BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF SCIENCE EDUCATION

BACHELOR OF SCIENCE EDUCATION HONOURS DEGREE IN CHEMISTRY

AN INVESTIGATION ON THE FACTORS CONTRIBUTING TO LOW UPTAKE OF CHEMISTRY AT ORDINARY LEVEL.

BY

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A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS OF THE BACHELOR OF SCIENCE HONOURS DEGREE IN CHEMISTRY EDUCATION.

MAY 2024

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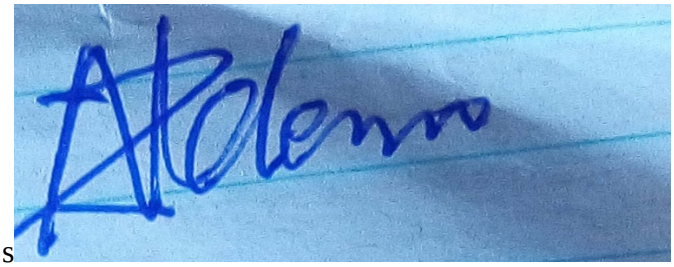
s 

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Signed……Fwhizi……..Date 30/05/2024

Permanent Address: Nyamazengwe Secondary school Private Bag 1042 Nembudzia

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Firstly I would like to thank my husband Paradza Paul for encouragement he gave me to complete this project. I also want to thank Mr Shasha for both the Material Assistance and the continual follow ups and available directions throughout of the project.

My appreciation is also directed to Makopa for their generous support and encouragement.

Dedication

This research is dedicated to my beloved husband Paul Paradza, my son Courage and my daughter Purity.

ABBREVIATIONS ACRONYMS

STEM ……..Science and technology engineering and mathematics.

UNICEF……United Nations Children Education Fund.

ICT…….Information Communication Technology.

Abstract

This research project aims to investigate the factors contributing to the low uptake of Chemistry at Ordinary Level. The research methodology used was questionnaire method. The study could be of great importance to the development of Science education in the country. It enabled me to understand factors contributing to low uptake of Chemistry at Ordinary Level. The sample size consist of 20 teachers and 20 pupils from both school A and school B. Data analysis was presented using pie charts and tables. In this study, all the teachers who were given questionnaires have professional qualifications. This means that they are either qualified to teach science subjects or they have other qualifications but teaching science at these schools. The researcher was satisfied that the information obtained come from the rightful people. This research study has revealed that low uptake of Chemistry at Ordinary Level is caused by streaming, lack of experienced teachers, shortage of resources, lack of laboratory and laboratory equipment. This study recommends Chemistry as a Science subject to be compulsory at Ordinary level .Therefore, teachers should eliminate streaming on Science subjects. There is need for an establishment of scholarship and should be awarded to any student who is brilliant in Science to create interest for others with low or no interest to Science

and motivate the weak ones. Parents and teachers should always motivate students to enrol for science courses by exposing them to various career opportunities available in Science.

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CHAPTER 1

1.0 INTRODUCTION

1.1 Introduction to the study

This chapter outlines the following headings: background of the study, purpose of the study, statement of the problem and research questions. Main research questions, research objectives, assumption of the study, significance of the study, limitations, delimitations and definition of key terms.

1.2 Background of the study.

A dual education system existed in Zimbabwe during the colonial era. The dual system was meant to create a clear distinction between whites and blacks (Ncube and Tshabalala, 2014). Education was used as a tool to suppress the blacks. It was segregator in nature. Education for whites was designed to prepare the white children for their predetermined status in life that is to say their white employers or masters while the African children was prepared to become a labourers or servants. After independence in 1980 the Zimbabwean government was committed to make reforms in the education system (Ncube and Tshabalala, 2014). The 1987 Education Act brought many educational reforms. Education was declared a fundamental right. It was regarded as a crucial tool for social and economic transformation.

Despite the noble idea of availing secondary education to most of students there was a general about low uptake of Science subjects from these schools at Ordinary level. There were hues and cries among stakeholders in the education sector about low uptake of Chemistry in Zimbabwean Secondary Schools. Chemistry is one of the subjects in the Zimbabwean curriculum which low enrolment at Ordinary level. The growth of Zimbabwean commerce and industry in the post-independence era saw a rise in demand for employees with a firm scientific background. The scientific background is an important function of any organization in the country. Many candidates took up Science subjects at Ordinary level .However, Chemistry enrolment was very low resulting in a shortfall of professionals taking science oriented careers such as teaching, nursing, medical doctors, engineers among others. This prompted the government of Zimbabwe to launch the Science, Technology, Engineering and Mathematics (STEM) programme in a bid to encourage more learners to take up Science subjects at Ordinary level and Chemistry is one of the Subjects included in the STEM programme. There are

programme which promote Science subjects like STEM. Zimbabwe's STEM initiative was introduced on the start of 2016. This is part of the government's drive to promote the adoption of such subjects, which are now at the core of most national development plans with the Zimbabwean government using this initiative as its own play at ensuring that the nation has the adequate number of candidates developing science-related skills. The Ministry of Primary and Secondary Education and Ministry of Higher and Tertiary Education have made it clear that Science Technology Engineering and Mathematics (STEM) subjects have strategic economic importance and are the priority. It is so much a priority that students taking up STEM subjects at Advanced level have been offered free education by the government.

Chemistry is defined as the study of matter, its properties, how and why substances combined or separate to form other substances, and how substances interact with energy. It comprises of many branches, which include, Analytical chemistry, Physical Chemistry, Organic chemistry, Inorganic Chemistry and Biochemistry. These branches into, Food Chemistry, Environmental Chemistry, Agricultural Chemistry, Chemical Engineering Geochemistry, Forensic Chemistry among others (Mary Bagley, 2017). This research work therefore attempts to make clear comprehensible all the factors which contribute to low uptake of Chemistry and also to suggest lasting solutions which promote higher of uptake of Chemistry at Ordinary Level.

.1.3 Purpose of the study

The focus of the study is to investigate the factors which contribute to the low uptake of chemistry at Ordinary level in Gokwe North considering Nyamuroro High School and Nembudziya High School.

1.4 Statement of the problem

Students enrolled for Chemistry at Ordinary Level tend to be very low in Gokwe North District as shown by table 1.1.The problem has been observed as not being limited to a single school. Therefore the researcher sought to find out the factors contributing to low uptake of Chemistry in Gokwe North.

1.4 Main Research questions

Table 1.1 Enrolment of School A and B

School	Year	Number of learners enrolled
A	2020 2021 2022 2023 2024	37 35 32 30 29
B	2020 2021 2022 2023 2024	48 45 42 40 35

From table 1 it was evident that the enrolment of students in Chemistry at Ordinary Level in Gokwe North was relatively low. This had prompted the researcher to find out the factors which contribute to low uptake of Chemistry at Ordinary Level.

1.5 Research objectives

The aims of this research is to;

- Investigate the factors which contribute to the low uptake of Chemistry at Ordinary level.
- Suggest strategies which will be effective in increasing Chemistry uptake at Ordinary Level.

1.6 Assumption of the study

- All respondents shall give true, reliable and relevant response to the questionnaires.

1. 7 Significance of the study

- This study is important as it would help teachers with information about factors that contribute to low uptake of Chemistry.
- This study will also increase the teacher's level of awareness and understanding of factors associated with low uptake of Chemistry at Ordinary Level.
- The study will also help parents to give adequate sense of motivation to learners as this inspire them to pay special attention to the learning of Chemistry.
- This study will help to improve students directly in their study habits in Chemistry.
- This study will increase high uptake of Chemistry at Ordinary level.

1.8 Delimitation

The study was done at two schools in Gokwe North District namely: Nyamuroro High School and Nembudzia High School because they are the only schools which offer Chemistry.

1.9 Limitation

Some respondents were too ambitious and focused on their personal feelings on their responses. Hence create bias, which finally implied some problems in data reporting

1.10 Definition of key terms

Curriculum

- It is the structured set of learning outcomes or tasks that educators usually call goals and objectives.

Curriculum Framework

- It contains the main guiding elements that cater for the cohesion, and consistency of the planned education activities (Zimbabwe Curriculum Framework for Primary and Secondary Education 2015-2022).

Chemistry

- Is the study that deals with the composition and properties of substances and various elements of matter.

Low uptake

- Is when a few pupils opt to do the subject Chemistry.

Ordinary level

A secondary school examination offered upon the completion of four years in secondary education.

Motivation

- In this research motivations are incentives which cause either Chemistry students or chemistry teachers in secondary school to act positively on the subject.

1.11 Chapter summary

This chapter explains the statement of the problem, research questions and the importance of the study, delimitation and limitation, and assumption of the study.

CHAPTER 2

2.1 INTRODUCTION

Literature review

Literature review gives reports of studies found in the world related to the low uptake of chemistry. This chapter focuses on the literature related to the specific objectives of the study. It also highlights some issues relating to low uptake of Chemistry in Secondary Schools and what other researchers have written about the subject and the gap requiring further research. The purpose of literature review is to outline the factors which contribute to low uptake of Chemistry at Ordinary Level.

2.2 FACTORS WHICH CONTRIBUTED TO LOW UPTAKE OF CHEMISTRY AT ORDINARY LEVEL.

Streaming

Science teachers practice streaming of learners after learners complete their form two. It is the practice of putting Science students in groups of the same age and ability to be taught together. Therefore, the decision of doing Chemistry at Ordinary Level is teacher based.

Lack of qualified personnel

Most schools do not have the requisite qualified personnel to teach Science, Mathematics and their related disciplines. These subjects also, are taught as separate independent subjects. This removes the coherence, interrelatedness and interdisciplinary nature of these subjects (Bhukuvhani and Nyikahadzoi, 2015).

Lack of science apparatus and equipment.

Lack of science apparatus and equipment is limiting the number of science students in the subject areas (Bhukuvhani and Nyikahadzoi, 2015).

Lack of resources

Rosemary S et al, (2014), state that attacking the problem with inadequate supply of teaching and learning resources such as chemicals, charts, apparatus, models, local specimens, laboratories, text books and libraries lead to poor achievement in Chemistry .Nja, Cornelius-Ukpepi, Edoho and Orim (2019) postulated that most students find that actual objects, models

or live equipment make phenomena or concept concrete enough to be understood. Therefore, resources are important in teaching and learning

2.3 WAYS OF IMPROVING LOW UPTAKE OF CHEMISTRY AT ORDINARY LEVEL

- Adoption of best practices like lesson study.
- ICT enhance the teaching of Chemistry.
- Chemistry workshops.

2.4 Research gap

Other researcher should use statistical techniques to test similar hypothesis.

2.5 Chapter Summary

Having gone through the above study, one can note that there are factors which contribute to the low uptake of Chemistry and these are: streaming, lack of science apparatus and equipment limiting the number of Science students in the subject, as well as lack of modern scientific resources.

CHAPTER 3

3.0 RESEARCH METHODOLOGY

3.1 Introduction

This chapter looks at how the research would be conducted, that is the research design, population and sample size, research instruments, data collection and analysis procedures. The use of questionnaires would be justified by looking at advantage and disadvantages of each.

3.2 Research design

The study would involving obtaining information on factors that contributed to low uptake of chemistry at Ordinary level. The research would employ qualitative and quantitative data collection and analysis the questionnaires will be administered for pupils and teachers.

3.3 Research strategy

Research strategy is a plan that guides my research activities and helps me to achieve my research goals. In this research l will use questionnaire.

3.4 Research methodology

3.4.1Questionnaire method

The questionnaire techniques are often used in many educational researchers usefulness in collecting both open and closed ended questions or information from a wide spread sample. When the pupils fill the questionnaire, the researcher will give them the chance to work on their own pace at their convenience. The use of the questionnaire as a research instrument has been justified for the following advantages. Respondents can comfortably express their own views and feelings. This is because the questionnaire affords the chance of respondents would remain anonymous since the names of the respondents were not been given. On the questionnaire, the open-ended questions permitted free response. The respondent gave a wide range of responses

3.4.2 Population and sampling

Population

The population used in this study was more about 40 from these two schools. Nyamuroro high school and Nembudzia Government high selected from samples size of 20 pupils and 20 teachers.

Sampling

The sample size consists 20 pupils and 20 teachers; 10 pupils from one school and 10 teachers from one school. The research used the stratified sampling technique to select the sample size. The population was divided in three different strata based on the level of education

3.4.3 Data collection method

The researcher also agreed with the school head that the information would not be made available to anyone else. After the agreement with the head, the questionnaires were distributed to the pupils with the help of teachers. The researcher made the following opinion for the questionnaire after an hour and then data was analysed.

3.4.4 Data presentation and analysis procedure

Data analysis is a process of organising and scrutinising data in such a way that the research question could be answered. The data gathered was structured to produce knowledge. The data obtained using questionnaire and combined to come up with an extensive explanation of the facts on the field. The teacher's ideas were merging with those of pupils to come up with an analysis of the problem statement. The data was presented by using appropriate data presentation methods of tables and graphs, after that, the data become easier to manipulate and explain. The factors that contribute to low uptake in Chemistry at ordinary level.

3.5 Reality and validity

Is the state of things as they actually exist, rather than as they may appear or may be thought to be. Validity is the quality being based on truth or reason or of being able to be accepted? The validity of the reason or of being able to be accepted. The validity of the research study refers to how well my results among the study participants represent true findings among similar individuals outside.

3.6 Ethical issues

Ethical considerations were considered consciously and deliberately made. Some practical considerations made during the study included resources, time, logistical limitations of the study. Of importance was the decision to exclude minors (children aged 14 years and below) from the sample frame as a way of avoiding known stringent research ethical challenges when children, as vulnerable populations, are involved as either research subjects or research objects.

3. 7 **Chapter Summary.**

The chapter has described the research methodology used in the study**.** The research design and pointed out the research instrument used. Data collection analysis and analysis methods were outlined.

CHAPTER: 4

4.0 DATA PRESENTATION, ANALYSIS AND DISCUSSION\INTERPRETATION

4.1 Introduction

A total of 40 questionnaires were distributed amongst Chemistry students at two high schools in Gokwe North District. The questionnaires were also supplied to teachers. Each school was assigned a letter of the alphabet for easy handling of data. Nembudziya Government High School and Nyamuroro High School were coded A and B respectively. Frequency tables and bar charts were used to present the data. Descriptions of collected data on factors faced by both students and teachers on low uptake of Chemistry were presented.

4.2 Data presentation and, analysis and discussion\interpretation

4.2.1 Composition of respondents

Table 1.2

Respondents	Number of elements in the sample	Percentage of sample frame
Teachers school A	10	25%
Pupils school A	10	25%
Teachers school B	10	25%
Pupils school B	10	25%
Total	40	100%

A cross-section of the study respondents informed the study. Different informant categories were preferred for the study to allow cross-checking, validation of key informant. The percentage of the sample is 25% on each group

4.2.2 Study response rate

Table 1.3 study response rate

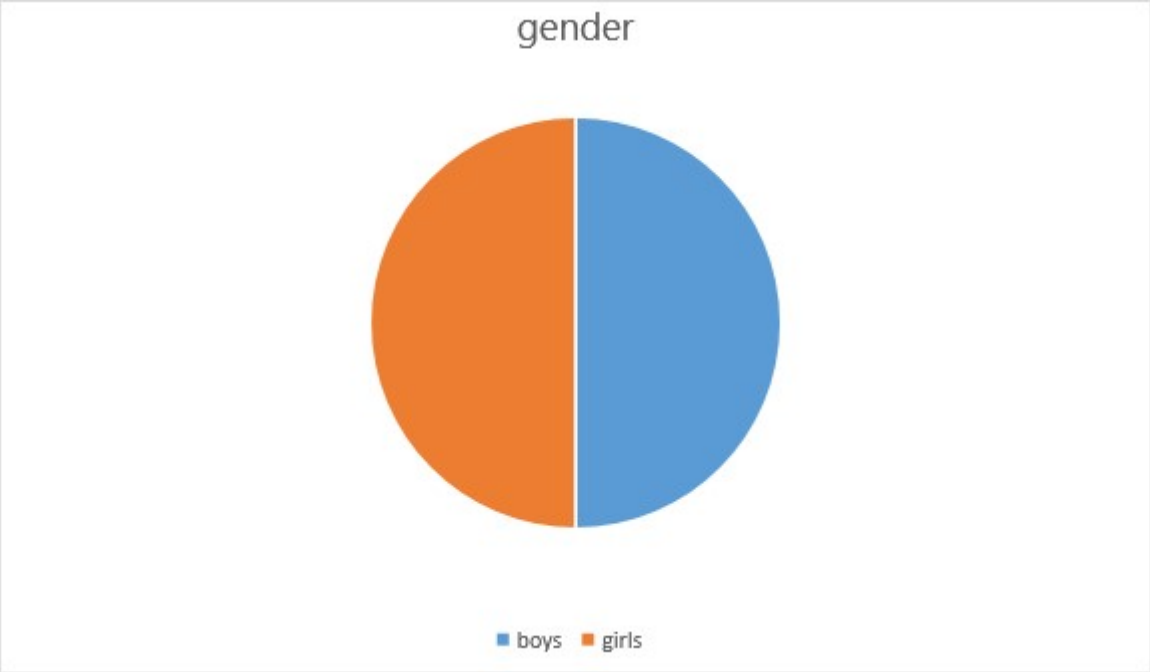
Respondent	Target number	Actual number	Response rate
Teacher school A	10	10	100%
Pupils school A	10	8	80%

Teachers school B	10	6	60%
Pupils school B	10	7	70%
Total	40	31	78%

The study response rate was quite high with 100% response rate in respondent teacher *on* school A. Respondent on pupils school A was 80% response rate .The response rate on teachers on school B was 60% and pupils on school B response rate was 70%.

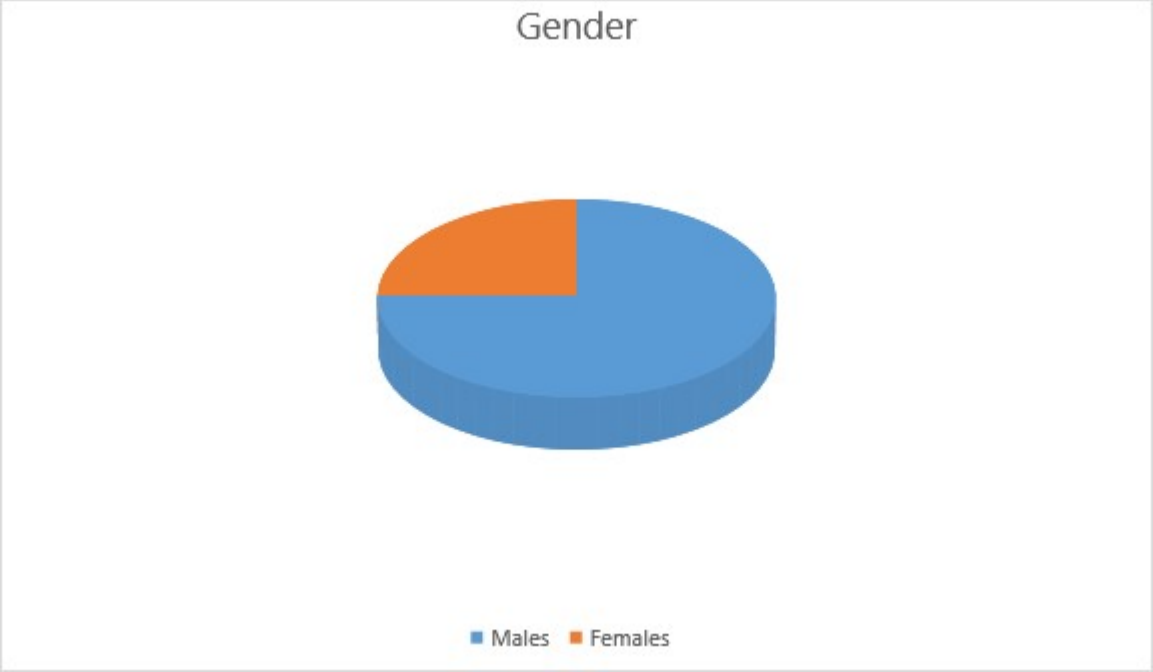
Figure 1.0 Gender Distribution

The gender distribution amongst Chemistry students of both schools A and B.



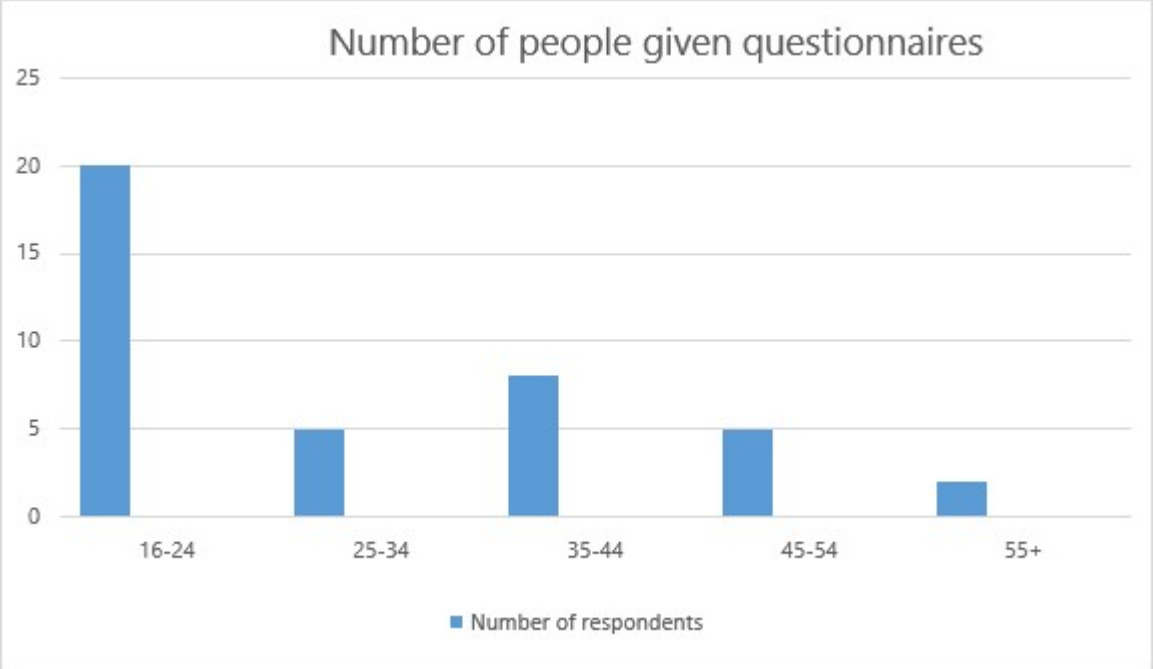
The gender distribution amongst pupils for both schools were half- half. 50% female and 50% boys. There was equal chances of male and female students of doing chemistry.

Figure 1.2 the gender distribution of science teachers for both schools.



Demographic data shows that there are more men than women in the research conducted. The pie chart above illustrates the gender dimension in the questionnaire distributed. The male teachers have 75% and the female teachers has 25%. This shows that there were more male teacher qualified to teach sciences and on female there was a low percentage on female and it shows few female are keen to teach science.

Figure1.3.Age distribution of science teachers and pupils



Informants were not selected according to age but age categories came from the interviews conducted as shown from the above diagram. It is clear that pupils given the questionnaires were from the age 16 to 24. Followed by those aged between 35-44 years .The age range between 25-34 and 45-54 were equal. The bar graph shows that most science teachers are between 35- 44.

4.3 Chapter Summary

The results shows that lack of resources, lack of laboratory apparatus and equipment, lack of qualified teachers and steaming is a major factor which contribute to low uptake of Chemistry at Ordinary Level. This factor agree with Bhukuvhani and Nyikahadzoi found. The next chapter will focus on the summary, conclusions and recommendations.

CHAPTER 5: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter summarises the research study outlining the conclusions drawn related to factors which contribute to low uptake of Chemistry at Ordinary Level.Recommendations are also given.

5.2 Summary of the study

The researcher has observed that low uptake of Chemistry has become a widespread problem. This motivated the researcher to carry out the study to establish the factors contributing to low uptake of Chemistry at Ordinary Level. The study is significant because Chemistry lays a foundation for a wide variety of careers such as medicine, teaching and pharmacist. . In this study, all the teachers who were given questionnaires have professional qualifications. This means that they are either qualified to teach science subjects or they have other qualifications but teaching science at these schools. The researcher was satisfied that the information obtained come from the rightful people. For all the respondent who responded to questionnaires both learners and teachers, highlighted that there are no enough laboratories and equipment's at their schools. Respondents at school A highlighted that there is no laboratory but they are using culture hut as a makeshift laboratory and equipment's and chemicals are scarce. At school B, the laboratory was present but it is a dilapidated situation and the equipment not enough. Lastly, streaming is a major factor which contribute to low uptake of Chemistry at Ordinary Level. Why, because learners are not given a chance choose the subject. The decision is made by the teacher.

5.3 Conclusion

In this study, we can conclude that there are various factors which contribute to the low uptake of chemistry. Streaming, lack of laboratories, laboratory equipment's and shortage of trained or qualified chemistry teachers, shortage of resources and lack of career guidance workshops. More so, what motivates pupils to do chemistry at Ordinary Level are, career guidance and STEM programmes. The other research objective of ways of increasing low uptake of Chemistry at Ordinary include putting Chemistry as a subject to be a compulsory and remove streaming, training of chemistry teachers under scholarships, Donations of resources by donors and government, career guidance and should be included in the Primary and Secondary curriculum to remove stigma.

5.4 Recommendations

Further investigation need to be done on low uptake of chemistry at ordinary level. There should be establishment of STEM centre and establishment of Science centre. The District should set a careers day. Donors from outside the country can donate laboratory apparatus or kit for example UNICEF. Chemistry as a Science subject should be compulsory at Ordinary Level.

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Zimbabwe Curriculum Framework Primary and Secondary Education 2015 -2022

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QUESTIONNAIRE FOR PUPILS

Good morning /Afternoon. My name is Whindizi Faith Ziviso. I am a student at Bindura University and conducting a study on ‘’an investigation on factors contributing to low uptake of Chemistry at Ordinary level; the information from this study will be treated for academic purposes only. Your answers will not be released to anyone and they remain anonymous. I hope you will not mind in responding to this questionnaire.

Thank you.

1a) Sex: Male ( ) Female ( )

b) Age (yrs.): 10-16, ( ) 16-24 ( ), 25-34 ( ),

2) Does the school has enough laboratories and equipment’s?

3) Do you agree that there is low uptake of chemistry at ordinary level? Strongly Agree ( ) Agree ( ) Neutral ( ) Disagree ( ) Strongly Disagree ( ).

4) What are the factors which contribute to low uptake of chemistry at ordinary level?

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5) What strategies can be effective to increase Chemistry uptake at Ordinary Level.

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BINDURA UNIVERSITY OF SCIENCE EDUCATION

QUESTIONNAIRE FOR TEACHERS

Good morning /Afternoon. My name is Whindizi Faith Ziviso. I am a student at Bindura University and conducting a study on ‘’an investigation on factors contributing to low uptake of Chemistry at Ordinary level; the information from this study will be treated for academic purposes only. Your answers will not be released to anyone and they remain anonymous. I hope you will not mind in responding to this questionnaire.

Thank you.

1a) Sex: Male ( ) Female ( )

b) Age (yrs.): 10-16, ( ) 16-24 ( ), 25-34 ( ), 35-44 ( ), 45-54 ( ) 55-64 ( ), 65+ ( ).

c) Status ( ) Married, Single ( )

d) +++e) Level of education: Primary level ( ), O’ level ( ) Advanced level ( ) Tertiary ( ), Professional ( ).

2) Does the school has enough laboratories and equipment’s?

3) Do you agree that there is low uptake of chemistry at ordinary level? Strongly Agree ( ) Agree ( ) Neutral ( ) Disagree ( ) Strongly Disagree ( ).

4) What are the factors which contribute to low uptake of chemistry at ordinary level?

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5) What strategies can be effective to increase Chemistry uptake at Ordinary Level.

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All Communication should be addressed to:
The District Education Officer
Ministry of Primary and Secondary Education
Telephone: [illegible]

Ministry of Primary and Secondary Education
P Bag [illegible]
Nembudziya

29 May 2024

Dear Sir

TO WHOM IT MAY CONCERN

The bearer ***WHINDIZI FAITH*** Z Reg: ***1460980*** is a student with Bindura University of Science Education undertaking a research on "low uptake of chemistry at ordinary level" [illegible] Gokwe North District."

Her research will go a long way in assisting the Ministry of Primary and Secondary Education in the implementation of curriculum issues in Gokwe North District and Ministry as a whole.

May you assist her carry out her research in your school.

Thank you

Yours Sincerely

Samunyaka D

pp……………………………………

District Schools Inspector

Gokwe North, Midlands Province

Cell Number: 0777 905 453