCHOOLS SCIENCE AND MATHEMATICS CURRICULA

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Abstract
This paper highlighted the trends in secondary schools science and mathematics curricula, describe the various curricula development reforms undertaken in science education, the systematic historical development of science education in Nigeria and re-appraise the progress of various research works undertaken thus far. The paper also provides detailed information on the various science curriculum projects undertaken at the secondary level of education in Nigeria, examines the progress and problems of science education in Nigeria at all levels of our educational system. There is no doubt that a good attempt has been made in this paper to position the status of science education content, teaching, learning and research in Nigeria. The information provided is valuable to science education students, teachers, researchers and policy makers as well.

Keywords: *Curricula, Science, Trends, Mathematics, Education*

Background to the Study

The Secondary Schools Science and Mathematics Curricula in Nigeria have been undergoing some changes in the last few years. As is the case with other Secondary Schools curricula in the country, our science and mathematics curricula are designed to meet the requirements of a public examinations body. The West African Examination Council (WAEC) very unfortunately, there is the urge to judge the suitability of our curricula by the performance of students at the west African School Certificate (WASC) examination. But a good science programme must be geared towards inculcating in students the need for a clear understanding of concepts in science and their capability to use science to solve simple problems for the good of man and society. Before independence, our secondary school science curriculum was very inadequate. Only very

few people had the opportunity of doing science. Emphasis in secondary school education was in the classes and arts. The products of our schools either took up office jobs (for which they were not adequately prepared) or aspired further in education. For various factors, the opening was extremely few and so the competition was very keen. Of the few who did science at secondary school, only a small fraction of them went further in science in higher institutions.

Soon after independence, the need for Nigeria trained personnel in the various areas of our national services became intensified. There was a dire need for qualified nationals in medicine, engineering and technology. More University were established to provide training programme in our areas of needs. Consequently a boost in science education at the secondary school resulted. Government policy at emphasizing the teaching of science led to a number of incentives being provided. Schools were provided with science laboratories and some equipment, liberals' scholarships for the undergraduates' science courses were available: special science allowances for science teachers in the secondary schools were provided. In an attempt to meet the demands of the time, there was a rush to teach enough science to many. Unfortunately, the schools were still inadequate equipped with science materials and resources.

Therefore, science was poorly taught at the secondary schools. Only few were good enough to benefit from the science courses and gain admission to the universities. Of those who did science course at universities, few of them returned to the teaching field to cope with the ever increasing demand of science education at secondary schools. In a situation of greater demands by society for persons competent in the science and a corresponding decrease in the ability of our schools to provide adequately for opportunities in science education, the defects in our school science curriculum became manifest and exposed. As we know, Mathematics is the language of science. The correlation between the secondary school science and mathematics makes the defects of our mathematics curriculum identical with those of science. In this paper, therefore, science would be regarded to include mathematics unless otherwise specified.

In attempt to rectify the identified defects of our science curriculum, some bodies have played very prominent roles. The Science Teachers' Association of Nigeria (STAN) and the Comparative Education Study and Adaptation Centre (CESAC) need some particular mention because of the project which they have evolved in the process of trying to find some solutions to the problems. Their interactions with other relevant bodies and the society in their curriculum development efforts will be discussed later on. An analysis of the identified curriculum projects in science and mathematics together with some proposals for science and mathematics curriculum for the 1980's will be given.

Defects of Science and Mathematics Curricula

Some defects in the contains and organization of our science curriculum were identified. For the contents, we had a combination of disjointed topics in each of the science subjects with no unifying concepts to make both teaching and learning easy.

General Science: the general science taught in the lower forms of the secondary schools was a mere selection of some topics from biology, chemistry and physic. There was no clear criterion for the topics so selected. In most cases, the general science courses degenerated into a course in biology with little chemistry and hardly anything of substance in physic. There was no attempt to relate some topics to others; no effect was made to relate the learning experiences of the students to their immediate environment and life encounters. As a result, there appeared to be very inadequate preparation for the science subjects taken at the upper forms of secondary schools.

In organization, schools had no personnel specially trained to handle general science. This may be due to the rather 'ad hoc' nature of the content. In most cases, the teaching was done by a teacher with interests in biology. In some cases, a person interested in chemistry took the course; interest in physic was least considered. This order may be due largely to the fact that there are usually more biology teachers than chemistry or physic teacher. As it were, the interest of the teacher dictated the scope, content and emphasis of the general science course. Thus the foundation course for science in the upper forms of secondary schools was defective.

Biology, Chemistry and Physics

In the upper classes, the contents of the science were as stipulated by the examinations body. The curriculum did not appear to meet the needs of the society which they school served. Since emphasis was in passing the WASC examinations, there was rigidity in teaching only what was mentioned in the syllabus. The contents were designed mainly to satisfy requirements for further studies in the subject areas. Consequently, only a small fraction of the school population benefitted from the course as the learning experience acquired by the majority served little or no purpose in their interactions in the society. No proper scientific skills and attitudes were acquired by the students. The orientation of the course and the teaching approaches were unsatisfactory. In most cases, teaching was the most interaction of student with teachers, chalkboard and textbooks. Learning was accomplished by recitation in majority of cases. There was a parroting of information or attempts to build concept within the learning by mechanical or forced means. Such concepts never lasted; they were forgotten soon after their use in an examination environment. The carry forward of concept to future en-counters in life became difficult or impossible. In this short of situation, the application of science to solving problems of the society was far from realization. But such application is essential for any attempt at being sufficiently self-reliant in the production of our goods and service.

Mathematics

The importance of mathematics is how the fact that there is hardly any subject that does not require the knowledge. This is one of the reasons for making mathematics compulsory at the secondary level. Initially, secondary school mathematics involved studies in Arithmetic, Geometry and Algebra, separately taught in the school and likewise examined at the school certificate level. There was the additional mathematics meant for a few talented ones who may continue studies in science and engineering in instructions of higher learning. Here Co-ordinate Geometry, Trigonometry, Calculus and

Mechanics formed the basic courses. Because of the demands for mathematics is so many areas or activities in the society, it soon became evident that the contents of the Secondary School Mathematics curriculum was inadequate. The large number of students taking mathematics made the manpower shortage in mathematics education very acute. All the efforts by the few teachers in the field could not improve the situation. Mathematics was taught as poorly as the other science subject; no attempt at concretization of the concepts being taught was made. There was a popular belief that mathematics was very difficult and meant for few gifted ones. This produce a kind of apathy in learning on the of majority of the students. Many of the teachers cared less as they appeared satisfied with the aura of toughness surrounding the few mathematics masters.

Following the advice of a new approach in mathematics teaching, a big confusion arose as to which of 'traditional' and 'modern' mathematics should be taught. As usual, the examinations body stipulated requirement in both versions. The conflict between the two versions caused confusion amongst the few available teachers and in the process of trying to proclaim the merits of one and decry the demerits of the other, the student became less enthusiastic and more incapable of performing well in either one. In a critical analysis of WASC result in Mathematics up to 1976, a decline in the performance of student was observed! Whereas 'modern' mathematics emphasis concepts formation and logical thinking. 'Traditional' mathematics emphasis manipulative skills. A detailed discussion of the defects of both mathematics in relation to our national needs for development is contained in Ozoro (1977)

Identified Curriculum Projects:
As a result of the identified defects with science and mathematics curricula in the country, a number of interest bodies drawing on the available manpower in the fields, set out to rectify the situation. In science, the STAN had identified the inadequacies of our secondary school science programme long before any other group. Unfortunately, the association lacked fiancé and was not able to organize as a member spread all over the country, for any effective reforms strategies in science until in 1968. It seems, therefore, that the story of our science curriculum reform may well have its formal origin on the event of 1968 when STAN and GESAC started their joint effort. Before this time, however the first education began in 1963 with the establishment of the Comprehensive High School, Aiyetoro.

Soon after its establishment, a group of Nigerian teachers and science educationists from Harvard University in U.S.A. set out to develop a new general science course for the junior forms in the school. The outcome of this group's effort played a very useful part in the development of the science curriculum reforms that began in 1968. We shall discuss this further in this paper.

CESAC was established at the University of Lagos in 1967 with an initial grant from the ford foundation on the approval of the Federal Ministry of Education and National Universities Commission. With STAN'S desire to improve science education at the secondary school level, a co-operative efforts between STAN and CESAC lewd to the

formation of science curriculum development Communities in 1968. The product of these communities led eventually to the STAN Nigerian Integrated Science Project (NISP) and the CESAC'S Nigerian Secondary Schools Science Project (NSSSP) in Biology, Chemistry and Physic. These two projects are now being used in secondary schools.

Following the defects in mathematics curriculum mentioned earlier, CESAC evolved the Nigerian Secondary Schools Mathematics Project (NSSMP) later events in mathematics education have rendered this project in-operative. It is my intention to discuss this project later on because of its effects on the recently approved national mathematics syllabus for secondary schools.

The Nigerian Integrated Science Project (NISP)
The NISP was developed between 1986 and 1978, three curriculum Development Committees in biology, Chemistry and Physic were formed at the STAN annual conference held at the College of Education, University of Lagos, Lagos. These committees were charged with the responsibility of developing syllabuses for an integrated science course for forms 1 and 11 and for Biology, Chemistry and Physic course for forms 111, v. members of the committees were drawn from STAN, CESAC, Ministries of Education with STAN providing most of the members. On the financial aspects, CESAC provide the fund from a financial grant by the Ford Foundation through the Ministry of Education.

By 1969, the joint effort of the committees resulted in the STAN integrated science syllabus later published as STAN Curriculum Development Newsletter No. 1. As soon as the syllabus was produced, many schools started using it. It was obvious that some instructional materials based on the syllabus were needed. Before STAN could produce any one, some STAN members had written some texts based on the new syllabus. At the moment, there are four sets of books based on the syllabus. In actual fact, none of these has been produced in accordance with curriculum development practice. STAN could not afford to trial test the NISP materials for other reason. In the first instance, there was no money to finance such a process of teacher training, trial testing and feedback before final edition of the texts.

Secondly, books produced by some members were already being used in the schools without any previous trial testing. Also to be considered in the fact that STAN needed money to finance many other activities which it should perform as a professional body interested in the development of science education in our secondary schools.

Despite the above defects in the process of developing NISP, one still has to regard it as our identified project in integrated science. For at least, the syllabus was developed through a rigorous process of preparation. The NISP tries to integrate aspect of Biology, Chemistry and Physic in anuntitled course through the major concepts of life, energy and matter. It involved a few fact, followed by a series of activities aimed at stimulating student interest in science and providing a real basis for the understanding of the concepts being taught. As discussed elsewhere 3, the NISP is a radical departure from the

former course in general science and its novelty is the fact that so much science is learnt from the well- strutted series of activities built round different themes 4. There has not been any formal evaluation of the enrichment of students' knowledge of science through NISP. I am not aware, either of any feedback on it. But from my discussion with some science teachers in the country, it appears that although no training courses are given to teachers on the use of the NISP, many feel confident and satisfied with the teaching course.

However, many feel that NSIP is not integrated enough. In the expected revision of the project, such a criticism is bound to be duly considered. It may be pointed out that complete integrated is not possible and that the entire project must be considered in assessing its degree or integration

But the NISP appears to have provided a basic for a sound science education in our secondary schools. The contents and orientation of NISP are consistent with modern trends in science curriculum. As we must all know, it is not all roses here. The usual problems of lack of personnel, the high mobility of the few science teacher in our schools and lack of training in the use of the project (especially to newly recruited teacher who may handle the subject) are all possible sources of poor implementation of the curriculum programme. All the same, there is hope of improved science resources and materials through frequent and effective inspection and supervision. With this and a proposed revision of the NISP, greater avenues for more effective utilization of the project for better educational outcome may be provided.

Based Science for Nigerian Secondary School (BSNSS)
Soon after the establishment of the Comprehensive High School, Aiyetoro members of its science department set out to design a general science syllabus for form I and II. In collaboration with Nigeria and Foreign educations, a basic science programme was developed between 1982 and 1966. In developing this programme extensive classroom testing of the material at the Comprehensive High School, Aiyetoro was undertaken. The materials were printed in two volumes in the form of teachers' guides. The programme is a 'laboratory oriented, child center activity course designed to make pupils think rather than accept blindly what the teacher says'. This was the first attempt to depart from the traditional method of teaching science in our secondary school. The philosophy of 'doing science the way the scientist do it was very apt. The underlying theme of the programme is energy transfer and this could be seen through the structure of the syllabus. The designers of the programme recognized the leading role has to play in developing in the student intended educational outcomes. They did not approve of a text for the students as they felt this could distract them from the actual process of doing science. Enough information was provided for the teacher to enable him direct the activities of the students effectively.

Between 1966 and1968, a nationwide trial testing of the materials for their suitability for use in Nigerian Secondary Schools was undertaken. Through regular visits to pilot school by staff of CESAC and science department of the Comprehensive High School, Aiyetoro, valuable feedback was collected, leading to a feedback conference in December 1969 at Aiyetoro. While there was no change in the philosophy and basic theme of the programme, the feedback was conference led to a through revision of the materials and the combination of the two volumes into a single one. The materials were re-structured to become suitable for 'teachers in secondary schools, crafts and technical schools and for the students in Teachers Training Colleges' this edition, published by CESAC in 1973, is still available for use in our schools.

The materials are very well written and the philosophy followed throughout. The fact that there are no student's textbook to go along with the teachers' guide may be a very serious departure from the formal procedure. But the intension is clear and sound, educationally. Student are expected to record their observations and with the teacher's guidance, produce their own text in the form of a rough book. At any stage of the course, this should give an up-to-date story of their exposure of science. In a situation where funds are not so readily available for curriculum development work, and in a society where emphasis is very much on students having their own text for use, it is perhaps a serious mistake to have catered only for teachers in this basic science programme.

The CESAC's basic for Nigerian Secondary Schools have be designed to adequately prepare student for the form 111 science course in Biology, Chemistry and Physic. It is the only integrated science programme that has been developed through the proper curriculum development processes in this country. Whatever is contained in the present volume has undergone copies testing and re-assessment by experts in the various field of science. As there are many student's texts on integrated science in our school, the BSNSSS will serve as a very valuable reference materials for the teacher in integrated science. The influence of the basic science programme on the STAN integrated science syllabus is one of its major contributions to the development of science education in our secondary schools.

The Nigerian Secondary Schools Science Project (NSSSP)

In August 1969, CESAC organized a science Curriculum Development Conference at the University of Ibadan with the aim of preparing some Nigerians with the skills necessary for designing and producing materials in secondary school biology, chemistry and physic. Following the conference was a writing workshop held at the Comprehensive High School, Aiyetetoro in 1970. The STAN syllabus in biology, chemistry and physic were slightly modified and textbooks written on them between 1970 and 1972.

The NSSS Project has an examination syllabus in each of biology, chemistry and physic together with students' text and teachers guide. The project combines theory with experiment in science as a basic of ensuring the development of scientific skills and attitude in students. The project has followed the curriculum development processes of syllabus preparation, writing of instructional materials, assessment at a critique

conference, organization of teacher training courses, trial testing and feedback leading to a revision of texts and final production of materials for public use. As stated earlier, the syllabus arose from the work of relevant committees which were formed in 1986. The trial testing initially started in four carefully selected school and so far useful feedback have been obtained to necessitate some revisions of the text. The revised texts are at the stage of going to the publishers. The NSSS Project has adopted the conceptual approach in the designed of the syllabus. Compared with the WAEC syllabus at the time, CESAC syllabuses were radically different; they resulted in a curtailment of some topics and the introduction of new ones. The major concerned used in structuring the syllabuses are Motion and Energy for Physic; Structure, Energy and Periodic Classification for chemistry; Nutrition, Energy Production, cell behavior and Ecology for biology. In all cases, relevance of the subject to the society in terms of application is emphasized. Instead of the usual lecture method, followed by the separated practical's, of teaching science in secondary schools, the discovery method is suggested. Thus active students participation through experimentation and discussion, with the teacher playing the role of a leader and not a preacher is encourage. This student activity oriented nature of the project made it very distinctive and innovative in the country. It has provided an opportunity for a transfer of learning experiences from theory to practice; a unique chance of students 'doing' science instead of 'reading' science at school. The philosophy of the project and the consequent effect on student and teachers have been analyzed.

In the project, the texts are deliberately loaded with students activities to ensure understanding of the concepts being presented and to develop in student the right scientific skills and attitude. The teacher's guide contained the objective of each chapter, some hints on the students texts and some test questions for possible evaluation of their achievement in the courses.

The reaction to the NSSS Project have been encouraging. The programme started in 1971 with only four schools. Now there are 60 functioning pilot schools, 30 associate pilot school and 19 voluntary schools. While only 3 schools entered candidate for the WASC examination based on the project syllabuses in 1974, number rose from 29 in 1978. From answer to our questionnaires and judging from discussion with teachers in our pilot schools there appears to be a conviction that the course, if properly followed, are capable of producing students of superior understanding of science. The WASC result of schools taking the project are encouraging. However, no proper evaluation of the project has been carried out as such. All the same, the influence of the project on the science programme in secondary school is positive.

In order to maintain an acceptable standard of presentation of the project materials to our students; long vacation science courses are organized every year since 1975 for our science teachers. Attendance at such courses is one of the requirement for stating the course in schools. During the courses, teachers are introduced to the contents and philosophy of the project. They undertake individual project in physic where they improvise apparatus or design simple devices for demonstrating important concept. In chemistry and biology,

group projects are undertaken aimed at providing excellence in the useful demonstration of relevant concepts. At the end of each course, each participant is given a chance to evaluate the project and the training courses with a view to our making some improvement.

Reactions at these courses have been very useful indeed.
So far, the WASC examination on the project has not reflected the entire intentions of the designers. However, an analysis of the past papers shows a remarkable improvement over the years. As at now, the syllabus are only slightly different from the WAEC's situation which arisen from the review of the WAEC syllabuses. There is some criticism of the project texts. Most of these have been taken into consideration in the revision just completed. When the revised editions are out, it is likely that most of the objections would have been considered to the satisfaction of our teachers. However one of the problem with the implementation of the project lies with our teachers. The demands for real preparation, in terms of time and energy, is great. Some teachers find no reason for choosing a more demanding course; yet, it is only through a student-activity oriented science course that a sound foundation may be laid for beneficial achievement in science and technology education in this country. It is for this reason that the project is being accepted by an increasing number of schools and people in this country.

The Nigerian Secondary School Mathematics Project (NSSMP)
In an attempt to resolve the conflict between 'traditional' and 'modern' mathematics in the country, CESAC evolved a mathematics project. Having observed Centre took the first a step of defining the objective of secondary school mathematics education in the country.

The six objectives determined at the workshop organized by CESAC are as follows:

i. To generate interest in mathematics and provide a solid foundation for everyday living.
ii. To develop computational skills and foster the desire and ability to be accurate to a degree relevant to the problem at hand.
iii. To develop precise, logical and abstract thinking.
iv. To develop ability to recognize problems and to solve them with related mathematical knowledge.
v. To provide necessary mathematical background for further education.
vi. To stimulate and encourage creativity.

Looking at this objective, it is obvious that a related mathematics curriculum must contain aspects of both 'traditional' and 'modern' mathematics. The project syllabus was then structured around 8 major topics of fundamentals ideas, Number, Algebraic processes, Statistics and probability, vectors, logic, space and analysis.

The project developed both examination and teaching syllabuses, and instructional materials for 6-year teaching programme. These materials could not be published as a national mathematics syllabus has now been developed and approved for use in all schools. The CESAC's mathematics syllabus was considered during the development of

the new mathematics syllabus.

The structure of CESAC's Mathematics syllabus is consistent with modern trends in mathematics education. It is intended to be taught in a logical sequence and with enough student activities to make the concept real and perceptible. Mathematics is an ordered system and unless the teaching reveals this order, its understanding may be fraught with difficulties and frustrations. A very good starting point is sets, which logically leads to numbers, Arithmetic, Algebra, Geometry, Calculus, etc. within this sequence must be built abstract thinking computational skills and creativity. When achievements in these areas are matched with understanding of concepts in science and the attainment of scientific skills and attitudes, a solid foundation would have been laid for future developments in science and technology.

The Present State of Science & Mathematics Curricula

Both the NISP and NSSSP are being used in schools. The NISP has a very large population of user. It is to be use in our junior secondary in1980, it would be possible to start testing the materials in September 1980 so that by September 1983,those who go to the senior secondary schools would have had the preparation to star trials testing the new science materials for the Senior Secondary Schools. The NSSSP just revised is still for the present system and it is expected that new materials for the senior secondary schools would be ready for use by September 1983.

A comparison between present WAEC and CESAC syllabuses and their forms in 1973 shows a progressive movement towards a common syllabus in each of biology, chemistry and physics. Whereas the CESAC syllabuses were radically different from WAEC's in 1973, they are now very much the same in content. Recent workshops organized by the federal ministry of education have produced a standardized list of science equipment in biology, chemistry and physics. This list intendent to be approved by government as the minimum item of science equipment to be provided in our secondary schools. One of the aims of providing such as a list is to reduce wastes arising from the purchase of equipment not crucial to the effective teaching and learning of science programme.

In mathematics, the new national mathematics syllabus is to be introduced into our school soon. Arrangements are being made for teacher training courses in the syllabus to begin in 1979. Strategies for a national network of training courses leading to early effective implementation of the new syllabus, element of the so called 'modern' mathematics are excluded from the junior secondary school programme. Student activities are suggested to aid teaching and learning processes; the objectives of each topic are clearly defined to indicate the teachers the desired direction to be followed in the new programme.

Apart from the inadequate supply of materials resources for the effective teaching of science in our Secondary School, the problems of personnel in our schools is very serious, despite all the effort of government. In many schools, there are no qualified teachers to teach science to our children. The rate of production of University and NCE science

graduates is very low. Only a few university science graduates take up teaching as a last resort while some NCE science graduates, attracted by outside inducement available to them desert the teaching profession. While the demand for science education is very high, the provision of laboratories, equipment and personnel is low. Many people who ought not to teach science in our schools are there doing more harm than good. The good ones are few and probably not satisfied with the service conditions. The outward mobility rate from the classroom has been increased y the expansion of the federal Inspectorate. It is not clear whether the expansion in the face of such acute shortage of science teachers is the best alternative in the circumstances. If standards are set for a project and there are no people to execute it, it become irrelevant to organize qualify control. We cannot depend on foreign science teachers to execute our science project. Those who are good at science teaching must be encourage to remain in the classroom without any loss of motivation.

Proposals

Having seen the trends in our secondary school science and mathematics curricula for the past few years, and having regard to thee well known problems facing science and mathematics teaching in this country, it is necessary to make some suggestions aimed at reducing these problems. Elsewhere, a detailed discussion of a number of proposals are given. It is sufficient here to consider the needs in our secondary school science programme stated at various sections of this paper and recommend as follows:

1. In order to effectively teach integrated science in our school, there is need for specialist in integrated science to be provided. As a start, integrated science teachers could produce at NCE level at our colleges of education. The Universities should also consider introducing a B.Ed. degree programme in integrated science.
2. In view of the very large number of student expected to span our secondary schools in the 1980's a new science curriculum for mixed ability rage of student should be developed. While it is true that we have ability ranges in our school now, the situation will be radically different in the 1980's. we need, at that time, to consider the individual interest of the students more than we are doing at present
3. To achieve 2 above requires a carefully planned set of activities involving people with expertise in relevant fields. This cost money, energy and time. In order not to dissipate our efforts by working independently towards the same goal, there is need for national syllabus in each of biology, chemistry and physic with the common underlying philosophy. The advantages of this are many and obvious. These includes saving in time, energy and money through the use of our most disposal and expert science educators.
4. For the science programme to succeed, we need adequate equipment and personnel. It is possible to produce the personnel overnight. These to teach science would most likely be products of our secondary schools who have gone for further training of science and science teaching. Therefore, there is need for the selection for a new schools for intensified science teaching. To start with, about 10 schools may be selected in each state to be properly equipped and well-staffed with top science teachers. In these schools, special one-year remedial science courses should be

organized for school certificate holders, to accelerate their admission into the universities and colleges of education to study science education at government expense.

In order to stimulate good science teaching in secondary schools government should make available substantial annuals grants for funning workshops and training courses for science teachers. Such special grants should go to the science professional bodies, curriculum development centers and the institutes of education for the updating and professional growth of our science teachers.

5. While it is recognized that every sector of the economy is important, it is true that the effective production of goods and service depends largely on science and technology. The base provided at the secondary school must be broad, strong and rich in ability and quantity. To attain this and maintain it, we need dedicated Nigerian Science Teaches who must be wanting knowledge, ability and status. To enhance the status of our science teachers and attract more into the field, they should, in addition to the science allowance being paid to them, be granted special annual incremental credits. For example, instead of the usual one step on the salary grade level a double-step rise may be granted.

Conclusion

The science and mathematics programme in our secondary school have grown from a kind of 'ad hoc' selection of topics to logically sequenced topics based on sound educational objectives. Our programme now aim at developing conceptual and logical thinking, skills and attitudes necessary for achievement in science and technology. Even greater challenges await us as we implanting our new national policy on education. We have the potential to succeed we need articulated efforts. The few suggestions given are capable for producing a solution to some of the problem identified.

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