

# THE POPULARITY OF NATURAL SCIENCES, AND ENERGY RESSOURCES MANAGEMENT IN SCHOOLS, IN CENTRAL AND NORTHERN REGIONS



The Report of monitoring and evaluation of  
the impacts of trainings conducted for teachers and  
tutors from selected pilot educational institutions.





## **Uganda National Commission for UNESCO**

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Published in July 2018

# The Popularity of Natural Sciences, and Energy Resources Management in Schools, in Central and Northern Regions

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## COVER PAGE

On the right: A group photo at Nakasongola SS of the staff and the UNATCOM representatives taken on the 9<sup>th</sup> April 2018

On the left: A group photo at Mutunda SS of the staff and the UNATCOM representatives taken on the 10<sup>th</sup> April 2018

All photos courtesy of UNATCOM team

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# MONITORING OF POPULARITY OF NATURAL SCIENCES, ENERGY TRAINING AND MANAGMENT IN SCHOOLS, IN CENTRAL AND NORTHERN REGIONS

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## List of Acronyms

<b>ICT</b>	Communication Technology
<b>NCDC</b>	National Curriculum Development Centre
<b>PCB</b>	Physics, Chemistry and Biology
<b>PCM</b>	Physics, Chemistry and Mathematics
<b>PEM</b>	Physics, Economics and Mathematics
<b>PS</b>	Primary School
<b>PTC</b>	Primary Teacher's College
<b>SESAMAT</b>	Secondary Science and Mathematics
<b>SS</b>	Secondary School
<b>SSS</b>	Senior Secondary School
<b>STAR</b>	Science Teacher and Researcher
<b>UNATCOM</b>	Uganda National Commission for UNESCO
<b>UNESCO</b>	United Nations Educational, Scientific and Cultural Organization

## Foreword

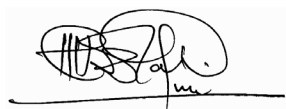
One of the strategic objectives of UNESCO for the Natural Science Programme is to strengthen science, technology and innovation systems and policies nationally, regionally and globally.

Sciences are the basis for understanding and analysing human and natural systems. In this regard, the community of scientists ought to be the engine for generating practical solutions to many of the challenges in the world. Engineering for example is a vitally important contributor to economic development and job creation, particularly for the youth and this calls for capacity building in engineering and the other science disciplines for advancing sustainable development.

According to the reports from the Uganda National Examination Board, the trend in performance over the period of 2010, 2011 and 2012 has shown consistent 40% annual failure of students in ordinary level Mathematics, Physics, Chemistry and Biology. The appalling situation of dismal performance in the midst of high unemployment and declining growth indicators is of great concern. It is against this background that there is need to examine the multiplicity of factors that influence the low popularity and poor performance of science subjects in schools. Moreover, it is crucial to improve the teaching of sciences in schools to encourage students to take sciences in school more often and thus continue having a science-related career.

In this regard, the Uganda National Commission for UNESCO trained science teachers from Central and Northern regions as champions to popularize natural sciences in schools. The following report shows the monitoring and evaluation process done after the workshops.

It is hoped that this report will stimulate further interest in all stakeholders to improve the situation of sciences and mathematics in Uganda.



**Dr. Dominic V. Lali Mundrugo Ogo**  
Assistant Secretary General



## Acknowledgements

This report is the result of the collaboration and support of many individuals, and various schools and institutions. It would not have been possible without the cooperation of the headteachers, the teachers and students of the selected schools as follow: Nakasongola S.S.S., Comboni S.S.S., Mutunda S.S.S, Loro Core PTC, Pope Paul VI S.S. and Anaka Primary School.

In addition, we would like to acknowledge with profound thanks all the staff of UNATCOM, especially the Secretary General, Ms. Rosie Agoi and the interns for their invaluable contribution to this report.

We especially recognize Dr. Dominic Mundrugo-Ogo Lali, Programme Officer of Sciences, Ms. Irene Mutumba and Mathilde Stoetzler for implementating and evaluating the project.

Finally, we thank UNESCO for funding this project.

## Executive Summary

The UN Secretary-General's Scientific Advisory Board (UNSG SAB) recommended to maximize the contribution of science beyond a 'means of implementation' with regard to achieving the 2030 Agenda and the SDGs. Moreover, the Natural Sciences is UNESCO's second major programme and UNESCO believes that science must respond to societal needs and global challenges through improved understanding of sciences and citizen participation.

There are currently increasing concerns about the continued low popularity of sciences and mathematics in the minds of students and hence students' continued poor performance in these subjects.

In this regard, the Uganda National Commission for UNESCO trained science teachers from Central and Northern regions as champions to popularize natural sciences in schools in April 2017. This followed an earlier training in energy education and management of energy resources in schools that took place in June 2016. To assess the impact of the above trainings, a monitoring and evaluative mission was conducted from 9<sup>th</sup> to 11<sup>th</sup> of April 2018 covering 6 of the beneficiary schools in four Districts of Nakasongola, Kiryadongo, Nwoya and Oyam.

The overall objective was to follow up the teachers who were trained as champions for popularizing sciences and energy management in their schools, find out if the trained teachers shared the knowledge acquired from the training with the other teachers working at the school and assess the progress made or other outstanding issues related to the learning of sciences, energy and management of energy resources.

The methods used included observation, discussions and questionnaires tailored to the different stakeholders (Headteacher, Science Teachers and Students).

The Monitoring and Evaluation showed that the goals of the workshops were achieved to greater extent. This is due to the selection of some of the representatives that was not effective as only two teachers trained were available when the different schools were visited. Only few of the representatives shared their acquired knowledge with the other teachers back in their schools and colleges. Therefore, though the training provided relevant information, some of the trained teachers kept the knowledge to themselves.

The programme needs to be continued as science needs to be popularized, especially among students.

## CHAPTER ONE

# INTRODUCTION

### 1.1. Background Information

In FY 2012/2013, UNATCOM commissioned a pilot study on energy education and management of energy resources in educational institutions. The overall objective of the study was to assess the baseline situation of gaps in energy education and management of energy resources in the educational institution based initially on three pilot districts of Wakiso, Kayunga and Iganga targeting 13 educational institutions including 4 Primary schools, 5 Secondary schools, 2 Primary Teacher Training Colleges and 2 Technical Training Institutes as a basis for the development of a more comprehensive study on energy supply and utilization across various institutions in the country. The major findings of the study was baseline data about the state of energy education and management in the sampled institutions that showed that there was inadequate knowledge of energy conservation and management in the institutions covered and that the level of energy awareness in the sampled educational institutions was very low across the board. In terms of stakeholder involvement, it was found that this was also low. Biomass was found to be the dominant source of energy at 92%. These findings prompted the Commission to launch follow-up practical trainings. From 2014 to 2016 trainings were conducted for the teachers from selected Primary and Secondary Schools in the North-western Region at Arua and the Northern and North-eastern Regions at Lira.

Then in the same period, Uganda was experiencing increased concerns about declining performance and enrolment in sciences including mathematics in the secondary schools across the country. This drew the attention of the National Commission which launched an intervention aimed at bringing together the science teachers in turns with view to gathering information about the possible causes of the problem. At the same time, the Commission initiated a popularisation drive to promote interest in the sciences by training selected teachers as champions for popularisation of the natural sciences in their respective schools in 2016/17 financial year. As a result, in April 2017, 60 science teachers from the best performing schools mostly in the central region and those performing poorly mostly in northern regions as champions to popularize natural sciences in schools.

### 1.2. Justification

As a number of trainings had been done between 2014 and 2017, there was need to assess the impact of the trainings by conducting a monitoring and evaluative mission so as to assess the impact of the training in those schools. The exercise eventually took place from 9<sup>th</sup> to 11<sup>th</sup> of April 2018 covering some of the beneficiary schools.

### 1.3. Objectives of the Monitoring and Evaluation

#### a) The Overall Objective

The overall objective was to follow up the teachers who were trained as champions for popularizing sciences and energy management in their schools, find out if the trained teachers shared the knowledge acquired from

the training with the other teacher working at the school and assess the progress made or other outstanding issues related to the learning of sciences, energy and management of energy resources.

## b) Specific Objectives

- i) To share information with the headteachers, the representative teachers and Students about the popularity and performance status of Science and Mathematics, Energy Education and Management of Energy Resources.
- ii) To find out the impact of the trainings in terms of the popularity of sciences, the performance of the students and the influence of the energy-saving technologies in the schools and whether the overall purpose of the trainings were being achieved.
- iii) To collect and document data on existing and needed interventions to upscale/consolidate progress made or address the identified challenges faced since the interventions in trainings of the teachers by UNATOM.

## 1.4. Methodology

### 1.4.1. Scope of the Coverage

Due to limited funds, the monitoring was broken into four phases. The first phase targeted 6 schools and institutions in four Districts of Nakasongola, Kiryadongo, Nwoya and Oyam. The methods used included observation methods, discussions and questionnaires.

### 1.4.2. Tools for data Collection

The tools included: A checklist for guidance in the observations and a questionnaire that was tailored to the different stakeholders (Headteacher, Science Teachers and Students).

These were administered for completion to the headteachers, teachers and students and the structured questionnaire was directly administered by reading out the questions to the respondents for a focus group discussion and the responses recorded by the monitoring team. The data was then analyzed later using a variety of methods including tabulation, use of excel spreadsheets and graphical methods for ease of interpretation.

### 1.4.3. Targeted Schools and Institutions

- a) Science (Basic & Earth) and Mathematics Promotion
  - i. **Nakasongola District:** Nakasongola S.S.S.
  - ii. **Kiryadongo District :** Comboni S.S.S. Kigumba and Mutunda S.S.S (Earth Sciences), Kiryadongo
  - iii. **Oyam District:** Loro Core PTC
- b) Energy Education and Conservation
  - i. **Nwoya District:** Pope Paul VI S.S. Anaka and Anaka Primary School.
  - ii. **Oyam District:** Loro Core PTC

## **1.5. Expected Results**

### **1.5.1. Expected Outputs**

- a) Information on the popularity and performance status of Sciences, Mathematics and Energy Education and Management of Energy Resources shared.
- b) Information on existing and needed interventions including the trainings for teachers on Energy Education and Management of Energy Resources and as Champions for popularization of the Sciences including Basic, Mathematical and the Earth Science made and documented.

### **1.5.2. Expected Outcome**

Data on the status of the popularity of sciences, science education and knowledge and skills in management of energy resources in the educational institutions determined and documented.

## CHAPTER TWO

### FIELD FINDINGS

#### A: FINDINGS FROM OBSERVATIONS AND DISCUSSIONS WITH STUDENTS AND STAFF

##### 2.1. Nakasongola Senior Secondary School

Nakasongola Senior Secondary School is a mixed school founded in 1968 in Nakasongola District. The head teacher has been in office for 4 years. The teaching staffs are composed of 14 science teachers 3 each for biology, chemistry and physics and 5 mathematics teachers. 730 students were attending the school. Of these, only 25 were studying sciences at S.5. and S.6. as principle subject as below:

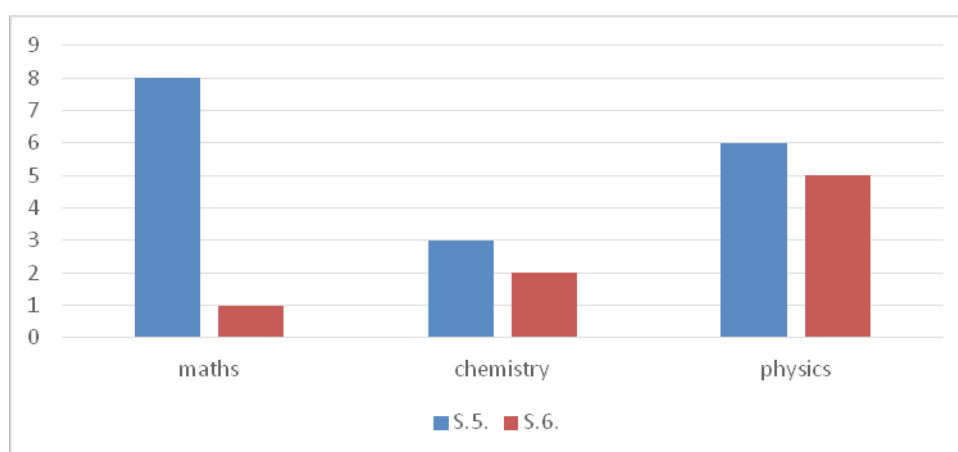
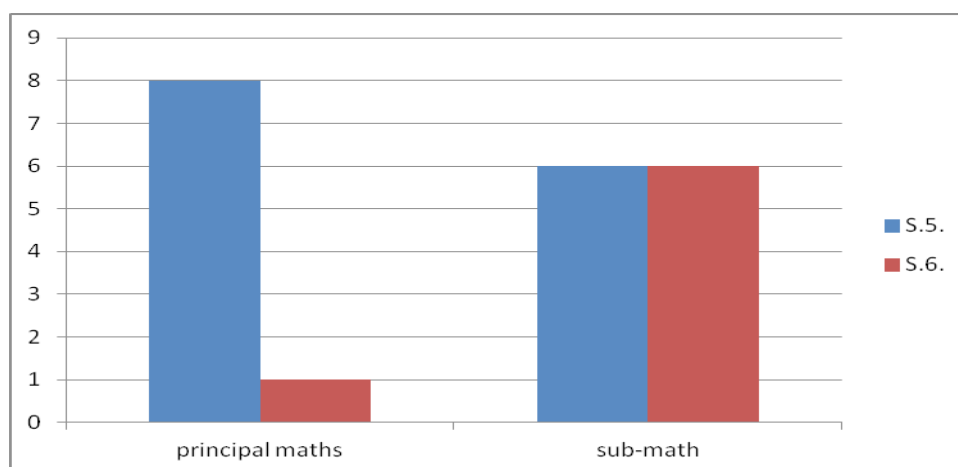


Chart 1: Number of students taking science subjects in S.5. and S.6 in 2018. (Table in Annex 8)

In terms of proportion of girls taking mathematics at advanced level, the findings are shown below:

	Girls		Total of Girls	Percentage of Girls
	Principal Maths	Submath		
S.5.	8	6	14/30	46,7%
S.6.	1	6	7/23	30,4%



Graph shows more students offered Principal Mathematics in S.5 than S.6 where in the latter sub-mathematics was offered equally.





Classrooms buildings of Nakasongola SSS

## 2.2. Blessed Comboni Secondary School

Blessed Comboni SS was founded in 1998 and is located in Kiryandongo District, Kigumba Sub county. It is a mixed private church-sponsored school. At time of visit, the Headteacher has been in office for 5 years. 156 students are enrolled in the school, in 2018 academic year. The performance in the last National Examinations is as below:

	Total		
O-level	121	Grade 1	4
		Grade 2	45
A-level	35		

In A-level, only 4 out of 35 students who passed in Grade 1 are taking sciences.

The data in the chart shows performance in Division One was highest in 2011 at 19.6% followed by 11% in 2004. The rest of the years were not good.

YEAR	Div-I	Div-II	Div-III	Div-IV	Div-V	Div-VI	Div-VII	Div-VIII	Div-IX	Div-X	TOTAL
2002	01	08	10	07	00	01	27				
2003	06	37	35	16	01	05	100				
2004	11	30	40	14	01	02	98				
2005	09	57	56	20	01	04	147				
2006	14	36	53	46	07	04	160				
2007	04	31	55	30	02	00	122				
2008	05	35	60	64	07	00	166				
2009	03	30	65	64	00	05	167				
2010	02	18	60	76	08	04	168				
2011	11	49	53	42	00	01	156				
2012	04	23	43	36	01	03	110				
2013	08	21	46	45	04	02	126				
2014	05	20	44	32	00	02	105				
2015	05	36	40	46	00	03	130				

UCE Results of Blessed Comboni SS from 2002 to 2015

## 2.3. Mutunda Senior Secondary School

Mutunda Senior Secondary School is located in Mutunda Sub-county, Kiryandongo District. It was started by the community as a Community Secondary School in 1993. The government took over the school in 2001, as a seed school under the Universal Secondary Education (USE).

YEAR OF EXAMS	LEVEL	DIV I	DIV II	DIV III	DIV IV	DIV V	DIV VI	DIV VII	DIV VIII	DIV IX	BEST STUDENTS	AGG AT	AGG AT	NL OF CHA
2008	UCE	00	03	07	10	00	01				OKOT GUINTO	41	11	21
2009	UCE	01	05	12	11	00	00				OPIO GEDFREY	32		28
2010	UCE	01	04	13	33	00	02				KATOM DENIS	32		53
2011	UCE	01	07	14	14	00	03				WANDOK ALBERT	31		42
2012	UCE	00	14	23	32	00	01				UGENRWOT STEPHEN	33		70
2013	UCE	00												
2014	UCE	00												
2015	UCE	00												
2016	UCE	00												

Example showing academic performance at Mutunda SS from 2008 to 2012

From the records, the school only got division 1 in 2009 - 2011 with only one candidate each of the years. The rest of the years did not produce any candidate in division 1.

## 2.4. Pope Paul VI Memorial Secondary School – Anaka

Pope Paul VI Memorial SS located in Anaka Sub-county, Nwoya District was founded 1956 by the Catholic Church as St. Mary Junior School and is a government-aided school. In 1962, the school was commissioned by President Milton Obote and taken over by government but later closed down. In 1962, Dr. Vincent Okot re-opened the school as Pope Paul VI Memorial SS. In 1982, the government took the school over again. An international non-governmental organization called Invisible Children added classroom blocks to the school. There are approximately 500 students in the boarding section and 250 in the day section. The lessons from the training had not been shared. Plans were underway to introduce energy saving stoves.

## 2.5. Anaka Primary School

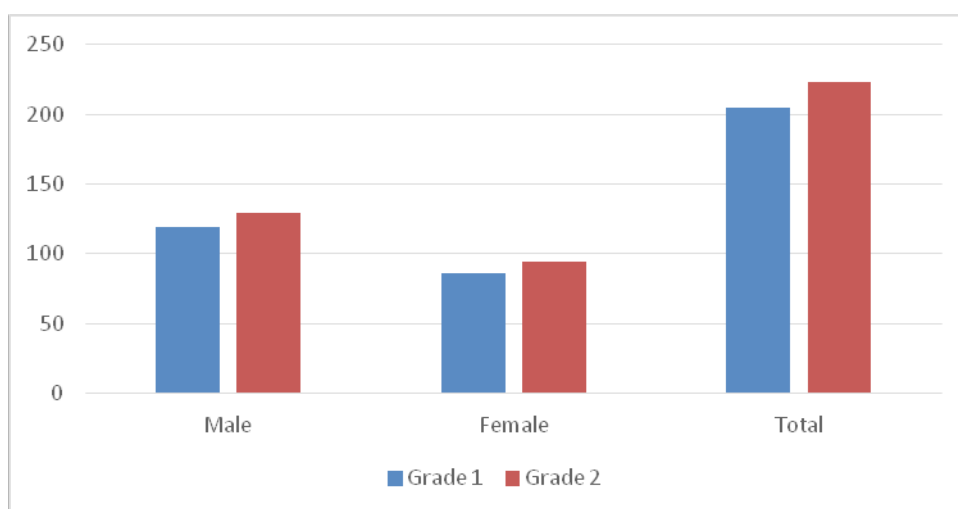
Anaka PS is a government-aided school located in Nwoya District, Anaka Subcounty. There are approximately 1300 enrolled in the Primary School. The school has embarked on an afforestation programme as source of energy. Another finding was that the teacher who had been trained in energy management shared the knowledge with others in the school on getting back.



## 2.6. Loro Core Primary Teachers' College

Loro Core PTC is located in Oyam and is a government-aided school. The government supports the school termly with about 118 Million UGX. 428 students are attending the school, approximately 60% are men.

Chart 2: The performance of the students at Loro Core PTC (Table in Annex 8)



The graph shows that more males got grades I and II than females.



Entrance of Loro Primary Teachers' College

## B. FINDINGS FROM THE ASSESSMENT ON THE POPULARITY OF NATURAL SCIENCES IN SCHOOLS, IN CENTRAL AND NORTHERN REGIONS

### 2.7. Questionnaire for headteachers of schools for popularization of science

The headteachers of Blessed Comboni SS and Nakasongola SS and the 2<sup>nd</sup> deputy of Mutunda SS answered the question:

1. “Which of the following in your opinion, accounts for the low popularity of science subjects among students?”

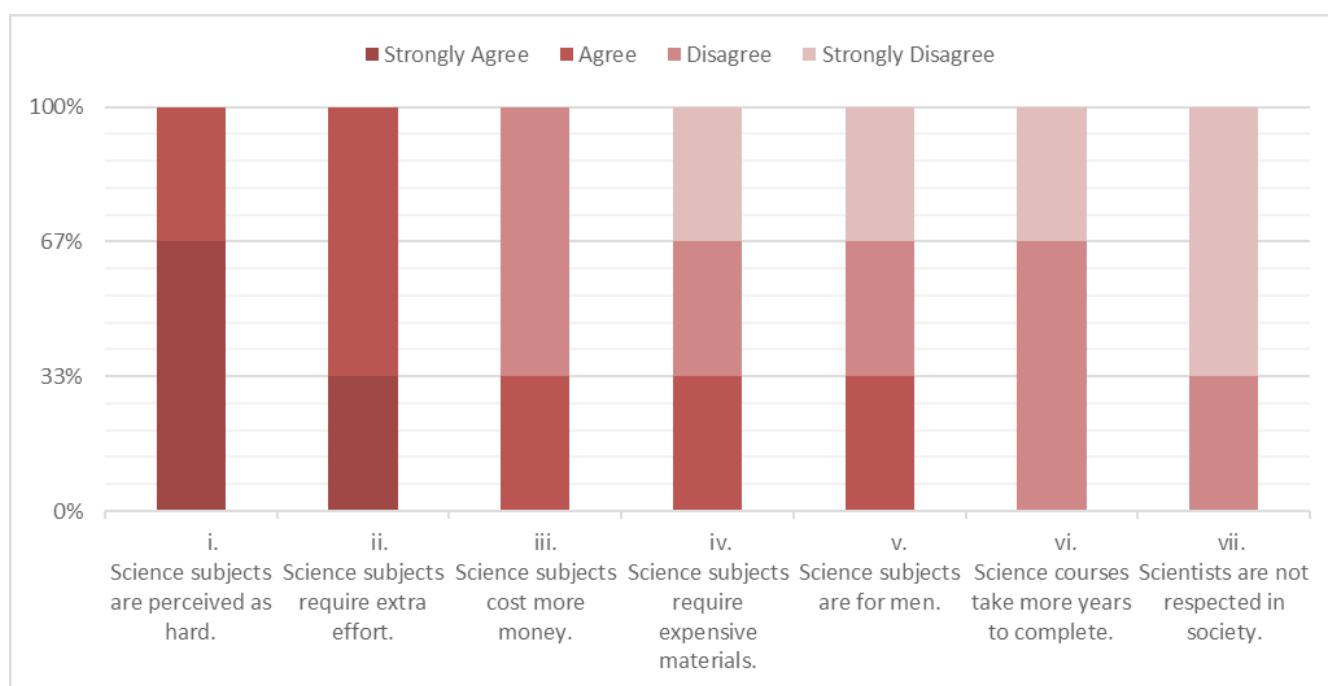


Chart 3 (Table in Annex 8)

The chart shows that the headteachers shared the same opinion that science subject are perceived as hard and require an extra effort. All respondents disagreed that science courses take more years to complete and that scientists are not respected in society. Therefore, it can be said that the efforts in science subject are worth it, as it is rewarding in the future. However, they didn't share the same belief on the statement that science subjects cost more money (one third agreed and two-thirds disagreed with the statement). On whether Sciences require expensive materials for teaching and learning, one third of the respondents agreed, one third disagreed and another one-third strongly disagreed. This means 33% shared this view and the remaining 67% disagreed on this. As for the perception that science are for men, 33% agreed with this view while 67 % disagreed with the half of them simply disagreeing and the other half strongly disagreeing.

2. "Which of the following in your opinion, account for some of the reasons for poor performance in science subjects by your students?"

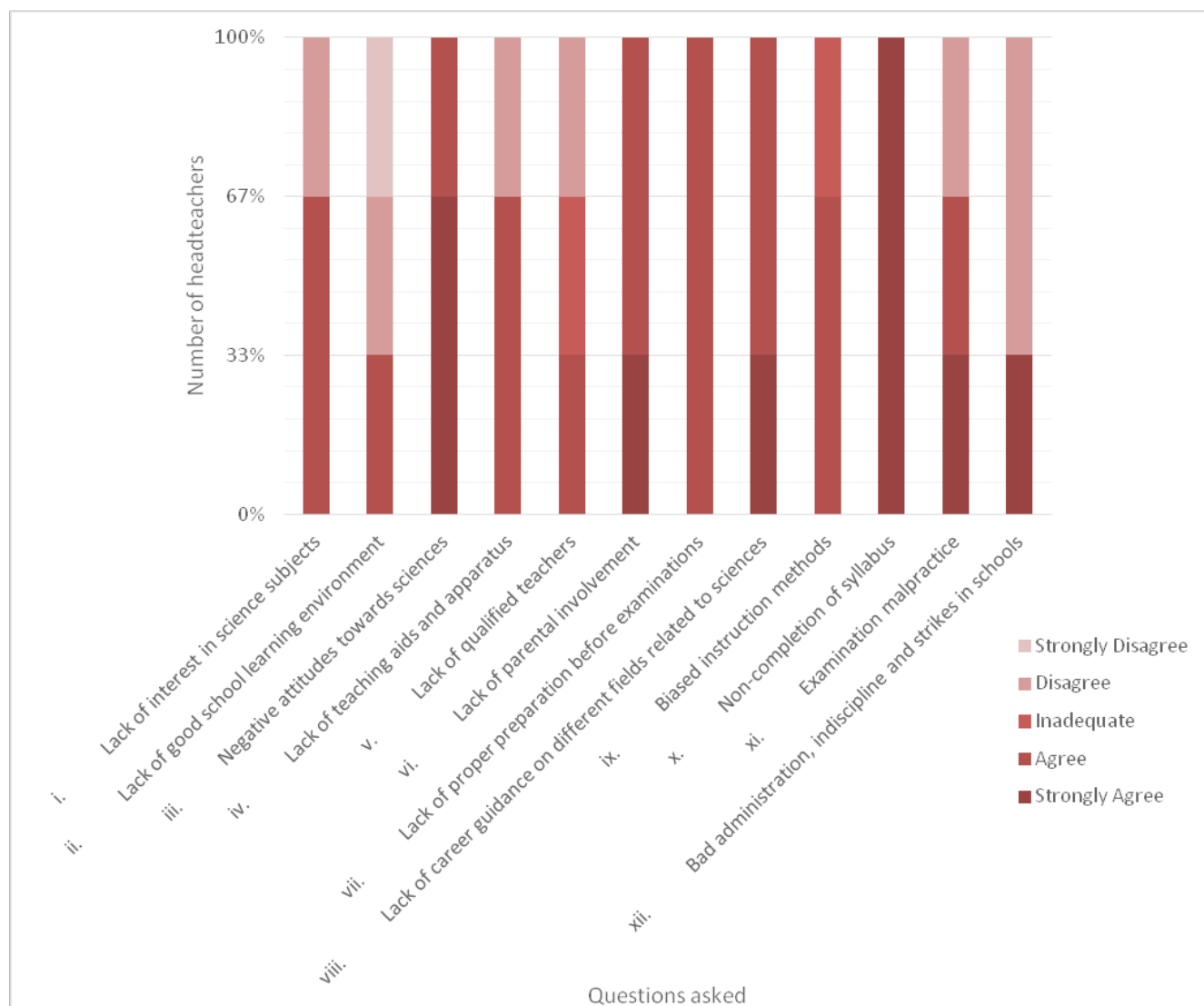


Chart 4 (Table in Annex 8)

The Chart emphasizes that reasons for poor performance by the students in school are the negative attitude towards sciences, the lack of parental involvement, the lack of proper preparation before examination, the lack of career guidance on different fields related to sciences and the non-completion of syllabus. The headteachers believed that the lack of interest in science subjects, the lack of teaching aids and apparatus, biased instruction methods and examination malpractice play only scarcely a role in the malpractice of students in sciences.

Moreover, the headteachers were asked if there is a career guidance talk related to science subjects that the students are pursuing in the schools.

In all of the schools, there is a general career guidance, which involves scientists and science teachers, but none of the career guidance is specifically for science subjects only due to the expenses involved. One possibility would be to organize one career guidance talk in one district where many schools can attend.

Furthermore, the headteachers confirmed in all of the schools that science teachers were attending different workshops such as SESAMAT.

## 2.8. Questionnaire for science teachers for popularization of science

The teachers from the 6 different schools visited were given the same questions.

### 1. *“Rate your students’ attitudes towards science subjects.”*

In Nakasongola Senior School, the science teachers explained that the attitude of students is very poor. However, the average performance is improving very slowly, especially in mathematics while chemistry is still a challenge. In Blessed Comboni Secondary School, the teacher rated out of their experience the attitude of students in mathematics positive whereas the attitude in physics is negative (3/4) in O-level and positive in A-level. In chemistry 50% of the students have a positive attitude and 50% have a negative attitude. In Mutunda SS, the attitude towards agriculture and physics is both positive. After the taking-over of the government, the performance of the students was fairly good but it is rising now. Overall, the attitude of the students towards science subject is rather negative than positive.

### 2. *“How often do you assess your subject?”*

How often assessments are done depend on the subject and the teacher.

In Nakasongola SS, the mathematical teacher assesses his subject on a daily basis whereas the physics teacher gives assessments twice a term. In chemistry, it is weekly, after finishing one topic. In Blessed Comboni SS it is weekly in mathematics and chemistry and once a month in physics. Pope Paul VI SS makes every weekend practical exercises.

One science teacher explained that especially in biology, it is difficult to cover the entire syllabus on time because it is congested. Some experiments may not be done, as practical assignments take more time than theoretical assignments.

### 3. *“Are assessments useful to the students?”*

One teacher explained that making regular assessments challenge students and encourages them to learn continuously in science as it promotes competition. Furthermore, the students realize their weaknesses and work harder. It is useful for the teachers to know the level of the students and to plan for revision.

However, another teacher said: “Learning facts and passing exams don’t expose the learner to think. Education should support students to think for them and analyse everything.” This can be achieved by using methods such as SESAMAT and encouraging student centred and critical thinking.





Programme Officer Dr. Dominic Mundrugo-Ogo Lali with the science students of Nakasongola SS

**4. “Which of the following in your opinion, accounts for the low popularity of science subjects among students?”**

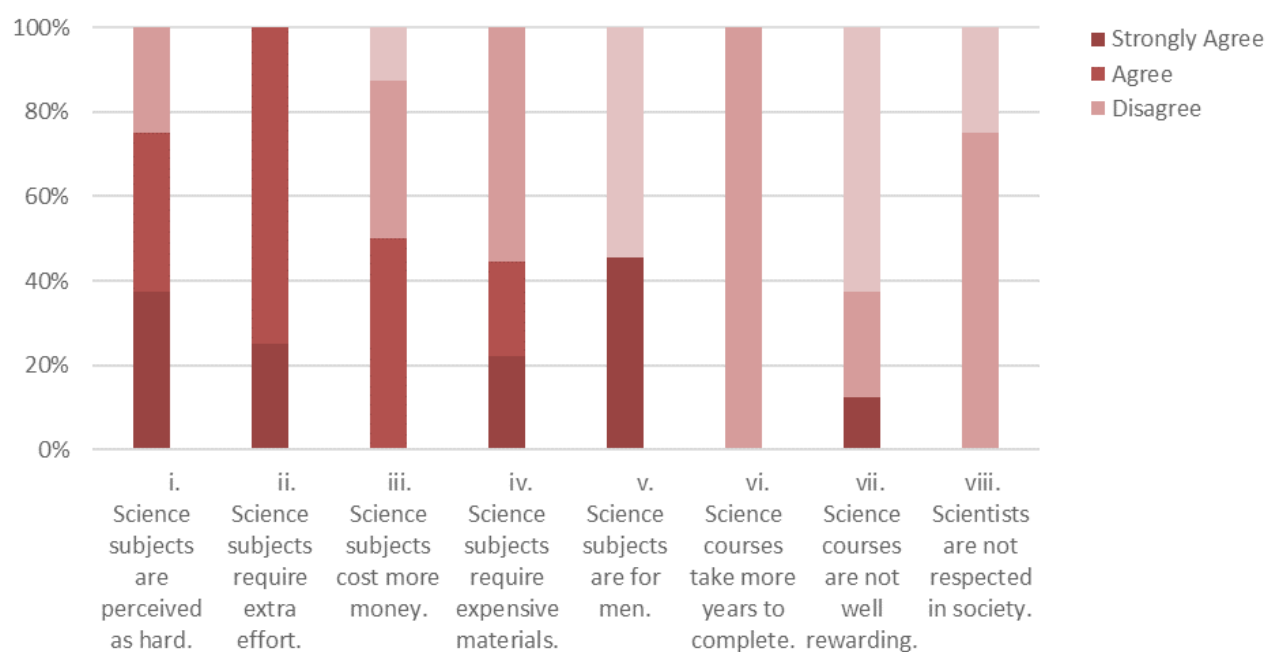


Chart 5 (Table in Annex 8)

Science teachers commonly agreed with the headteachers that science subjects require an extra effort, science courses don't take more years to complete, they are well rewarding and scientists are respected in society. They didn't share the same belief on the statement that science subjects cost more money (50% agree, 37.5% disagree and 12.5% strongly disagree) and that science subjects cost more material (22% strongly agree, 22% agree, 56% disagree). To sum up, the views of the teachers were very similar to the ones of the headteachers. The only big difference was that on the statement "Science subjects are for men." 45% teachers agreed whereas all headteachers disagreed.

**5. "Which of the following in your opinion, account for some of the reasons for poor performance in science subjects by your students?"**

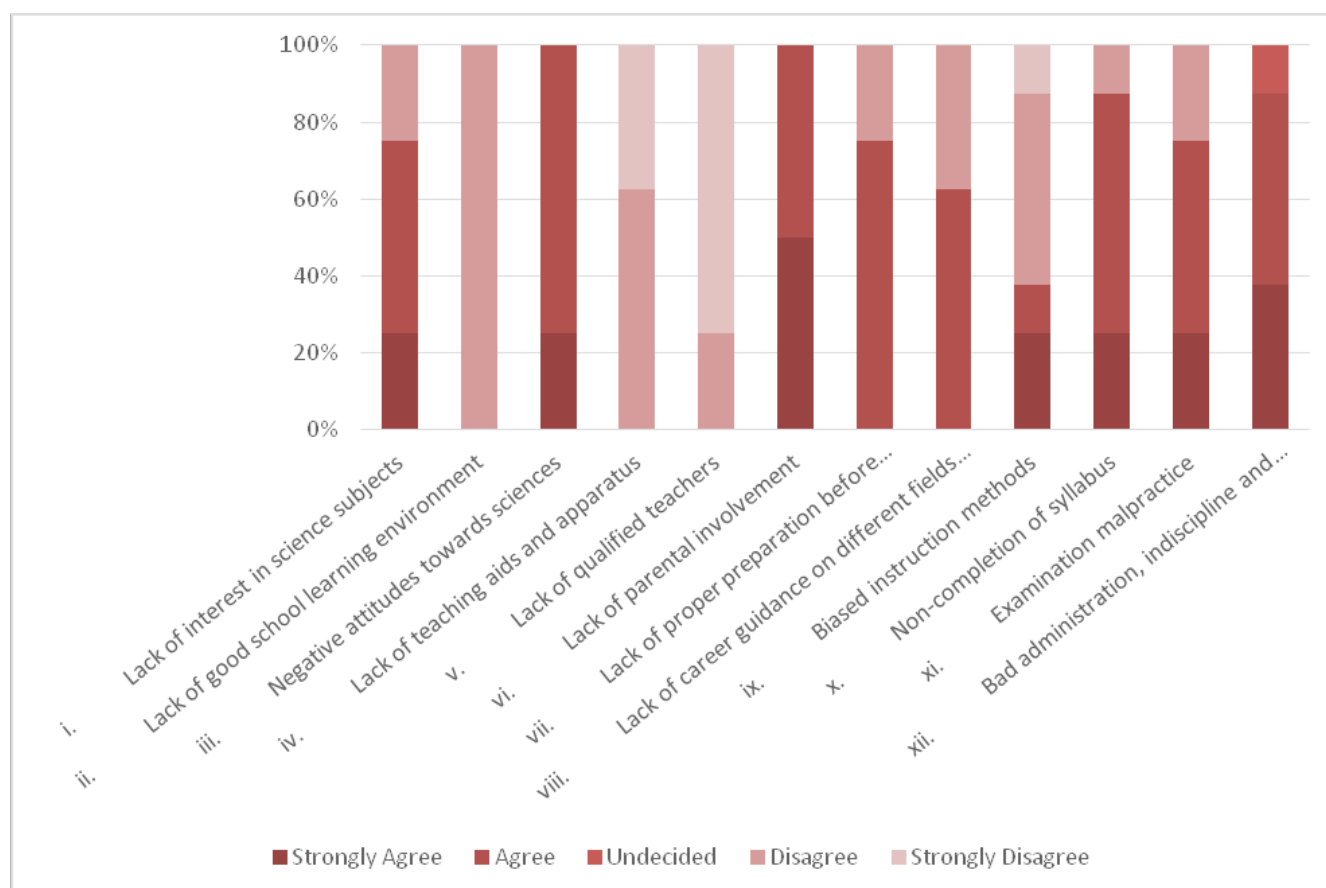


Chart 6 (Table in Annex 8)

The reasons for poor performance of the students in science subjects the teachers gave differed from the ones from the headteachers. The biggest difference was that all teachers disagreed that it was due to lack of qualified teachers and teaching aids and apparatus. The teachers concurred that the reason was bad administration, students' indiscipline and strikes in schools – whereas headteachers agreed on the contrary. However, both agreed that there is a lack of parental involvement and a negative attitude towards sciences. This shows that nobody wants to take the responsibility of the poor performance of students in science subjects.

The teachers and headteachers were asked if the type of school has any effect on academic performance of students in science subjects. There was no consensus on this. Various advantages and disadvantages were given as below:

### 1. Single-sex or mixed schools?

Advantages of a single-sex schools	Advantages of mixed schools
<ul style="list-style-type: none"> <li>• It is easier for the students to concentrate.</li> <li>• Single-sex schools are well facilitated.</li> <li>• The selection is strict.</li> </ul>	<ul style="list-style-type: none"> <li>• Mixed schools encourage competition.</li> <li>• Boys and girls can help each other to perform better.</li> <li>• The students are better in performance.</li> <li>• “In single sex schools, girls and boys are raised in zoos. When they are let out, chaos reigns.”</li> <li>• The difference is not about the influence that single-sex and mixed school have over students but rather about the environment. In average, it is more expensive to go to single-sex schools.</li> </ul>

### 2. Private or governmental schools?

Advantages of private schools	Advantages of governmental schools
<ul style="list-style-type: none"> <li>• Teachers are highly motivated, they work harder and make more assignments.</li> <li>• Private schools have more money available.</li> <li>• Private schools achieve better than governmental schools.</li> <li>• Teachers are more relaxed in governmental schools, for example when coming late.</li> </ul>	<ul style="list-style-type: none"> <li>• Government schools have a better structure, they have more materials for teaching, and especially the laboratories are better equipped.</li> <li>• Proprietors in private schools are often business men who have no educational background. They concentrate on the number of students passing but not on the holistic education of children.</li> </ul>

## 2.9. Questionnaire for science students for popularization of science

The students were questioned about the different influences that have made them chose their A-level subjects in regard to science subjects.

In one of the schools, approximately 70% (16 students) responded that they decided which subject to take on their own. 3 students explained that they were influenced by friends, a teacher or the family. Another important inspiration on the students was that they have a role model (3 students). Examples are Albert Einstein, a family member who is engineer,... Only one student said that it was his personal ambition. One student explained that she took sciences because in the guidance book, it is written that you have to take biology to become a doctor.

Over 55% (9 students) rated the teaching of science too theoretical; the rest (7 students) found that there is a good balance between theory and practice.

All the students believed that their science teachers were doing their best to make the teaching and learning of science subject as interesting as possible. In the opinion of the students, their teachers gave appropriate explanation and advice when needed, they provide career guidance and revision time.

90% (19 students) rated the teaching skills of science teachers as good, one person rated the skills as very good and another one as reasonable.

However, the students pointed out that many of the chemicals they have to work with are expired.



*Example of expired chemicals at Loro Core PTC*

The students underlined that the science subjects are relevant for their future career. 9 of 15 students taking sciences in Nakasongola SS want to become engineers, 4 want to become doctors. The learners explained that the subject is relevant because people studying the same subjects ended up being engineers and doctors. Furthermore, science is present in the day-to-day life and there are people needed to work in this sector.

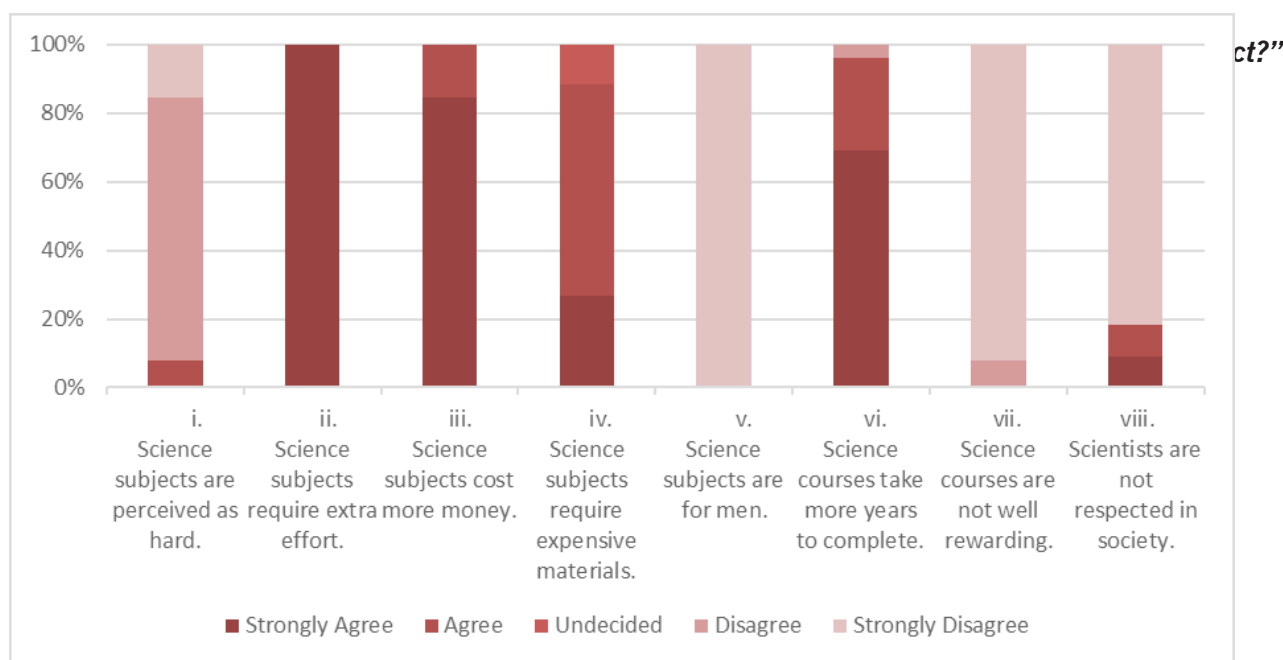




Chart 7 (Table in Annex 8)

The main difference between asking students and teachers was that the students mostly agreed whereas teachers had often different opinions under themselves. As well as the teachers, the students agreed on the fact that science subjects require extra effort, science subjects are not only for men, science courses are well rewarding and scientists are respected in society. They disagreed with the teachers that science cost more money, require expensive materials and are perceived as hard. Furthermore, most of the students strongly agreed that science take more years to complete.

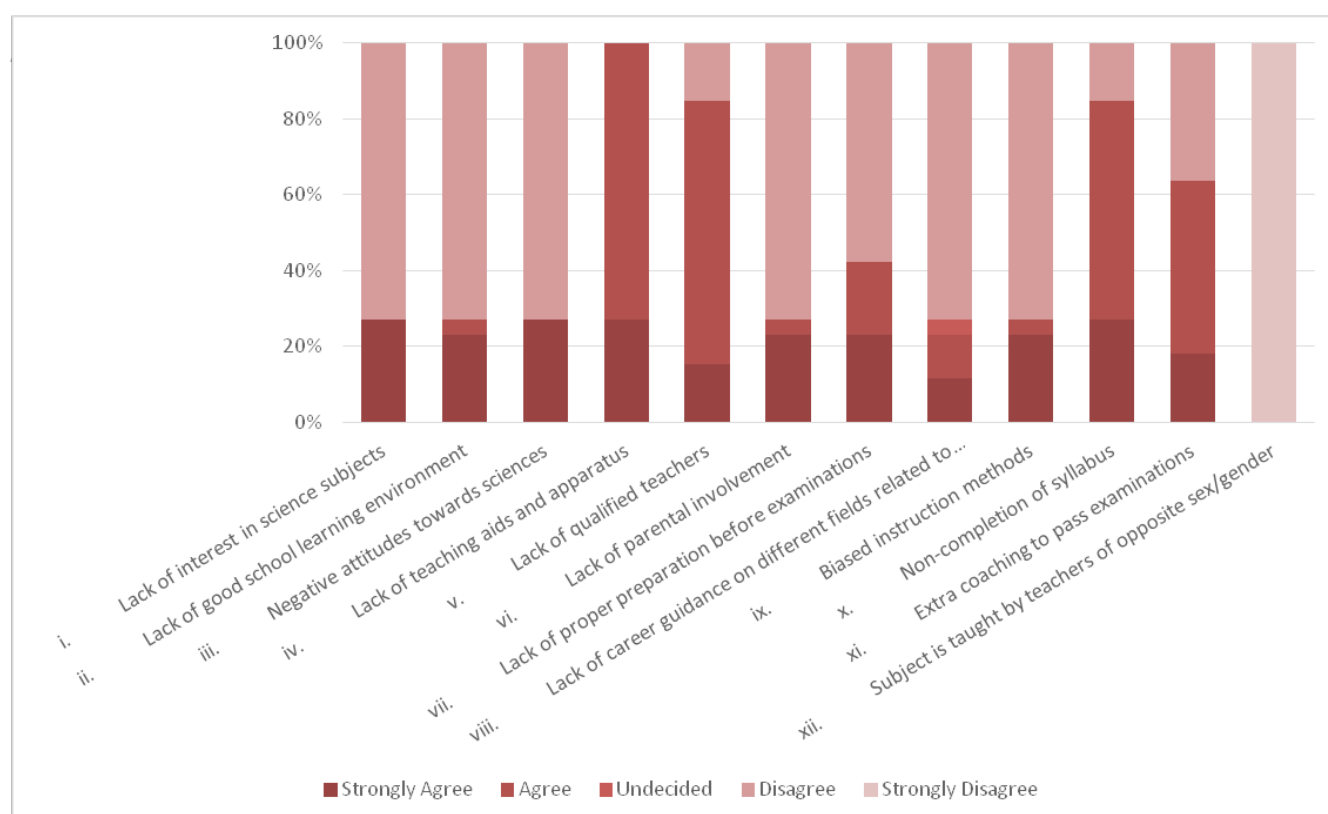


Chart 8 (Table in Annex 8)

The students disagreed on most of the factors that lead to poor performance. The chart above shows that the students only agreed on the following statements, lack of teaching aids and apparatus, lack of qualified teachers, non-completion of syllabus and extra coaching to pass examination. Furthermore, it can be seen that all students disagreed that a reason of poor performance is that the subject is taught by teachers of opposite sex.

In order to improve the science classes, students suggested to have group work more often, to have regular practicals, to be well prepared before class and examinations and to follow up with teachers after lessons. They wished to have a teacher who is up to date and who has a passion for the subject. Furthermore, they wanted the teacher to be tolerant even when students give a wrong answer in response to a teacher's question during classes.

The students were asked about what changes they had observed with the teachers' lessons or responses

to students concerns since the previous year. In Nakasongola SS, the students reported some changes, especially in chemistry and biology. At Blessed Comboni SS, the students explained that the teachers and students were more committed and showed more ambition. However, some schools didn't have any information about the training of their science teachers.

### 2.11. Conclusion of the questionnaire

Overall, the responses showed that the main reason of the low popularity of science subjects is that they are perceived as hard and require an extra effort. However, it is more rewarding in the future as scientists are highly respected in society. To encourage students to choose science subjects more often, specifically career guidance in sciences is needed. None of the schools visited had any career guidance focusing on sciences. It shows that a lot of students don't know the rewards when studying sciences. Some students did not know about the combinations that science subjects required to study a certain course in university such as biology and chemistry for medicine.

Another aspect of the low popularity was the high expenditures connected to science subjects. Students and teachers had a mixed opinion towards this statement. Science subjects don't need to be expensive as there are a lot of different ways to make experiments and to put it into practice. In Biology for example, students can easily go out of class and analyse the fauna and flora around them. However, a common problem is that many chemicals expired and were not usable anymore.

Another finding was that depending on the status of the person – teacher, headteacher, or student, the reason of poor performance varied. A big problem was that nobody took the responsibility for the poor performance. When asked, teachers gave the reason of lack of interest of students in sciences and administrative issues but students claimed that it was because of lack of qualified teachers or poor handling of students by teachers.

One common problem was the non-completion of the syllabus. A way to improve this would be to have regular assessments to encourage students to learn continuously. However, it is also very important to encourage a student-centred way of teaching to enhance their critical thinking.

The type of school, if single-sex or mixed schools and private or governmental schools was also discussed. It was not possible to make a decision on what is the better learning environment for students. However, most of the teachers who responded to the questionnaire preferred mixed schools to single-sex schools.

### 2.12. Other reasons for poor performance

According to the students and teachers met, other factors that account to poor performance of sciences are following:

#### A) Environment of the students

- **Tuition fees:** The students depend on the money of their parents. If their parents have problems paying the school fees, the students have to help their parents at their work. At Mutunda Secondary School, peasant agriculture is the biggest income of the parents. Thus, the students have to help their parents and come late to school. On Wednesdays, the students don't attend classes in the afternoon because of the market. They need to help their parents to pay tuition

fees. The students don't have enough money to buy books, pens, a calculator, a school uniform and other things needed.

- **Family support:** Lack of encouragement by parents to study beyond O-level, the students rather begin to work in local activities. Furthermore, another problem at Mutunda SS is that girls get secretly married before S4 and get pregnant soon after.
- **Distance to school:** Some students have a long distance between school and home. Especially in the rainy season, this causes problems. When reaching the school, the students are late and tired.
- **Energy:** Some students are not able to revise the lessons at home, because they don't have any power to lighten the room.

B) Attitude of students

- **Determination:** The determination of students is important too, some students don't prepare enough before exams and for classes.
- **Biased attitude:** Students have often a biased attitude towards science subject because of previous performance.

C) Peer pressure

D) Students fear to consult teachers because of shyness.

E) Students are differently talented, some learners have more difficulty to concentrate in class.

**F) Language:** If the students have problems with the language, science causes a big problem. The learner has to understand what he or she is reading, instead of just memorizing it. Furthermore, the reading culture is dying, even by the teachers. To fight against this, Pope Paul VI SS introduced an optional subject in the library.

**G) Situation of teachers:** The remuneration of some teachers are poor, they are working in 2 to 3 different schools. Hence, they have less time to prepare classes. Furthermore, the size of some classes is too big, teachers have problems to deal with the weaknesses and strengths of every student.

**H) Syllabus:** Because of a congested syllabus, it is difficult to do many practical exercises. This leads to an exam-driven teaching. The performance is measured by the number of first grades in UNEB.

I) In some part of the country, there is a lack of model or nearby school to compete against.

## 2.13. Strategies

- **Number of teachers:** One possibility is to increase the number of science teachers in each school, in order to have a ratio of 35 students to one teacher. The teachers would be able to pay more attentions to the different needs of the students, especially for slow learners. Thus, slow learners would not be eliminated. It would also lead to teachers being able to cover the syllabus.
- **Payment of teachers:** To encourage the motivation of teachers, it would also be necessary to increase their payment. Many science teachers work in 2 or 3 different schools to earn extra money. Better payment would prevent this from happening. The scale of science teachers should be equivalent to those of doctors.
- **Skills of teachers:** Furthermore, regular trainings and workshops such as SESAMAT would improve the skills of teachers.
- **School administration:** To promote practical training, the administration should support the science teachers. If more science teachers are part of the administration, it would be easier for science teachers

to engage in new projects and make more practicals because of the support they would get.

- Teachers can use text books for teaching rather than preparing notes for the students.
- **Practical exercises:** Through many practical exercises, teachers can make science tangible for students. Most of the students requested to have more time for practical exercises and rated the science subjects as too theoretical. If science teachers had to report monthly how many practical lessons they have done with the students, sciences would not be left as a theoretical subject. To ensure that science teachers make practical exercises, another possibility would be to make a monthly review of all practical exercises done and reward the best one.

To make it easier for teachers, the syllabus should clearly outline practical exercises (NCDC).

- **Exposure:** A possibility to make science more attractive is to expose the students by visiting various sites and organizing study tours to different energy sources.

Workshops, science competitions and seminars could also be done for students throughout different schools. This would enhance the interaction between schools and make science more attractive.

- Another option is to engage students early in sciences, so that they pick interest at a young age.
- Learners should be encouraged to read ahead of the teachers.
- Replacement of expired chemicals.
- **Marking scale:** Another important aspect reported by the teachers is the marking scale, especially in biology reportedly very strict. That it was possible to get a C, when a student got 90% in one paper and 60% in the other paper. This discourages students to continue sciences in A-levels or even to continue school. Because physics is difficult to pass, students that want to study medicine prefer to take mathematics instead of physics. Nowadays, more people take BCM rather than PCB. This change came after changing the grading system. When taking BCM, the student has to pass 2 papers and ICT. When taking PCB, the student has to pass 3 papers and different practical exercises.
- **Family support:** A strategy would be to give family support, because students often imitate their parents work. Some parents often don't understand the value of education. It would be good to sensitize parents about the importance of science in the day-to-day life and in the career possibilities. An example is to talk with the parents about the strengths and the weaknesses of the student.
- **Career guidance:** Another possibility is to give more career guidance, especially in the science area to show the importance of these subjects.
- **Girls in sciences:** Having more women teachers in science would lead to girls having a role model. In Nakasongola SS there is for example only one woman who teaches a science subject out of 14 teachers.
- **Competition:** What makes a school a good one is when learners with bad grades come into the school and go out with good ones. When charting the grades of the students, the learner can see their own improvements and decline. This would create competition.
- STAR education (Schools and teachers involved for results), mind-set education is a good programme to promote.

## C. FINDINGS FROM THE ASSESSMENT OF ENERGY TRAINING AND MANAGEMENT IN SCHOOLS

### 2.13. Nakasongola Senior School

Type	Information	Cooking	Lighting	Heating	Laboratory	Workshop
<b>Firewood</b>	Both energy saving stones and free stones are used but the free stones are used less often.	12-15 /termly 2.160.000 UGX				
<b>Charcoal</b>						
<b>Electricity</b>						
<b>Paraffin</b>						
<b>Gas (LPG)</b>					1/year 160.000 UGX	
<b>Biogas</b>						
<b>Solar</b>						
<b>Generator</b>	Used alternative to solar.		32 l/weekly			
<b>Others</b>						

The main energy resource in Nakasongola Senior School is firewood. The total expenses of the school for firewood and gas is yearly at 6.640.000 UGX. The firewood costs 33UGX per student per day. Gas, solar energy and a generator are also used but not as frequently. To reduce the cost of firewood, it would be good to use only energy saving stones.

### 2.14. Mutunda Senior Secondary School

Mutunda SSS uses solar energy but the battery is week. The school needs a replacement. There is no pipe water, the borehole is shared with the community which is not sufficient.

## 2.15. Pope Paul VI Memorial Secondary School

Type	Information	Cooking	Lighting	Heating	Laboratory	Workshop
<b>Firewood</b>	It is the 2 <sup>nd</sup> biggest energy source, the school needs to have savings (3 fire stones in the kitchen).	1/week 130.000 UGX				
<b>Charcoal</b>	The school plans to increase the amount of charcoal used.				1/year 150.000 UGX	
<b>Electricity</b>	It is too expensive to connect the school to electricity.					
<b>Paraffin</b>						
<b>Gas (LPG)</b>						
<b>Biogas</b>	Sustainable and reliable, because of all the students (1000 people).					
<b>Solar</b>	It is the biggest source, but the panels must be cleaned in the dry season. There is a problem of theft and the solar panels cannot be used for long.					
<b>Generator</b>	It is used when there is not enough power, for student entertainment and for computer lessons.				2/month	
<b>Others</b>						

The total expenses of the school for firewood and charcoal is yearly about 6.390.000 UGX. The cost of the paraffin is not included. A possibility to use even more sustainable energy sources would be to use biogas. Some experiments were done at the primary school (1300 students), but they were very costly. In the SS, approximately 1000 student and staff are attending the school every day. The school needs a local person trained who can help with the maintenance. The building of energy saving stoves is planned.

### Energy education

In the Secondary School, there is an environment club which planted flowers, fruit trees and avocados. There is also a peace club.

## 2.16. Anaka Primary School

Anaka PS teaches energy sources in integrated sciences and social studies. However, gas is not listed among the

Handwritten list of members of the Energy Conservation Club at Anaka Primary School:

No.	Name of Pupils in Energy Conservation Club	Name
1	Edmund Kene	Christopher
2	Quo	David
3	Andan	Moses
4	Aber	Mary
5	Adony	Mary
6	Adoniam	Gracella
7	Angela	TOPATA
8	Acen	Wendy
9	Kilega	Kenneth
10	Hatima	Moses
11	Acello	Scara
12	Acen	Moses
13	Acen	Moses
14	Alma	Jordan
15	Anna	Peace
16	Mugisha	Patrick
17	Adony	Polycarp
18	Acello	Kenn
19	Apys	Milly
20	Lahgo	Samuel
21	Ocello	Moses
22	Adoniam	Justin
23	Ayega	Mary
24	Nafula	Joan
25	Acen	Scara
26	Oyet	Sunday
27	Adony	Patricia
28	Kilega	Atamano
29	Acen	Philip
30	Opyo	Ronald

energy source in the institution because it is not used due to the high costs. The students acquire energy saving skills and learn for example about the usage of saving bulbs.

The school set up a team to oversee the campaign and encourage energy conservation. Furthermore, the school formed different clubs such as the patriotism club, the writers club, the mathematics club, and the environment club. In the environment club, 30 students are participating. Activities executed are tree planting, creating awareness of children and parents about energy savings, etc. Regularly, students and staff walk around the school and identify energy wastage. Moreover, the school put in place energy use monitors made of teaching staff and students and the school provides a regular progress on energy use.

## 2.17. Loro Core PTC

Loro Core PTC has an area available for potential establishment of woodlot.

Type	Information	Cooking	Lighting	Heating	Laboratory	Workshop
<b>Firewood</b>	The amount of firewood is increasing. Individuals supply the college. The school has energy saving firewood cookstoves from NGO 2 years ago and ordinary traditional cookstoves. Both are used very frequently.					
<b>Charcoal</b>						
<b>Electricity</b>	The access is regular and affordable; the demand is increasing, depending on main grid.					
<b>Paraffin</b>						
<b>Gas (LPG)</b>						
<b>Biogas</b>						
<b>Solar</b>						
<b>Generator</b>	The demand is decreasing because of the access to electricity. The generator lies within the college.		1/month			
<b>Others</b>						

They are many advantages using energy saving cookstoves. However, the cookstoves in the school needs to be repaired.





*Ordinary traditional cookstove at Loro Core PTC*



*Energy saving cookstove at Loro Core PTC*

Advantages of the improved cookstove	Disadvantages of the improved cookstove
<ul style="list-style-type: none"> <li>• Remains longer warm</li> <li>• User-friendly (no smoke and heat)</li> <li>• Less expensive (1000 pieces remain one month for the improved cookstove and half that time for the traditional cookstove)</li> </ul>	<ul style="list-style-type: none"> <li>• Takes longer to heat up</li> <li>• Cannot contain big size of fire wood</li> </ul>

It would be possible to use the waste from vegetables, etc. to use more different energy sources. Another possibility would be to use saw dust.

### Energy education

There are many different clubs such as the wildlife club, the writers club, the mathematics club, the scouts club, the patriotism club, the health and sanitation club which advises the college on hygiene, health and cleaning, the child-to-child club and the Peace and Justice club.

The different energy sources are taught under Integrated Sciences, Agriculture and Social Studies. In those subjects, the students learn practical skills such as using firewood and charcoal. Moreover, they learn how to connect simple circuit connections. Besides, the students learn how to use paraffin to produce heat and light and how to reduce the consumption by mixing it with diesel. There are no practical exercises done with gas and solar.

The estate officer regularly updates the lists of items that need maintenance, servicing, repair and replacement. Many engines expired, this has to be solved. Furthermore, the school provides a regular progress on energy use and sets up regular and continuous meetings and discussion on energy conservation.



## CHAPTER THREE

# SUMMARY ASSESSMENT OF THE FINDINGS FROM THE EXERCISE

### 3.1 Achievement of the Capacity Building Goals

The goals were achieved to greater extent. There was wrong selection of the representative who were not effective as representatives. Only two teachers trained were available at the time of visiting in some of the different schools. Only few of the representative teachers shared their acquired knowledge with the other teachers after training.

### 3.2 Effectiveness of the Methodology used in capacity building

The training provided relevant information but not from the trained teachers. Of the schools visited, only two out of six schools (30%) of the beneficiary teachers implemented the recommendations from the training and were also found available on the ground. The others either did not share the knowledge from the training or left the school/institution. It has therefore been a good eye-opener to understand the short falls of the approach of training selected teachers.

### 3.3 Lessons learned

- a) The training would have been more effective if more teachers had been targeted per subject per school. However, this would need more resources.
- b) The teachers selected for training by the schools were not effective representatives for their schools because many of them did not share information with the headteachers and fellow teachers upon return to their schools.
- c) There are big differences in the implementation that was done in schools after the training for promoting the popularity of natural sciences. Some schools improved their science subject by giving more career guidance and making more practicals.
- d) Another lesson learned was that the number of teachers doesn't determine the popularity of the subject and the performance of the students but rather the quality of the teachers even if there are fewer. In Nakasongola SS, there are up to three teachers in each science subject but the popularity and performance in the subject are below the national standards.
- e) A number of students had no idea on the careers involving sciences due to lack of career guidance in the sciences.
- f) A few schools have integrated courses such as energy in their lessons and this helps students to be well grounded in energy management and environment conservation.
- g) A number of schools have various clubs through which they acquire a variety of knowledge and skills in areas like health, sanitation, environmental management, peace to mention but a few. This provides a good platform for introduction of new initiatives like energy conservation and management.

## CHAPTER FOUR

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# CONCLUSION

The objectives of the monitoring and evaluation were met as information was shared with the headteachers, the representative teachers and students on the popularity and performance status of Science and Mathematics, Energy Education and Management of Energy Resources. Furthermore, the follow-up helped to find out the impact of the training in terms of the popularity of sciences, the performance of the students and the influence of the energy-saving technologies in the schools.

The following recommendations were made:

- a) The trainings need to cover more teachers per school.
- b) Consideration be made to train only committed and reliable representatives from schools. Headteachers need to make careful selection of teachers sent to represent their schools.
- c) When resources permit, school-based training would be best as this would cover the whole school.
- d) The MoES should ensure that all the schools have qualified science teachers and continuous training is done to improve their quality such as through the SESEMAT programme.
- e) The MoES and the respective headteachers should ensure that each school has career guidance service for students.
- f) Schools should establish appropriate clubs and encourage the participation of their pupils and students in such club activities as a way of influencing positive attitude, behaviour change and adoption of new initiatives such as conservation.

Some data on the status of the popularity of sciences, science education and knowledge and skills in management of energy resources in the educational institutions has been documented. However, some schools were not informed about the training that their science teacher attended and were therefore not able to support science subjects with the methods that were shared at the training.

The programme needs to be continued as science needs to be popularized, especially among students.

## CHAPTER FIVE

### ANNEXES

#### Annex I: Photo Gallery



Group picture at Nakasongola SS of the staff and the UNATCOM representatives



Group picture at Blessed Comboni SS of the O-level students and Mathilde Stoetzler



Group picture at Nakasongola SS of the A-level student, Dominic Mundrugo-Ogo Lali and Irine Mutumba



Group picture at Nakasongola SS of the science teachers, Dominic Mundrugo-Ogo Lali and Irine Mutumba





Group picture at Mutunda SS of the staff and the UNATCOM representatives



Group picture at Pope Paul VI Memorial SS of the staff and the UNATCOM representatives



Group picture at Loro Core PTC of the member of staff, Dominic Mundrugo-Ogo Lali and Irine Mutumba

**Annex II: Attendance list – Nakasongola Senior School**

SN	Name	Organisation	Employment	E-mail address
1.	Sekayingo Robert	Nakasongola SS		
2.	Naritaba Graceous	Nakasongola SS		
3.	Ddama Fredrick	Nakasongola SS	physics teacher	Ddambafredrick58@gmail.com
4.	Katabira Moses	Nakasongola SS	student	Katabiram4@gmail.com
5.	Apuryo Augustine	Nakasongola SS	student	
6.	Luyiga Ronald	Nakasongola SS	student	
7.	Mwanja Charles	Nakasongola SS	student	Mwanjacharles078@gmail.com
8.	Sebawutu Kalifan Wassia	Nakasongola SS	student	
9.	Senkasi Micheal	Nakasongola SS	student	senkasi@gmail.com
10.	Ssemaambo Isaac Fatcat	Nakasongola SS	student	okwangaisaac@gmail.com
11.	Kizza Daniel	Nakasongola SS	student	
12.	Kakayi Nimrod	Nakasongola SS	student	nimrodkeyzizz@gmail.com
13.	Sekiriba Emmanuel	Nakasongola SS	student	
14.	Muteesi Gerald Micah	Nakasongola SS	student	mutesigerald@gmail.com
15.	Kirabo Edward	Nakasongola SS	student	edwardkirabo@gmail.com
16.	Nakazibwe Esther	Nakasongola SS	student	nakazibweessie@gmail.com
17.	Ekwang Solomon	Nakasongola SS	student	
18.	Sebuuma Joshua	Nakasongola SS	student	sebuumajoshua@gmail.com
19.	Kalumba Enock	Nakasongola SS	student	
20.	Rukupdo Isaac	Nakasongola SS	student	
21.	Ogwal Amov	Nakasongola SS	student	amosdauson@gmail.com

**Annex III: Nakasongola Secondary School, 'A' level science students**

	Name	Class	Combination
1.	Sebawutu Kalifan Wasswa	S. 6	BCM/ICT
2.	Mwanja Charles	S. 6	PCM/ICT
3.	Kalumba Enock	S. 6	BCA/ICT
4.	Muteesi Gerald	S. 6	BCM/ICT
5.	Ssemambo Isaac	S. 6	PCM/ICT
6.	Senkasi Michael	S. 6	PEM/ICT
7.	Kizza Daniel	S. 6	PEM/ICT
8.	Luyiga Ronald	S. 6	PEM/ICT
9.	Kirabo Joshua Walter	S. 6	BAG/SM
10.	Semayobe Gerald	S. 6	BAG/SM
11.	Ekwang Solomon	S. 5	PCB/SM
12.	Rukundo Isaac	S. 5	PCM/ICT
13.	Sebuuma Joshua	S. 5	PEM/ICT
14.	Ogwal Amos	S. 5	PEM/ICT
15.	Kirabo Edward	S. 5	PEM/ICT
16.	Nakazibwe Esther	S. 5	BCM/ICT



17.	Seruggo Emmanuel	S. 5	BCM/ICT
18.	Sekitte Abel	S. 5	BAG/SM
19.	Mirembe Loy	S. 5	PEM/ICT
20.	Kyaligonza Joseph	S. 5	MEG/ICT
21.	Alyao Bathmas	S. 5	MEG/ICT

#### Annex IV: Attendance list – Blessed Comboni Secondary School

SN	Name	Organisation	Employment	E-mail address
1.	Byamukama Expedsto	Blessed Comboni SS	headteacher	byamukara@yahoo.com
2.	Esudu Andrew Boniface	Blessed Comboni SS	student	
3.	Droti Benson	Blessed Comboni SS	student	
4.	Lalam Prisca	Blessed Comboni SS	student	
5.	Kusiima Hellen	Blessed Comboni SS	student	
6.	Patrick Niogga	Blessed Comboni SS	student	
7.	Johnson Kenyi Kaya	Blessed Comboni SS	student	
8.	Opaka Innocent Emmy	Blessed Comboni SS	student	
9.	Leopoldo Sunday	Blessed Comboni SS	student	
10.	Okello Walter	Blessed Comboni SS	student	
11.	Bakwana Benaro	Blessed Comboni SS	student	
12.	Chandiga Patrick	Blessed Comboni SS	student	
13.	Komakech Stephen	Blessed Comboni SS	M/C teacher	Komakechstephen1991@yahoo.com
14.	Opiyo John Louis	Blessed Comboni SS	G/M teacher	
15.	Adriko Bernard	Blessed Comboni SS	P/M teacher	adrikose@gmail.com
16.	Okodoi Alfred	Blessed Comboni SS	P/M teacher	okodoialfred@rocketmail.com

#### Annex V: Attendance list – Mutunda Senior Secondary School

SN	Name	Organisation	Employment	E-mail address
1.	Adokorach Evelyn	Mutunda SS	H/T teacher	
2.	Orwenyo Patrick	Mutunda SS	DOS	
3.	Adong Doreen Oyet	Mutunda SS	deputy II	
4.	Good Peter	Mutunda SS	P/M teacher	Goodpeter123@gmail.com
5.	Ojara Denish	Mutunda SS	A teacher	

#### Annex VI: Attendance list – Pope Paul VI Memorial Secondary School and Anaka Primary School

SN	Name	Organisation	Employment	E-mail address
1.	Oryema Emmanuel	Anaka Central PS	Teacher PS	oryemaemmanuel@gmail.com
2.	Abalo Alice Odoxig	Pope Paul VI SS	teacher	
3.	Ottobor Matthew	Pope Paul VI SS	headteacher	ottomatob@yahoo.com

**Annex VII: Attendance list – Loro Core Primary Teacher’s College**

SN	Name	Organisation	Employment	E-mail address
1.	Adyang Francis Neukyon	Loro Core PTC	Acting principal	adyangfrancis2014@gmail.com
2.	Aceng Anna Jercey	Loro Core PTC		
3.	Omoko Dickens	Loro Core PTC		omokodickens@gmail.com
4.	Okec Patrick	Loro Core PTC	physics teacher	Okecpatrick19@gmail.com

**Annex VIII: Diagrammes of the questionnaires**

subject	S.5.	S.6.
maths	8	1
chemistry	5	
physics	6	5

*Table of Chart 1: Number of students taking science subjects in S.5. and S.6.*

	Male	Female	Total
Grade I	119	86	205
Grade II	129	94	223
Total	248	180	428

*Table of Chart 2: The performance of the students at Loro Core PTC*

	Strongly Agree	Agree	Disagree	Strongly Disagree
i. Science subjects are perceived as hard.	2	1		
ii. Science subjects require extra effort.	1	2		
iii. Science subjects cost more money.		1	2	
iv. Science subjects require expensive materials.		1	1	1
v. Science subjects are for men.		1	1	1
vi. Science courses take more years to complete.			2	1
vii. Scientists are not respected in society.			1	2

*Table of Chart 3*

	Strongly Agree	Agree	Inadequate	Disagree	Strongly Disagree
i. Lack of interest in science subjects		2		1	
ii. Lack of good school learning environment		1		1	1
iii. Negative attitudes towards sciences	2	1			
iv. Lack of teaching aids and apparatus		2		1	
v. Lack of qualified teachers		1	1	1	
vi. Lack of parental involvement	1	2			
vii. Lack of proper preparation before examinations		3			
viii. Lack of career guidance on different fields related to sciences	1	2			
ix. Biased instruction methods		2	1		
x. Non-completion of syllabus	3				
xi. Examination malpractice	1	1		1	
xii. Bad administration, indiscipline and strikes in schools	1			2	

Table of Chart 4

	Strongly Agree	Agree	Disagree	Strongly Disagree
i. Science subjects are perceived as hard.	3	3	2	
ii. Science subjects require extra effort.	2	6		
iii. Science subjects cost more money.		4	3	1
iv. Science subjects require expensive materials.	2	2	5	
v. Science subjects are for men.	5			6
vi. Science courses take more years to complete.			8	
vii. Science courses are not well rewarding.	1		2	5
viii. Scientists are not respected in society.			6	2

Table of Chart 5

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
i. Lack of interest in science subjects	2	4		2	
ii. Lack of good school learning environment				8	
iii. Negative attitudes towards sciences	2	6			
iv. Lack of teaching aids and apparatus				5	3
v. Lack of qualified teachers				2	6
vi. Lack of parental involvement	4	4			
vii. Lack of proper preparation before examinations		6		2	
viii. Lack of career guidance on different fields related to sciences		5		3	
ix. Biased instruction methods	2	1		4	1
x. Non-completion of syllabus	2	5		1	
xi. Examination malpractice	2	4		2	
xii. Bad administration, indiscipline and strikes in schools	3	4	1		

Table of Chart 6

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
i. Science subjects are perceived as hard.		2		20	4
ii. Science subjects require extra effort.	26				
iii. Science subjects cost more money.	22	4			
iv. Science subjects require expensive materials.	7	16	3		
v. Science subjects are for men.					26
vi. Science courses take more years to complete.	18	7		1	
vii. Science courses are not well rewarding.				2	24
viii. Scientists are not respected in society.	1	1			9

Table of Chart 7

	<b>Strongly Agree</b>	<b>Agree</b>	<b>Undecided</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
i. Lack of interest in science subjects	7			19	
ii. Lack of good school learning environment	6	1		19	
iii. Negative attitudes towards sciences	7			19	
iv. Lack of teaching aids and apparatus	7	19			
v. Lack of qualified teachers	4	18		4	
vi. Lack of parental involvement	6	1		19	
vii. Lack of proper preparation before examinations	6	5		15	
viii. Lack of career guidance on qeretzdifferent fields related to sciences	3	3	1	19	
ix. Biased instruction methods	6	1		19	
x. Non-completion of syllabus	7	15		4	
xi. Extra coaching to pass examinations	2	5		4	
xii. Subject is taught by teachers of opposite sex/gender					26

Table of Chart 8





