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(CASE REPORT)

Factors contributing to the students' poor performance in biology subject: A case study of ordinary level in rural secondary schools of Rwamagana district

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Abstract

This study explored the factors contributing to the students' poor performance in Biology subject. By using qualitative method design, sample were chosen purposefully from two secondary schools in rural area of Rwamagana district. The schools were selected on the fact that the students were characterized by poor performance in Biology in the years 2017 and 2018. The participants of the study were both ordinary level learners, ordinary level Biology teachers, Deputy Head teachers and Head teachers. Open-ended questionnaires, interview and documents review were both utilized to gather the data. 110 learners were asked to complete the questionnaires while 4 Biology teachers, 2 Deputy Head teachers and 2 Head teachers were interviewed. The collected data were analyzed qualitatively by content and thematic analysis. The data were interpreted using literature review and the findings were also presented in graphs using Microsoft Excel. The results indicated that the root causes of the students' poor performance in Biology are namely: English language as medium of instruction, insufficient laboratory equipment, insufficient teaching and learning materials, inappropriate teaching methodology, amount of content and time allocated, inadequate involvement of parents in learners' education, poverty, students' absenteeism and school environment. All factors were not explored, there might be other causes that affect learners' performance in biology subject of rural ordinary level schools. The researcher finally made recommendations to the various education stakeholders to improve the academic performance.

Keywords: Poor performance; Poverty; Laboratory practices; Teaching methodology

1. Introduction

As in the case of other developing countries, Rwanda has agreed to create a knowledge-based and technology-based economy to ensure good health and human capital growth. To do so, the Rwandan government has created, through the ministry of education (MINEDUC), nine years of free basic education, consisting of two levels, six years of primary and three years of lower secondary/educational level [1]. Students have taken various subjects over the past three years, including both core and extra-curricular classes, from which they can choose the combination subjects in the upper secondary school after passing the national ordinary level test.

Biology is a central subject taught in Rwandan secondary schools of ordinary level. It is therefore the subject which can help our country to fulfill its aspirations of maintaining educational perspectives with socio-economic and technological demands as set out in vision 2020 and EDPRS policies. Biology is a worthwhile subject, as students can be prepared to face the real world of work through numerous career paths such as medicine, pharmacy, agriculture, nursing, food science, environmental studies, and many others [2]. In addition to being the focus of an individual's career, biological knowledge is very important for the well-being of the society through the mitigation of low agricultural yields by

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increasing plants immune to high output diseases, and the overpopulation through the development of contraceptives [3].

While Biology is a career-linked subject and contributes a great deal to the development of the country, the output at ordinary schools in Rwanda is still poor. Numerous researchers analyzed the poor performance of the graduates, and many factors were noted. Jackson (2009) concluded that the poor performance of students is attributable to many factors including the insufficient parental participation in school events, insufficient or inadequate teaching facilities, inadequate trained educators and instructors, and the absenteeism of the learners [4]. In addition, the author claimed that there is a problem of inadequate resources in secondary school, where one textbook is shared among many students. In addition, poor performance of the students is commonly caused by the lack of school laboratories and libraries. (i)The current research has therefore been planned to examine the factors associated with the poor performance of students in the subject of Biology and was conducted in a rural ordinary level secondary school in the district of Rwamagana, Rwanda, which helped to provide feedback on how to increase student performance in the study field. Study specifically answered the following questions: How does the current curriculum being used in teaching Biology affect student's performance? (ii) What are the factors contributing to the poor performance of the students in Biology at the level of school? (iii) What are the parental socio-economic factors which are responsible for the students' poor performance in a biology course? Many studies were conducted to identify various factors that lead to the poor performance of students, but most of them pointed out the structural factors that are more correlated with the poor performance at the school.

2. Research methodology

A descriptive case study was employed in this study to explore the factors contributing to the students' poor performance in Biology subject in ordinary level of Rwamagana rural schools. The researcher chose a case study based on the problem of students' poor performance and it was an opportunity to be studied in depth in limited time to explore the causes. Both open-ended questionnaires, interview and documents review were used to collect qualitative data.

Purposive sampling technique was used to select 110 out of 911 ordinary level students from two selected rural schools. 2 deputy head teachers, 2 head teachers and 4 biology teachers who were present at the schools all participated in the study. The open-ended questionnaires were administered among the selected students while biology teachers, deputy head teachers and head teachers were interviewed. Before administering the research instruments, they were submitted to the experts who are namely the supervisor and to my fellow Med Biology students to check their relevancy and effectiveness. Then, the modification were made for some items where necessary before distributing to the respondents. All biology teachers, Deputy Head teachers and Head teachers from the population were involved in the study on the fact that they were able to provide all necessary information for their schools which were underperforming from the years 2017 to 2018 in Biology subject and they are few in number. For data analysis, content and thematic techniques were used.

3. Results and discussion

3.1. Biographical background of the ordinary level learners

This section gives information concerning the biographical background of learners. Those information were collected to determine whether their background can have an effect on their performance. Different aspects were studied in this section which include: gender, age group, class, parents' possession and distance walked to school. The figure 1 and 2 present all the information according to sex, age group, distance walked to school and parents' possession.

The figure 1 indicates that each class of ordinary level was represented in the study. By purposefully sampled, the 50 participants of senior one, senior two and senior three were 30. The figure 1 also indicates that 61 out of 110 were males while 49 out of 110 learners were females. Those responses reveal that both girls and boys participated equally in the process of data collection. Since the policy of education for all (EFA) launched in Rwanda education system in 2006 [5], everyone is allowed to go to school regardless the age. This is indicated by the responses provided by the participants in the same figure where 101 out of 110 of learners are ranged from 10-20 years, 9 out of 110 of learners are ranged from 21-25years and none is ranged from 26 and above. According to Piaget, (1970), these ranges of age are good for learners to think hypothetically about the world around, and develop scientific reasoning. So, the participants are cognitively ready, and should perform well in Biology subject [6].

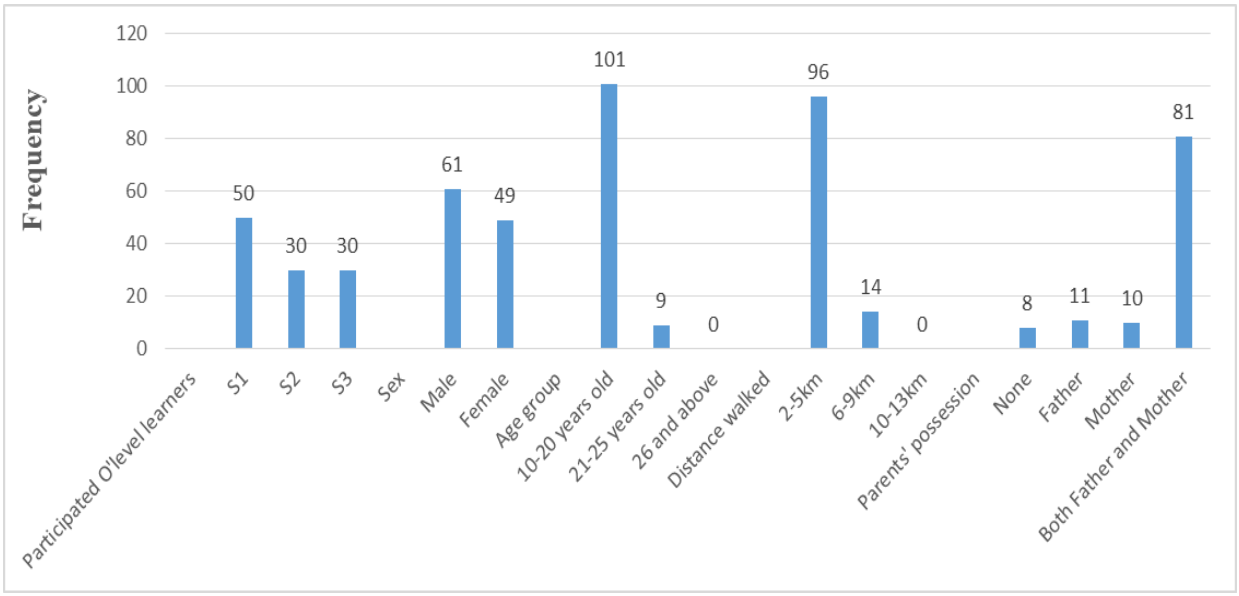

Figure 1 Participated ordinary level students

Furthermore, figure 1 indicated that 96 out of 110 learners walked 2-5km, 14 out of 110 learners walked 6-9 km and no students responded that the distance from home to school is above ten (10) km. According to Mhiliwa, (2015), the school location is closely linked to the learners' performance [7]. The researchers further investigated that the learners who walk long distance from home to school spend most of their time travelling, instead of learning and hence failing during exams. Since most of the respondents walk less than 5 km, they should be at school before the class and start revising the subject content.

From the figure 1, the last variable indicated that 81 out of 110 learners had all the parents, 10 out of 110 learners had only mother, 11 out of 110 learners had only father, and 8 out of 110 learners were orphans. According to Emerllahu et al, (1998), the parents are the direct holder of the educational work [8]. This means, the parents are the ones to provide with discipline, love, respect, values and attitudes. In the family, the parents are the ones to take care of the overall children physical and intellectual development [9]. Since, the majority of learners participated in the study have parents, they are expected to perform well because all their needs are being met.

3.2. Learners' performance in Biology subject

Question one (Appendix E) asks the learners to rate their performance and to mention the main causes that justify their challenges (if any) in biology subject. The table 1 and figure 2 below summarizes their responses.

Table 1 Students 'responses on their performance

How learners rate their performance in Biology	No	Yes
Is your performance in Biology good	85	25

Source: Research findings, 2021

The table 1 indicates that, 85 out of 110 learners showed underperformance in Biology while 25 out of 110 learners performed well. Those responses clearly show that the learners are performing poorly. Since the majority of the learners showed underperformance, the following were also the contributory factors listed as reasons for their poor performance.

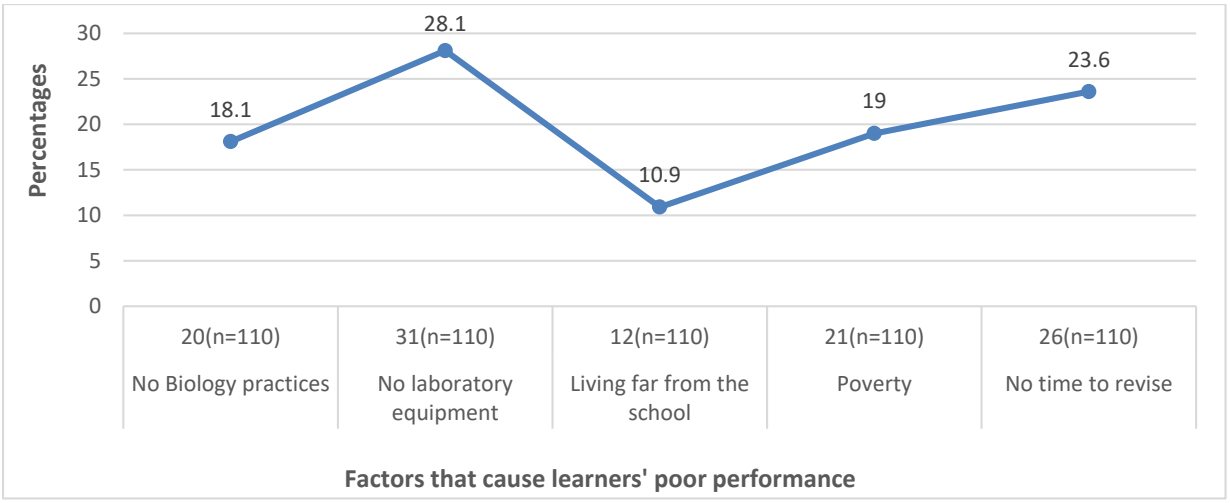

Figure 2 The factors that influence poor performance as listed by the learners

As indicated by the figure 2, the learners responded to the question as follow: 18.1 percent of learners are affected by lack of Biology practices which are not done, 28.1 percent of the learners said that there is no laboratory equipment, 10.9 percent of the learners said that they are living far from the school, other 19.0 percent said that their poor performance is influenced by the poverty, and other 23.6 percent said that they don't get enough time to revise at home. From the literatures, the researchers highlighted the power of laboratory practices in the knowledge and competency acquisition [10]. This is because the experiments in biology subject appeal student's interest to understand the concepts got in the class. However, those works are not done in the school due to poor school infrastructure which lead to the learner's poor performance.

The minority of the respondents said that they are living far from the school which cannot be regarded as the main cause of the students' poor performance since the majority are living near the school. However, those learners are academically affected by living far from the school in a negative way. This is because, by walking longer to school the students get fatigue and hungry leading to drowsiness during learning [11].

3.3. Socio-economic status of the parents

Figure 2 below shows the results provided by the learners on the level of education of their parents, employment sectors, size of the family and the economic status of their families.

The figure 3 indicates that 51 out of 110 learners their parents completed only primary school, 35 out of 110 learners responded that their parents completed ordinary level of secondary school, 17 out of 110 learners responded that their parents completed secondary school while 7 out 110 learners, their parents have university level. These results show that most of the parents are illiterate, and the illiterate parents fail to help their children during home learning activities. According to Desforges et al, (2003) academic performance of the children is closely linked to the education level of the parents [12]. The lower literacy levels of the parents limits their active participation in children's education [13].

From the figure 3 above, 11 out of 110 learners responded that their parents are public workers, 95 out of 110 responded that their parents are farmers while 4 learners out of 110 responded that their parents are not working. This implies that the majority of the learners come from the families which practice agricultural and rearing activities. As it is indicated in the figure 3, most of the parents are not educated and do not care about their children's education. The parents always engage their children in domestic activities such as looking for food to cattle, cultivating and most of the time attending the market selling the agricultural products. This increases the rate of learners' absenteeism which ends up by learners' poor performance.

The question 7 (b) in appendix E was asked to capture information about the size of the family from which the learner come from. This was asked because the family size is closely linked to the academic achievement [14]. The figure 3 indicates 35 out of 110 learners responded that the members of family fall in the range of 1-4 persons, 61 out of 110 range from 5-8 persons and 9 out of 110 learners range from 9 and above while 5 out of 110 did not respond. Findings revealed that the majority of the learners come from big sized families. According to Shen, (2017), the size of the family

is more correlated to the children's education [14]. The additional children reduce the financial means that the parents can afford for education. Which means, the more the children, the lesser the parental resources for children's education.

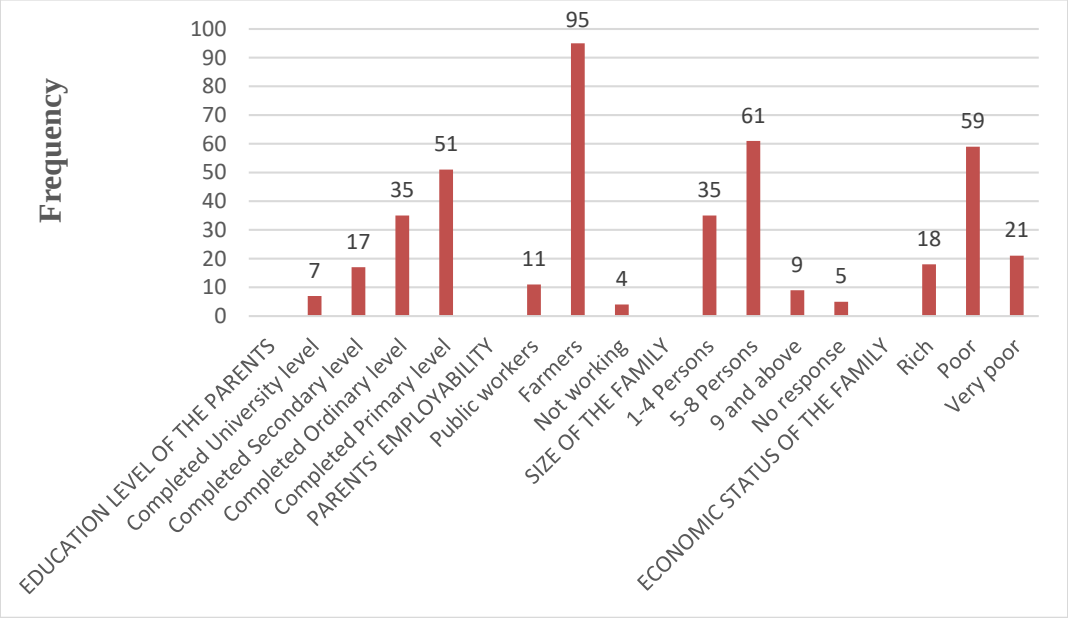

Figure 3 The levels of education of the parents, employment sectors, size of the family and their economic status

The last variable in the figure 3 investigated the family status of the learners. This is because the academic achievement closely associated to the socio-economic status of their families. The responses indicated that 18 out of 110 learners are from rich families, 59 out of 110 learners are from poor families, 21 out of 110 learners are from very poor families, while 12 learners out of 110 skipped the question. Living in a poor families, the children's education may be affected negatively. The children may lose school fees and other scholastic materials to facilitate the academic activities and this may lead to poor performance. This is supported by Zack and Gaston, (1954) from his research findings [15]. The researcher revealed that the academic achievement is correlated to the students' socio-economic status. The author believed that the lack of resources due to poverty affects the performance of learners and revealed the challenges that may lead to failure in the subject of biology for learners from poor families.

Table 2 The challenges in biology learning due to living in poor family

What challenges that come with living in poor family in relation to Biology learning?	Frequency	Percentage
No school feeding	38(n=110)	34.5
No scholastic materials	23(n=110)	20.9
High level of absenteeism	25(n=110)	22.7

Source: Research findings, 2021.

The table 2 indicates the responses on the challenges that may come due to living in poor families. 34.5 percent learners said that they don't get school feeding, 20.9 percent learners are unable to get scholastic materials, 22.7 percent learners are frequently absent, while 31.9 percent learners did not respond to the question.

3.4. Biology curriculum

Figure 4 below indicates the responses on the extent to which biology practice assessment is done, difficulties encountered, the way language of instruction affects biology learning and the availability of biology textbooks. These problems encountered in biology practices assessment, the way language of instruction affect biology learning and availability of biology textbooks.

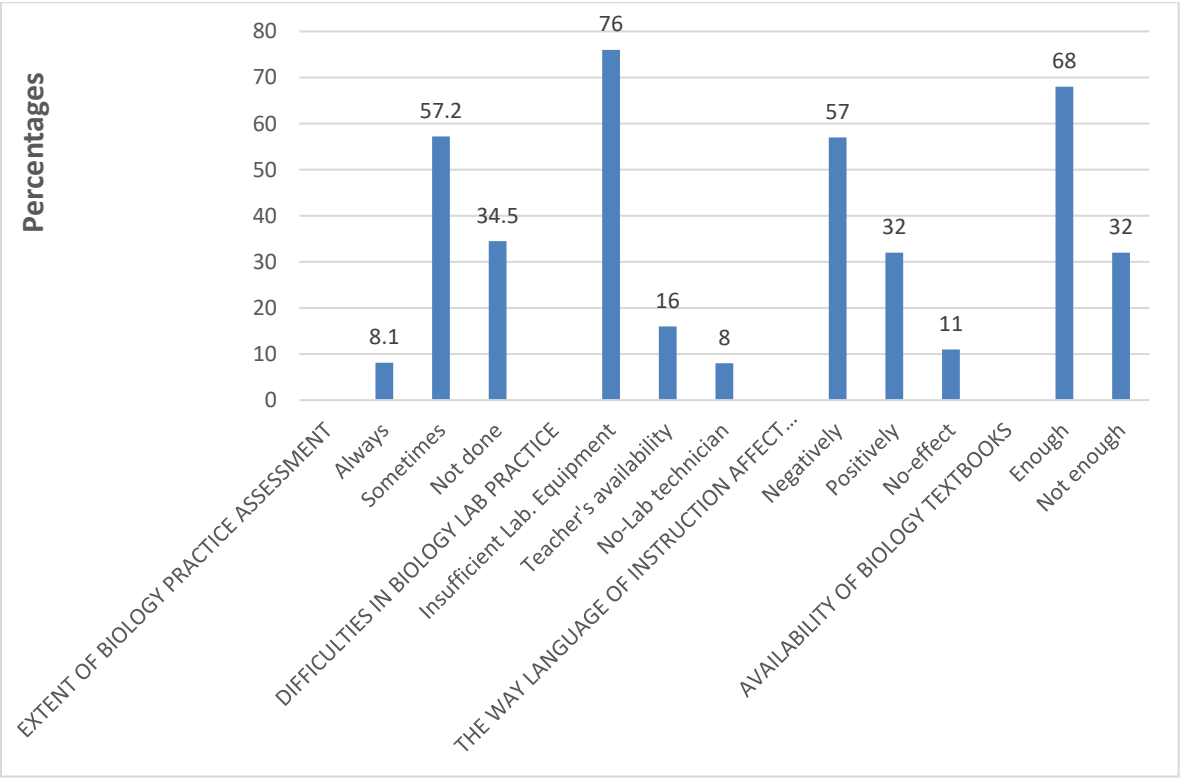

Figure 4 The extent of biology practices assessment

Figure 4 indicates that, 8.1 percent of learners responded that the biology practices are done always, 57.2 percent of learners responded that the biology practices are sometimes done, while 34.5 1 percent said that it is not done. The same figure indicates that 76 percent learners have insufficient laboratory equipment, 16 percent learners have the challenge of Biology teacher's availability in laboratory practices and 8 percent of learners face the challenge of laboratory technician. Obviously, the laboratory practices are not conducted due to the insufficient biology laboratory equipment. This, however, influences the outcome of the students in the biology study. The students who have performed hands-on activities receive higher scores than those who have not been engaged in those activities [16]. Despite the limited number of laboratory practices conducted in Biology subject, they have a major influence of the learners' outcome. This is because, the way new biology curriculum is designed encourage the learners to learn through hands-on hands activities. Unfortunately, the learners fail in national examination because they have been assessed practically with original laboratory apparatus that they had never seen in the classroom. Therefore, theoretical or using improvised materials in assessment affect the students' performance in national exams. The previous research revealed that the insufficient or lack of laboratory practices in science subjects result in student's poor performance [17].

Figure 4 also presents information on the language of instruction. It shows that 57 percent of learners responded that English has a negative impact on their learning, 32 percent learners responded that there was no negative impact on their learning caused by language of instruction, and 11 percent responded that English has no influence on their learning. It is clear that English as foreign language negatively affects learners. This is because the learners are not knowledgeable in English, so they will not be able to understand well the Biological concepts which will end up with a failure in the exam. Language of instruction is very essential in teaching and learning process and it can be a barrier in academic achievement for students whose language is not native. For the students whose primary language is not the language of the classroom, According to Thomas and Collier (1995), can take up to 7 or 10 to catch up their peers academically if there is no support in language development [18].

The figure 4 indicates that 68 percent of learners declared that the biology textbooks in the school are not enough, while 32 percent confirmed that the biology textbooks are enough for their learning. Based on the responses provided by the majority of learners, biology textbooks as teaching and learning materials are not sufficient to help learners for self-revision. The academic success, According to Behnke, (2018) depends entirely on how both teachers and learners communicate through the use of textbooks with each other [19]. The author also argues that the absence of textbooks can lead to poor learning especially in practical subjects.

3.5. Teaching methodology

The figure below illustrates the responses provided by the learners on the teaching methodology mostly used by the biology teachers.

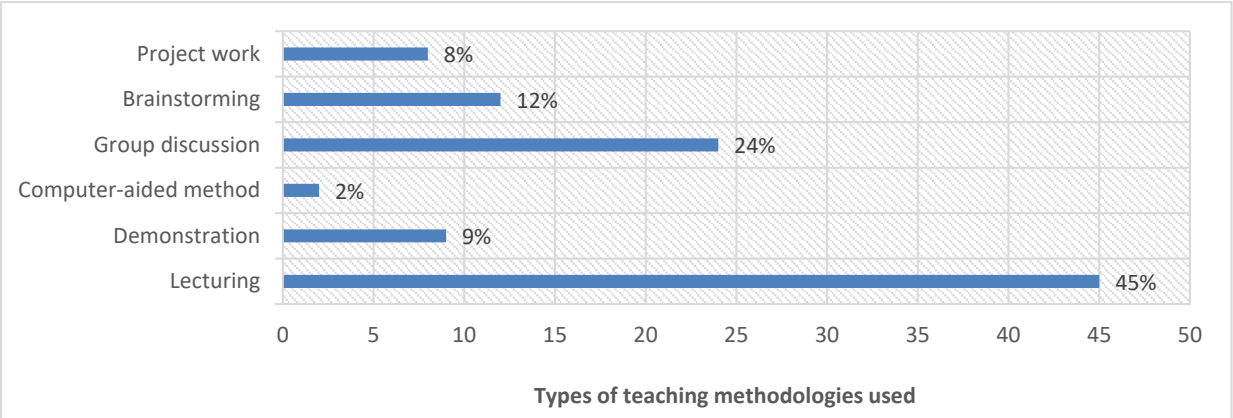

Figure 5 The teaching and learning methodology preferred by biology teachers

The figure 5 shows the findings on the teaching methodology mostly used by teachers in teaching biology. 45 percent of the respondents answered that biology subject is taught by lecturing, 9 percent of the learners responded that biology subject is taught by demonstration, 2 percent of the learners responded that biology subject is taught by computer-aided methodology, 24 percent of the learners responded that biology subject is taught through group discussion, 12 percent of the learners responded that biology subject is taught by brainstorming while 8 percent responded that biology subject is taught through project work. It is evident that the majority of the participants responded that biology subject is taught by lecturing. Lecturing is a method of teaching where the instructor gives an oral presentation of subject content to the learners, who are supposed to be taking notes. Simply, the teacher talks and the learners listen. This method of teaching is against what the new curriculum in Rwanda education system recommends, and results into students' failure to develop an appropriate knowledge and skills to apply in real life situation [20].

4. Data analysis from interviewees

4.1. Interview with the Biology teachers

The focus group discussions (FGD) were conducted with four teachers who teach Biology in ordinary level secondary school of the two purposefully selected schools. For anonymity purposes, those four teachers were renamed by codes from 001 to 004. All responses provided were categorized into the following themes: Biology curriculum, teaching and learning activities, Language of instruction, Parents' involvement in learners' education and Learners' socio-economic status.

4.1.1. Biology curriculum

The first and second questions (Appendix G) focused on the biology curriculum in respect to the issues related to the amount of content and time allocated.

The teachers showed that there is a very big content of Biology which is not matching with the number of four periods per week. From his views, teacher one from school A said: "the allocated time for units is not enough, there is a lot of content to be covered in a little time especially in senior three. Even the time for workshops, meeting and other events in the school are not considered on the timetable"

From the discussions, the participants claimed about the Biology curriculum which is so vast to cover in limited time and always end up not covering the syllabus. When the subject content is not finished, it doesn't mean the learners will not be assessed on the unfinished content during the national exam, and this can cause most of the learners to fail. According to Odunsi, (1988) there are several factors influencing the coverage of syllabus but when finished, it has a significant effect on student' performance [21].

The allocated time in biology syllabus can therefore be a factor influencing students' poor performance, because the teachers teach to finish the syllabus not for learners to understand the content.

4.1.2. Class size

Even though the government intervened in the building of new and rehabilitation of old classes to reduce the overcrowded classes and to combat with corona virus, the teachers are still facing the challenge of class size. Teacher one said:" there is a big size class, social distancing is still the problem".

The results from teachers' discussions indicated that the size of class affect the way of teaching and learning activities. A crowded class can't allow teacher to facilitate every individual based on his/her needs and it cannot allow even cooperative learning. In addition, there is a shortage in teaching and learning resources in the overcrowded classes. This can lead to poor learning achievement because the learners are not all taken care for their learning interest and personal problems [22].

4.1.3. Teaching methodology and teaching aids

During the discussions, the teachers said that they are challenged by the lack of laboratory equipment and they are only limited to the charts, diagrams and improvisation. Furthermore, the teachers said that they are challenged by teaching in the times of corona virus 19 since they are not able to apply learner-centred methodology (Below are their results)

Charts, diagrams, posters and improvised teaching materials. Yes, they help them to have in hand the subject.

Not in a very good way because of COVID-19. For example, I cannot cooperate with the learners in group as the best way to accomplish biology curriculum.

From the above discussions, the findings revealed that the teachers do not easily cooperate with the learners due to the class size and the period of corona virus. Due to inadequate laboratory equipment, also biology practices are not conducted. Well conducted cooperative sessions, have an impact on students' academic success. A study was conducted to investigate the effect of cooperative learning on students' academic achievement. The results revealed that cooperative learning has a favourable effect on students' performance [23].

4.1.4. Language of instruction

The responses from question 7 (Appendix G) indicate that English as the language of instruction is a challenge to the majority of the learners.

Based on the teachers' responses, it is evident that the biology lesson is not conducted in English only. For example, one teacher from school A responded: "the language of instruction is so difficult for our learners because they don't understand Biology concepts and to express themselves in English is not easy. This make them perform poorly in exam because we are not able to explain everything for them". Teachers mix with Kinyarwanda which is known as code-switching so that the learners understand.

Being challenged by the instructional language which will be assessed in, also bring an issue of poor academic performance. In biology teaching and learning, the learners need to read and write, and those skills are very essential to the improvement of scientific understanding. From the literatures, the ability of English writing and reading is a contributing factor in effective critical thinking [24]. Critical thinking skills are regarded as important for problem-solving which strengthens the link between academic language proficiency and critical thinking [25].

4.1.5. Parents' involvement in learners' education

The teachers' responses in questions 8, 9 and 11(Appendix G) showed that the parents' contribution in children's education and academic performance is undisputable. However, they are not able to cooperate from each other towards the learners' progress at school. Teacher three from school B said: "No, the parents are always busy in their farming practices, they do not intervene in children's education". And teacher two added: No, the parents do not participate in their children's education due to their illiteracy.

From the teachers' responses, the parents in this area are not educated. So, they are not familiar with the syllabus and English as language of instruction to facilitate their children in doing home works. In addition, the parents in this area are always involved in rearing and agricultural practices, so the time to attend the school events is useless for them. Previous studies have shown the positive effects of parental support and socio-economic status on students'

performance. Khan et al, (1999) indicated that the socio-economic status of the parents is strongly correlated to the students' outcomes [26]. Additionally, the parents' education and income affect the ways of interaction and sharing with children's activities. Therefore, the parents' involvement in children's education has a consistent and positive effect on the academic achievement [26].

4.1.6. Learners' socio-economic status

The question 10 (Appendix G) intended to capture the information related to the socio-economic background of the learners and its effect on the academic performance. The teachers mentioned that most of the learners come from poor families and it has an effect on their performance. (See below).

The most of our learners come from poor families, because they do not have enough scholastic materials and it is not easy to get school fees for feeding. Of cause, their poverty impact their performance since they mix exercises, homework, group work and notes in one book.

The results indicates that the learners come from poor families and this have an effect on learning in many ways. Being in poor families, the rate of absenteeism increase because they are mostly attending the market with their parents. In addition, the learners are mostly absent because of fishing activities in Mugesera lake which is bordering the study area. All of this contribute to the lower performance. The results correlate to the research findings by Amadi, (2019) which revealed that the students' achievement is closely linked to their socio-economic status [27]. This is because the families cannot afford the extra fees for learning at home and textbooks.

4.2. Interview with Head teachers and Deputy Head teachers

4.2.1. Learners' performance in biology

Based on the responses provided on the question 1 (Appendix I) on the students' performance, the school leaders rated them to be performing at low level, and the reasons were mentioned. HT_1 said that:" level of performance is still at low level. The reasons are the higher level of absenteeism and drop-out, parents' awareness and lack of teaching and learning equipment" and the DHT_1 added:" No, they are not performing well. Because of the level of understanding of the learners to be studying in 9 and 12YBE, language of instruction complicates the learners, no laboratory equipment and the learners do not revise at home".

From their responses, it was clear that the learners do not perform well on the fact that, students do not get time to make biology practices, the students are not motivated to study in 9 and 12YBE which make them to be mostly absent and dropping-out the school. This poor participation in class activities affect their performance [28]. In addition, the author argued that the learner's ability is measured through class participation.

4.2.2. Teaching and learning activities

Questions 2, 3 and 4 (Appendix I) were prepared to investigate the factors contributing to the poor performance of learners related to the teaching and learning activities. The researcher looked at the following aspects: availability of teaching and learning materials in line with CBC implementation, attendance of biology teachers at job, teaching methodology and lesson preparation.

When the school leaders, Head teachers and Deputy Head teachers asked about availability of school facilities to facilitate implementation of the new curriculum in science subject especially in biology teaching practices. The responses revealed that the teaching and learning materials are not enough, see below the results.

The teaching and learning materials in science subjects are not enough, especially in Biology. We don't have enough textbooks and laboratory equipment.

Timely attendance of the teachers at job is crucial [29]. When teachers attend early at job help to satisfy the daily work by organizing and preparing the lesson before to deliver. The following is the common views of the school leaders on teachers' attendance and lesson preparation by Biology teachers.

Biology teachers attend early and regularly at a job and always prepare their lessons.

New curriculum intends to develop competencies in the learners through cooperation, collaboration and interaction with the subject matter [2]. Which means the teachers should employ learner-centred method that facilitate learners to

be active and develop values and attitudes for long-life learning. The school leaders were asked about teaching methodology used in relation to CBC implementation.

Teaching methodology is still teacher-centred, no collaboration with the learners because of poor school facilities and even corona-virus pandemic. And all of these affect performance (HT_1).

The teaching methodology does not allow cooperation with learners due to covid19. But before the spreading, it was possible to use available materials for manipulation (DHT_2).

The responses provided indicated that the teaching methodology which commonly used is still teacher-centred method. This feedback from the HTs and DHTs is similar to the findings from the study conducted by Lak et al., (2017) which indicated that teacher-centred methodology is the most dominant in rural secondary schools [30]. However, HT1 suggested that this methodology doesn't allow learners' collaboration and hence affect learners' performance.

4.2.3. School location and effects on performance

School leaders were interviewed about the location of the school and comparison with the other schools in relation to teachers' recruitment, job satisfaction and students' performance (question 5 and 6 in Appendix I). From the discussions, head teachers and deputy head teachers confirmed that the school is in rural area, and being in rural area has effects on students' performance. HT1said that:" School is located in rural area, being in rural area effects, the appointed Biology teachers do like to come because of poor infrastructure. Teachers are not satisfied to work in rural schools, they always like look transfer in urban schools. Rural schools perform poor". Furthermore, DHT2 said that the school is Rural. Teachers are not easily recruited in rural schools, because they are not satisfied with working in rural areas and cause the students to perform poorer than in urban schools.

The results from the interview indicates that teachers are not satisfied with teaching in rural school and the school leaders struggle to get the appointed teachers. Because the school is in remote area where there is no transportation means, sanitation resources and other infrastructure, the newly appointed teachers do not like to go to school and always come late. Being taught with not motivated teachers, the syllabus is not covered and cause the students to perform poor. So, considering the results from the discussions with school leaders, the location of the school is the contributory factor to the learners' poor performance. Researchers conducted different studies and the same findings were found. According to Du Plessis, (2014), rural schools are not attractive for new teachers [31]. The reasons are geographical isolations and rural values [3], and hence poor performance.

4.2.4. Parents' participation in school activities and learners' education

The question 7 (Appendix I) investigated the level to which the parents participate in the school activities. All the respondents had a common agreement with the undisputable contribution of the parents in children's education, but they still participate at low level. The results are given below:

Yes, the parents' participation affect students' performance positively. The parents participate at the lower level.

Most of the participants in interview said that parents in this area do not participate in the children's education. The reasons are their level of education (figure 8) and being busy in their farming activities (figure 9). Research findings have shown that a parental involvement in school activities has an effect on students' outcome [32]. The author concluded that this involvement should be achieved through parenting, communication, volunteering, learning at home, decision-making, and collaboration with the community [32].

Socio-economic background of the learners

Question 8 (Appendix I) intended to investigate the socio-economic background of the learners. The participant' views are as follow:

The majority of our students come from poor families. They are not able to afford the scholastic materials and school feeding fees (DHT2).

From the discussions and questionnaire (figure 11), the results show that learners come from poor families. Being in poor families, the learners face many challenges in their learning. The learners do not get easily learning materials, school feeding and mostly poor nutrition. All the challenges together with malnutrition which affect mental

development [32], lead to academic poor performance. The findings correlate to the research findings by Zack et al, (1954) who revealed that poverty directly affect learners' performance due to lack of resources [15].

4.3. Analysis of the reviewed documents

The researcher analyzed the documents from the learners, Biology teachers and HT's office. The factors which influence learners' poor performance in Biology were identified and noted. See the table below:

Table 3 The reviewed documents and the identified factors influencing students' poor performance

Documents analysed	Identified factors influencing student's poor performance
Sampled teachers' pedagogical docs	Documents are prepared appropriately
Lesson plan preparation of the sampled teachers	Lessons are well prepared
Attendance list of the sampled biology teacher	Biology teachers attend regularly
Notes of the students	Some do not take notes (don't have enough notebooks)
Meeting report of the parents from the HT's office	Parents do not attend as required
Timetable of the sampled biology teachers	Timetables are full
Ordinary level biology syllabus	Number of units especially in senior three are many and they are not matched with the allocated time

Source: secondary data, 2021

Table 3 indicates lessons and documents are prepared by Biology teachers, and also attend regularly on job. However, some learners do not take summary during the biology session. Furthermore, the parents do not regularly attend the school meeting and timetable of the teachers are full. The later, cause the teacher to do not have time to prepare, mark and search. This is supported by biology teachers' views in Appendix G where one teacher from school A said: "the allocated time for units is not enough, there is a lot of content to be covered in a little time especially in senior three. Even the time for workshops, meeting and other events in the school are not considered on the timetable" and this is also linked to the research findings by Ribeiro et al., (2013), who found out that the teacher's workload influence learners' poor performance [33].

The researcher further analyzes the biology syllabus of ordinary level. The main findings were that the teachers have a big workload especially in senior three where the teachers have to cover twenty three (23) units while senior two and senior one are sixteen (16) and fourteen (14) respectively. This makes the teacher to rush the material so that they can finish the syllabus in given period of time. The learners are taught to cover the content not to understand it which cause them to perform poorly.

5. Conclusion and Recommendation

This research investigated the factors that influence the poor performance of students in the biology subject: ordinary-level case study in rural secondary schools in the district of RWAMAGANA. In general, the study was guided by the question "What are the variables that influence the poor performance of the students in the subject of Biology?" The results showed that the causes of poor performance of students are: English as medium of instruction, inadequate laboratory equipment, insufficient teaching and learning materials, inappropriate teaching technique, amount of content and time allocated, insufficient participation of parents in education of learners, poverty, absenteeism of the students and school location. However, it doesn't mean that there wasn't any other factor that caused such a poor performance problem in Biology subject, there might be others. Based on the research findings, the researcher issued recommendations to various education stakeholders on the basis of the research results in order to improve the performance of students in Biology subjects: Biology teachers, school leaders, Ministry of education (MINEDUC) and parents. Biology teachers should apply code-switching during teaching and learning processes so that the students understand the Biology concepts and apply collaborative approach as learner-centred teaching methodology. School leaders should develop good school-community relationship and mobilizing the students on the importance of education. Ministry of education should provide adequate Biology teaching-learning materials and laboratory

equipment in the rural schools and also the Curriculum developers should allocate an appropriate time with the content. Finally, the parents should contribute to their children's education by: participating in school events and making available all needed resources for the children to study both at school and at home.

Compliance with ethical standards

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Disclosure of conflict of interest

Authors have declared that no conflict of interests exist.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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