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An Evaluation of Teachers' Implementation of the Innovative Science Curriculum in Secondary Schools of the Eastern Region of the Democratic Republic of Congo.

Dr Habimana Mvukiyehe .Athanase[1], Dr Benson N. Kinuthia[2] and Prof Yona Balyage[3]

[1]PhD, Department of Education , Curriculum and Teaching, University of Eastern Africa, Baraton, Kenya
[2]Senior Lecturer ,Department of Education, University of Eastern Africa, Baraton, Kenya
[3]Professor, Department of Education, University of Eastern Africa, Baraton, Kenya

ABSTRACT

The study intended to evaluate the teachers' level of implementation of the Innovative Science Curriculum (ISC) in public secondary schools of the Democratic Republic of Congo in the Eastern Region of the Democratic Republic of Congo (DRC). The study focuses on (1) the evaluation of the level implementation of the ISC and (2) the way teachers impart into the learners the basic skills of the ISC as recommended by the National Board of the Curriculum(NBC), namely: (1) logical mind; (2) creativity; (3) scientific curiosity; (4) initiative; (5) manual ability; and, (6) use of tools. To achieve these objectives a sample of 174 teachers was selected in three provinces of the Eastern Region of DRC namely: Maniema, North-Kivu and South-Kivu where 140 returned the questionnaire. The instruments used to collect data were semi-structured questionnaires and interviews schedules. The semi-structured questionnaire was piloted in two schools of Tanganyika province and the computed Cronbach alpha of .858 judged the questionnaire good to yield reliable results. The validity of the instruments was determined by a team of experts who judged whether the instruments covered the content of the entire study. The teachers level of implementation of the ISC was determined using the Concern- Based Adoption Model(CBAM) which uses 8 levels to implement the innovations of a curriculum as mentioned in Armstrong (2003): (1) Level 0, none use; (2) level 1: Orientation; (3) level 2: Preparation; (4) level 3: Mechanical use; (5) level 4a: Routine; (6) level 4b refinement; (7) level 5 integration (8) level 6: Renewal. The scale assessed the actual level of teachers' concern in the process of implementing the ISC. The results indicated that science teachers were implementing the ISC at Use level. However there were some science teachers who failed to implement the ISC at Use level due to the lack of training on how to implement it. The study recommended to the National Board of Curriculum (NBC) of DRC to increase the sessions of training to enhance teachers' competence in the process in implementing the ISC.

Keys words: Innovative Science Curriculum, Level of implementation, Basic Skills

Background of the Study

Science curriculum is being given a significant role in the area of education Holton, (2019) explains that since 1990s, science education has been given an acronym STEM (Science, Technology, Engendering and Mathematics). STEM is an important study as is connected to the general education of citizens and because of its contribution to an understanding of the natural world. The important role of science in various countries has led to the reform of the system of education to adapt to the demand of society. The reform of science curriculum for two decades, focused on science oriented subjects in many countries of the world. In Indonesia Widiyatmoko and Shimizu (2017) reports that the development of the conceptual understanding in science is important in today's word as it gives to a learner a clean and scientific process of handling issues of life. Science curriculum was also valued by the United States of America, (USA). According to the Next Generation Science Standards (NGSS, 2013), implementing science curriculum helps prepare graduate that will rigorously be committed to their carriers. In this line, employers will hire workers scientifically skilled in specific content areas but also the same workers will be able to display competencies such as critical thinking, problem-solving, higher-order-Thinking among others. In turn, when these skills are applied to socio-economic life, then all sectors of the life will be developed. There is a connection between science and technology. Munikwa (2016) stressed that science and technology have become ways that boost the development. In that perspective the government of Pakistan developed a curriculum that fit the 21st century and the current digital world. Such curriculum was mainly centered on science and technology as tools of economic development (Nandwani et al., 2021).

African countries considered science as a tool to boost national economy. Nsengimana et al. (2014) reported that the government of Rwanda implemented an outcome based curriculum focusing on science subjects to develop into youths skills that would boost the economic development of the country. In the light of curriculum reforms, Obanya (2014) argued that on the attainment of independence, every country in Africa tried to address the education policy and practices most suited to its nation needs. However, the content of the address of those issues was questionable. Cleary stated the answerable

questions were: (1) what should school, classes, teachers, leaners, parents and communities do to ensure changes desired by the reform takes place? (2) How should teaching and learning be promoted to ensure that desired learning takes place? (3) What should be the appropriate materials to promote teaching and learning, (4) what suitable knowledge, values, attitudes and societal patterns to be inculcated into the learners to bring about the desires leaning? Therefore, the newly independent country reformed their national curricula to meet the demands of their citizens.

In the Democratic Republic of Congo (DRC), the need of developing science curriculum goes back to the African independence era. According to Acebo (2013) the vision of the newly independent country was to develop a curriculum that would provide skilled workforce to replace the one of colonialists. Only one year after the independence in 1961, the new government enacted and published two laws that saw the education reform in the light of the constitution of May 19, 1961. The first law was number 037 of June 24, 1961 which established the commission for secondary education curriculum reform, and the 2nd law was number 053 of July 17, 1961 which defined and outlined the subjects to be taught in secondary school (The government of the Republic of Congo, 1961). These subjects were thirteen in number and included: Religion, moral and civic education, Mathematics, History, Geography, Human anatomy, Botany, Drawing, Music, Physical education and sports, French and English languages (The government of the Republic of Congo, 1961). The emphasis was put on numeracy and mathematics, because the learner who was able to calculate was easily integrated in the society. Since the system of education after the independence led to the training of the mass of manpower labor with few elite, it was unable to make available for medium and high class of professionals aimed at serving the county in different domains of life. It was therefore, mandatory to reform the curriculum again that could allow the training of such category of professionals in the 1980s.

After 25 years, which is in 1986, the government of the Republic of Zaire published the first framework that was in a gazette of the law number 86-005 of September 22, 1986. This law embedded the guidelines of education from nursery to university level (République du Zaïre, 1986). These guidelines were intended to provide the country with a class of medium and high professionals to replace the colonial ones. Cyr,et al. (2016), remarks that this curriculum did not promote the social and economic development of the country as it was expected.

Based on social dynamics and conflicting scenario that the country was and still undergoing, the 1990's faced violence and instability in the DRC that negatively affect the social and economic development of the nation (Acebo, 2013), the framework law of education was revised and published in 2014 to give a new orientation to the education sector. Acebo (2013) remarks that the DRC was far from reaching the purpose of establishing the social and political stability and empower the youth with skills and employment opportunities without a reform of the education system.

This new framework law number 14/004 of February 11, 2014 embedded many innovations that intended to transform the Congolese society through the establishment of a sustainable peace which in turn would be the basis of sustainable development. On the same note, Jonnaert, et al., (2018), mentions that the new framework-law intended to construct an inclusive education system which may contribute to the national development, promote peace and actively involve citizens in the management of society. Furthermore, young people were envisioned to be proactive citizens in the development of their own society and in an interconnected world (Acebo, 2013).

The education reform put an emphasis on science subjects. These comprise 40% of the subjects taken in the first cycle of secondary school in the DRC, and include: Algebra, arithmetic, Geometry, statistic, anatomy, botany, physical science, technology, Information Technology and Communication (ICT). These science subjects include innovative basic skills that enable learners to be proactive and to develop the aptitude to solve the problems of the daily life. These include (1) logical mind; (2) creativity; (3) scientific curiosity; (4) initiative; (5) manual ability; and, (6) good use of tools and instruments as recommended by the NBC. The remaining subjects that comprise 60% of the secondary curriculum include: Drawing, music, geography, History, civil and moral Education, physical education and Languages (DIPROMADI, 2018).

Statement of the Problem

The government of the Democratic Republic of Congo put a great emphasis on science education reform as a tool that enables learners to acquire long life skills to adapt to the current society. Such skills include logical mind, scientific curiosity, creativity, initiative and manual ability (DIPROMADI, 2018). The vision of the government of DRC was to develop a new science-oriented curriculum which will promote critical thinking and masterly of technology considered to be key factors to boost social and economic development of the country. The outgoing curriculum lacked several aspects of integration of training and labor and was judged to be too theoretical. According to Jonnaeert (2018) the outgoing curriculum met a lot criticisms including; (1) lack of teaching and learning using situated approach, (2) lack of good criteria to evaluate teaching and learning, (3) lack of connection between leaners' prerequisites and knew knowledge to acquire, and (4) student failure on national examinations particularly in science subjects. For example, according to De Saint Moulin (2017), in the year 2013 only 53.3% of students qualified in science to the national examination. Additionally in the year 2017, students' success rate in science subjects (62,3%) was the lowest compared to one of vocational subjects (72,6%). Students' failure on national examinations was viewed to hinder the vision of the government of sensitizing youths to join science courses. The report of the Ministry of education indicated that in the year 2018 only 5.1% of learners were enrolled in sciences subjects (EPST, 2020). Furthermore, students' results on National Examination indicate a low performance in science subjects.

Knowing that science curriculum produce graduates scientifically equipped that helps develop problem- solving skills; and taking into account that a small number is enrolled in science subjects, the Government of DRC launched new science-oriented curriculum, the Innovative Science Curriculum(ISC) to be implemented in the Terminal Cycle of Basic Education(TCEB) of secondary schools. A new pedagogical approach to the situation fitting the teaching of science was recommended to attract youths towards science subjects. According to Jonnaert et al.(2018),the approach to the situation helps leaner to acquire from the situations of his own environment using the resources of the same local environment.

After two years of its launching, it seems as if teachers were not implementing this curriculum as it was recommended by the National board of the Curriculum (Mbuyamba, 2020; Mayambala,2020). The same study recommended to find out whether teachers do understand that curriculum, how they are prepared to handle it, what is the attitude do they have about it. Also, Malu (2019) highlighted that the government of the Democratic Republic of Congo promised to provide secondary schools with instructional materials, textbooks, laboratories and experimental halls; and to train teachers on job for the purpose of improving the teaching and learning of science subjects, but the literature reviewed did not indicate whether secondary schools received these facilities and whether teachers have been well trained to handle science subjects. The literature reviewed failed also to indicate whether science teachers were using the approach to the situations and impart into the leaners the required innovative skills.

The study was also anchored on the recommendations of Jonnaert, et al., (2018) who recommended: (1) to involve educational partners especially teachers in the process of implementing the science curriculum; (2) to consider the political factors in the process of implementing the ISC; and, (3) to establish whether school environment is suitable for teaching and learning science subjects. The failure to investigate and evaluate the factors that sustain teachers while implementing the ISC would hold back the performance of students and therefore, turn into the wastage of resources (money, energy, and time) that supported the reform

Research Questions

This study was guided by the following research questions:

1) What is the level of implementation of the ISC in public secondary schools of the Eastern region of the DRC?
2) How do science teachers instill into learners basic skills namely, logical mind, creativity, scientific curiosity, initiative, manual ability; and use of tools in secondary schools of the Eastern Region of DRC?
3) How can the implementation of the ISC be improved in secondary schools of the Eastern region of DRC?

Methodology

Population and Sample Size

The population of the study was composed of 698 public secondary schools, where 151 were located in province A, 324 in province B and 223 in Province C; and approximately 1739 science teachers of the TCBE, where 370, were located in province A, 799 in province B; and 570 in province C (EPST, 2019-2020; INS,2020). The population distribution in the three provinces was composed of secondary schools, and science teachers as indicated in the table1 below. According to Mertler and Charles (2008) in survey studies, the best recommendation is to sample approximately 10 to 20% of the population. Therefore, the researcher selected 10% of schools proportionally distributed in the three provinces as follows: 15 in province A, 32 in province B, and 22 province C, making a total of 69 school sample. 10% of schools to be surveyed were considered to be representative of the population. Likewise the study involved 10% of science teachers proportionally distributed among the three provinces as follows: 37 in province A, 80 in Province B and 57 in Province C making a total sample of 174 participants. Not all 69 schools were reached by the researcher due to different factors including the unavailability of the head teacher who were supposed to grant permission to undertake the study in their schools. Likewise all the 174 science teachers did not return the questionnaire. Therefore, 42 schools out of 69, making 60.86% were reached and 140 science teachers out of 174, which makes 80.45% returned the questionnaire.

Among the 140 science teachers the researcher selected 45 more experienced to participate in the interview. Data collected from interview was analyzed into to theme of the eight levels on implementation an innovation in the curriculum. In the interview teachers were asked to state the level at which they were implementing the ISC, the challenges encountered and to state how they inculcate into the learners the recommended basic skills.

Data Collection Procedures

Science teachers were asked to fill in the questionnaire at their convenience time and to retune it to the researcher or to the assistant. The researcher trained three research assistants who assisted to collect data in each of the three provinces. The questionnaire contained clear items and instructions were given to fill it. The interview process with selected teachers lasted for a minimum of one and half hour. The head teacher provided a location where interviews were conducted. To ensure the anonymity and confidentiality the interviewed participants were given codes. The researcher used the first initial standing for teacher and the name of the province using the fist initial or two first initials if the province has a compound name. After the Initial the researcher used alphabetic letters to show the order of participant. For example, the first teacher interviewed in Maniema Province bearded the code TMA, T standing for Teacher, M standing for name of the province and the first letter of English alphabet for the first participant and son on. Therefore each one of the provinces of the study namely Maniema, North-Kivu and South-Kivu Province were given codes of letters, for example province A, province B and province C

Statistical Treatment of Data

In this study, the researcher use descriptive statistics to analyze collected data using Statistical Package for social Scientists (SPSS). The descriptive statistics were used to compute frequency and percentages of teachers level of implementation of the ISC.

The Concerns Based Adoption (CBA) model

To determine the level of implementation, the Concerns-Based Adoption (CBA) model was used. This model was developed by Frances Fuller in the 1960s and was intended to identify the feelings and training needs of teachers. In the early 1970s the researcher and a group of scholars from the University of Texas studied how the concerns of teachers might be addressed to best implement educational innovations (Armstrong, 2003). According to Armstrong (2003), there are eight stages of concerns which correspond to the levels of use that helps to assess the level of implementation of innovations of a curriculum. The eight levels are listed below:

Level 0. None use: State in which the teacher has little knowledge of the innovations and is doing nothing towards becoming involved.

Level 1.Orientation: State in which the teacher has acquired or is acquiring information about the innovation and/or has explored its value orientation and its demands on her/him and the system.

Level 2.Preparation: State in which the teacher is preparing for the first time to use the information acquired about the innovation.

Level 3.Mechanical use: State in which the teacher focuses most effort on the short time day to day use of innovation with little time for reflection. Changes in use are more made to meet teacher's needs. The teacher is primarily engaged in a stepwise attempt to master the task required to use the innovation often resulting in disjointed and superficial use.

Level 4. Routine: state in which the use of innovations is established. Few, if any changes are being made in the ongoing use. Littre preparation or thoughts is being given to improving innovation use or its consequences

Level 5.Refinement: State in which the teacher varies the use of the innovation to increase the impact on students within the immediate sphere of influence. Variations are tested for both knowledge of both short and long terms consequences for students.

Level 6.Integration: State in which the teacher is combining own efforts to use the innovation with the related activities of colleagues to achieve a collective impact on students' common sphere of influence.

Level 7.Renewal: State in which the teacher reevaluates the quality of use of the innovation, seeks major modifications of or alternatives to present innovations to achieve increased impact on students, examine new developments in the field and explores new goals for self and the system.

According to Hall as cited in Sheakaili (2015) the eight levels could be condensed into two groups, namely, (1) non-use level comprising of the first three levels including non-use, orientation and preparation ; and (2) use level comprising of the five remaining levels including mechanic use, routine, refinement, integration and renewal. This model was applied to the current study to assess the levels of implementation of the ISC in the TCBE of public secondary schools of the DRC. The process consisted of asking teachers to rate the level at which they implemented the ISC. Shakaili (2015) mentions that in a school, each teacher implements a curriculum at his own level. The measurement of the level of this implementation helps to identify the areas of weaknesses and the remedial measures that will be taken into account to help science teachers implement the ISC effectively

Results and Discussions

This section presents the findings of the level of implementation of the ISC in answering the research question number 1 , "What is the teachers' level of implementation of the ISC in the TCBE of public secondary schools in the Eastern region of DRC?" The level of implementation was determined using the Concern-Based Adoption Model (CBAM) of Francis Fuller (Armstrong. 2003), which was modified and adapted to current situation.

Teachers' Level of Implementation of the ISC

This section presents the findings of the level of implementation of the ISC in answering the research question number 2 stating, "What is the teachers' level of implementation of the ISC in the TCBE of public secondary schools in the Eastern region of DRC?" The level of implementation was determined using the Concern-Based Adoption Model (CBAM) of Francis Fuller (Armstrong. 2003), which was modified and adapted to current situation.

Table1

Science Teachers' Level of Implementation of the ISC

Level	Description	Frequency	%
1	Non-use	6	4.29
2	Orientation	20	14.29
3	Preparation	5	3.58
Sub-total non-use level		**22.16%**	

4	Mechanic use	11	7.85	
5	Routine	24	17.14	
6	Refinement	50	35.71	
7	Integration	21	15.00	
8	Renewal	3	2.14	
Sub-total-use level	**77.84%**			
Total	140	100	100	

Table 1 above which indicates the levels at which science teachers had attained in the implementation of the ISC, shows that 77.84% of science teachers are implementing the ISC at use level, only 22.16% are not implementing it. This means that majority (77.84%) of science teachers in secondary schools have understood the new science curriculum and are in the process of imparting right knowledge to students. Nevertheless, there is more room for improvement within the implementing groups since only 2.14% have attained the highest level of implementation which is Renewal level.

Responses from Interview of Science Teachers

When the qualitative findings from science teachers were analyzed to complement the quantitative findings, where the science teachers were asked to state and justify their level of implementation, one of the teachers of province B bearing the code (TNK) responded to the researcher's interview by saying:

I am implementing the ISC because I prepare lesson and, instructional materials, I mark student works, and I assign students into different groups of activities. I use the situated approach recommended by the NBC to teach science. In the evening, when I am back from school, I accomplish other social activities in order to satisfy the needs of my family. I realize that I need more time to reflect on my work for improvement

Science teachers who have attained the fifth level of implementation, corresponding to the routine acknowledge applying the ISC, but due to some reasons they are not seeing major improvements on the side of learners. When responding to the researchers' interview the teacher of province C bearing the code (TSKG) declared:

I am called teacher TSKG. I have been teaching geometry and algebra in the 7th and 8th forms for 8 years. I have been trained to implement the ISC and I make an effort to improve my work but I am not seeing major progress in the achievement of my students. When I tried to search for the reasons, I discovered that there might be other factors that could intervene in the achievement of learners at school. First, the level of learners from primary school is low. Some learners from primary schools lack basic skills in calculations and French language. Second, some parents are not aware of the reform taking place in secondary schools. They fail to direct their children to do their home works and to provide to them with mathematical sets. Third, there are some themes of the syllabus which are not provided in the textbooks

Teacher who are implementing the ISC at the mechanics use level were focusing on short time use of the information of the ISC, and still wish to increase their time to reflect on their teaching activities. The teacher of province A encoded (TMANH) responded to the researcher's interview by saying:

I am called teacher TMANH. I have taught technology for five years in the TCBE. The reform of the ISC is important but it needs more time to understand its requirements. According to the new methodology, technology should be taught practically. In the former curriculum when it was the time to teach the theme "house'' it was easy to describe the house and to give its importance. On the Contrary to the ISC, where instead of describing the house, students are taught how to make building materials such as blocs. Also, there are taught how to build a house. I try my best to apply this new methodology of teaching technology.

Another teacher of province B (TNKA) who attained the integration level of implementation, when responding to the researchers' interview said:

I am called teacher TNKA of the school NKA .I teach TIC course. In my subject, I connect the theory to the practice. I use the cyber for students' practice. Actually some students are able to produce a word document and to print it out. I believe that at the end of the TCEB, they will be able to use the acquired skills to their day today life

The teacher of life science of province C bearing the code of (TSKF) who attained the seventh level of integration responded to the researcher's interview by saying:

I have started to implement the ISC according to the guidelines of the syllabus. I have been teaching life science in the TCEB, in one lesson, I asked students to prepare the compost from the waste of the kitchen at their homes to have a soil where they can plant vegetables. I was happy one day to hear the testimony of one of my students explaining how he yielded the amaranth. The student stated that he prepared a piece of small land in their plot where he planted the amaranth. After two months only, the amaranths were mature; he sold them and earned some money. He used that money to buy note books.

Another teacher who attained the last level of implementation that corresponds to the renewal explained:

I am called teacher TNKN of the school NKN of province B, mathematics teacher. I have been trained to handle science subjects and I have worked for more than 8 years. I have reached the level of renewal because I apply the recommendations of implementing the ISC as outlined in the syllabus. I assign students into different groups of activities and I prepare students to use peer coaching technique for a better performance. However, I have realized that some important concepts are not outlined in the syllabus such as logic for mathematics.

The findings from the interview showed that there were science teachers who were implementing the ISC at nonuse level. The teacher TNKA of province B was open to tell the researcher that his level of implementation of the ISC was 0 corresponding to non-use in the CBAM of Armstrong (2003). He defended his position under the following note:

I am a secondary school diploma holder; I teach life sciences in this school in the TCBE for four years. I participated only once on the training session of three days conducted by inspectors in 2018, but I feel as if I have not acquired the needed information that could help me implement the ISC. When I read the science syllabus, I realize that it is difficult to implement the ISC using the new pedagogical approach to the situation. First, the approach requires teacher to assign students in small group of activities. This can be possible in a classroom setting where students seat on chairs instead of bench not movable. Also, science teachers are given only 50 minutes teach one lesson. It is difficult to introduce a lesson, present a situation, analyze the situation together with students, present the new lesson, assign students in small group of activities and evaluate their work within 50 minutes. Second, the syllabus recommends for the subject such zoology, and botany to organize field trips to observe the real object in its natural environment whenever possible. The Head teacher is not ready to allow such field trips due to the shortage of funding. Therefore, I continue to teach as I used to do before the launching of the ISC because I am not seeing any difference. Third, the content of the ISC requires one to have been to the college or university for further knowledge.

Another teacher who's the level of implementation corresponds to orientation shared the following information when responding to the researcher interview:

I am teacher TSKD of the school SKD, of province C. I teach ICT since 2018 and I participated to the training on the implementation of the ISC. I took the time to read carefully the ICT course syllabus and I realize that it contains useful information that would help learners acquire skills to adapt to the current society. I have understood that when a student acquires computer skills such as the masterly of Microsoft word, Microsoft Excel, Microsoft power point and Internet in the TCBE, he can use them in his daily life even if he is not able to continue to the higher level of secondary school.

This teacher argued that the science curriculum contains useful information to help students acquire skills that would help them to adapt the society. However, he continued to explain the challenges that he faces to carry this curriculum by saying that:

I have a challenge of using the situational- Based approach required to teach ICT because: First, the school do not have electricity and computer laboratory. Second, the classroom is overcrowded, with more than 50 students. Third, it is difficult to practice the ICT within a minimum period of 50 minutes and once per week. A good practice requires a minimum of two hours and twice a week. Therefore, while still thinking on the ways implanting the ISC, I teacher the theoretical aspect of the course and leave behind the practical aspect.

Additionally, the teacher TMANH of the school MAN H of the province A was complaining about the lack of the instructional materials as he responded to the interview saying:

I am called teacher TMAN of the school MANH in the province A. I have been teaching technology in the TCEB for 5 years. The reform of the ISC is important but it needs more time to understand its requirements. I have been trained only for two days and the third day the head teacher asked me to implement the ISC. However, according to the new methodology, technology should be taught practically. In the former curriculum when it was the time to teach the theme "house'' it was easy to describe it and to give its importance. Contrary to the ISC, where instead of describing the house, students are taught how to make building materials such blocs how to build a house.

Science teachers were at the third level of implementation that corresponds to the preparation, meaning that teachers have acquired the information about the ISC and are prepared to use it for the first time. Some of science teachers interviewed accepted that they have made a step in the process of charring out the ISC. One of them, teacher TNKF of the province B responded to the interview by arguing:

I am teacher TNKF of province A, as a newly hired teacher I am trying the strategies to implement the ISC. It took time to understand the meaning of the material of the new curriculum because I did not participate to different sessions as my colleagues did. I hope the effort of the head teacher to organize peer -teaching techniques will help me climb the ladder and also implement the ISC at use level.

The quantitative and the qualitative data from science teacher's show that majority of science teachers are implementing the ISC to the use level. However there still some teachers who are not implanting the ISC and the reasons have been raised: Lack of training, shortage of instructional materials, among others. The findings from science teachers and head teachers did not differ from the ones of head teachers.

Past studies focused on the role of teachers in the process in the process of implementing innovations of the curriculum. For example, Syomwene et al. (2017), support that the curriculum implementation involves two important processes: (1) changing the attitudes of the people including policy makers, administrators, teachers, teacher trainers, school supervisors, parents, and the learners, (2) providing the resources and administrative means to make the process possible. Focusing on teachers' capacities, Joel (2017) indicated that there are some teachers who lack competences that would help them to achieve the objectives of a curriculum, including the failure to interpret the syllabi, and the use of appropriate teaching and learning methods. They fail to connect classroom activities with the subject matter. The major problem of the curriculum is not the writing of the mission statements and objectives but to implement what the written curriculum intends to achieve and later on, to evaluate if it has been achieved. According to Ondimu (2018), the quality

of education largely depends on the quality of teachers. Tiana (2017) went on to say that teachers are primarily responsible for students' absorption of new information by implementing educational programs. They use the means and resources provided to them to meet the educational ends. So the way teachers handle the subject matter will impact either negatively or positively on students' success. The good performance of students indicates that the curriculum the curriculum was rightly implemented. Equally the failure of students denotes that the curriculum was not rightly implemented. The implementation of a curriculum is central to the school system. It's monitoring and evaluation is critical. This is the sole purpose that makes the implementation stage to be concerned with putting into practice what has been planned and carried out in the classroom setting.

How do Science Teachers Instill Basic Skills into the Learners?

The section answered the research question 2 asking teachers to state how they instill into the learners basic skills recommended by the NBC.

Science teachers were asked whether they were aware of basic skills to be instilled into the learners. The teacher SKF of province C declared "the main skills to be infused in the learner are: scientific curiosity, logical mind, critical thinking, creativity and problem-solving". On the other hand, teacher NKG of province A asserted "I am not aware of basic skills; I fail to understand what their meaning is". However, the teacher MANC of Province A accepted that he integrates some of basic skills in the teaching and learning through the development essay question type and drawing. He added "among basic skills, creativity is most integrated in the process of drafting handcrafts designs,". On the same note, the teacher D accepted to integrate the interpersonal relation competence. He said "the interpersonal relation is enhanced by the grouping technique, sometimes pupils are asked to accomplish some tasks in groups".

Teachers were asked to state how they inculcate into learners the scientific curiosity, Teacher NKA of province B, declared "to instill the scientific curiosity into leaner, I give a homework that requires learners to develop a similar model using their own resources". The teacher SKE of province C added "when I am teaching the computer literacy, I give ask learners produce a text in Microsoft word; students do their best because, they know that a good work will highly rewarded". The logical spirit is integrated in subject like math and physics. The teachers of these subjects try their best to exercise the leaners on logical reasoning.

.The teacher NKB of province B explained how he develops the initiative skill into the leaners and said: "I develop the initiative into the learners by asking them to draft some materials on sheets of papers, Bristol papers, and woods or on any other materials". The teacher of the school TSK of province C added: "I am not able to develop the practical skills into the learners due to the lack of instructional resources. When teaching computer science, it is very easy to develop creativity when computers are available. In our school we don't have a single computer.

How to Improve the Implementation of the ISC in Secondary Schools

This subsection presents the suggestions and recommendations from science teacher to answer research question 3 seeking the ways of improving the implementation of the ISC.

Data was collected from the open-ended section of science teachers' questionnaire and interview schedule and the following suggestions emanated from their responses: (1) science teachers' continuous training on how to best implement the ISC; (2) equip the school with instructional facilities; (3) supervision from head teachers and science inspectors; (4) motivation of teachers; (5) involve teachers in the process of curriculum development.

Science teachers' continuous training: Science teachers suggested that teachers need more sessions of training to enhance their capacity to best implement the ISC. Science teachers indicated that they were trained generally in pedagogy rather than in subject matter. One of them, teacher MANA of province A responded to the researcher's' interview by saying:

The training that science teachers received was not enough. Also inspectors who conducted training sessions did not have knowledge in the subject matter. I have been teaching t Mathematics for several years. However, the one who trained me was History major. I think that we need more sessions of training in holydays with expert in subjects.

Another teacher, Teachers TNKB of province B agreed that teachers were trained but he recommended that training be extended to other stakeholders such as parents. He responded to the researcher's interview by saying:

I suggest that training be extended to parents because they are also involved in curriculum implementation in different ways: (1) paying schools fees, (2) providing to their children school equipment such as mathematical sets and note books, (3) helping their children to perform, etc.

Equipping school with instructional materials: Science teachers argued that schools need provision of instructional material; this has been a challenge in the teaching and learning science in secondary schools. When responding to the researchers' interview most of science teachers showed that generally, schools in the Eastern region of DRC do not have laboratories and libraries. One of the science teachers responded to the researcher interview by saying:

The government provided to selected secondary schools a limited number of laboratory kits but did not train teachers on how to use them. The ISC compared to former knowledge- based curriculum needs more practices, and without appropriate instructional materials the leaner cannot acquire expected skills and knowledge.

Instructional supervision: science teachers agreed that head teachers conducted usually instructional supervision. However, science inspectors did not regularly supervise instruction in schools. Science teachers responded to the researcher's interviewee by saying:

I am teacher TNKC of mathematics in province C, since the launching of the ISC in secondary schools; I have never seen science inspectors supervising instruction in our school while mathematic teachers face a lot of challenges related to the content of the curriculum.

Motivation of teachers: Majority of science teachers recommend the government to pay newly hired teachers and increase the r salary. One of the science teachers, Teachers TMANE of province A responded to the researchers' interview by saying:

I thank the government for the reform of science curriculum. However, the most important aspect to consider in the process of curriculum implementation is to motivate teachers. I teach Information Communication and Technology in my school since two years, but since then I am not yet paid.

Involve science teachers in the process of curriculum development to increase their understanding and attitude on the ISC.

Conclusion

The study intended to determine the level at which science teachers implemented the Innovative Science Curriculum (ISC) in the Eastern Region of the Democratic Republic of Congo. The study involved 140 science teachers of 42 schools distributed among three provinces. The methodology consisted of rating the level at which science teachers attained. The findings revealed that science teachers are implementing the ISC at use level, but newly hired teachers need more training to climb the ladder that will enable them implement the ISC at use the same as the count part. Further the findings indicated teachers basic skills are not properly inculcated into the leaners.

Recommendation

The study recommended to the National Board of the Curriculum should regularly assess the science teachers' level of implementation of the ISC for remedial purposes. Further the study recommended to increase the sessions of teachers' training and to equip schools with instructional materials

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