Students Perceptions towards the Practice of Science Education Stream Choice in Secondary Schools of Kembata Tembaro Zone: Implication for 70:30 Students' Admission to Tertiary Education

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Letter of approval

This is to certify that the thesis prepared by Melese Alemu entitled "Students' Perceptions' Towards the practice of Science Education Stream Choice in Secondary schools of Kembata Tembaro Zone and Its implication for 70:30 students' admission to Tertiary education" and submitted in Partial fulfillment of the requirements for the degree of Master of Arts in Educational Leadership and complies with the regulation of the University and meets the accepted standards with respect to Originality and quality.

Approved BY Board of Examiners

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Declaration

The research here by declares that the thesis on the title:- “Students perceptions towards the practice of science education stream choice in secondary schools of Kembata Tembaro Zone and its implication for 70:30 students admission to tertiary education” is my original work and has not been presented for a degree in any other university that all resources have been referred to and quoted have been dully indicated and acknowledged with complete references

Name……………………………

Sign………………………………..

Date………………………………….

This thesis is submitted for the examination with my approval as university advisor

Name……………………………………

Sign……………………………………..

Date…………………………………….

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List of Acronyms and Abbreviations

DEST: Department of education, Science and Technology

FASTS: Federation of the Australian Science and Technology Society

EGSCE: Ethiopian General Secondary school leaving Certificate

ESDP: Education Sector Development Program

ETP: Education and Training Policy

MoE: Ministry of Education

SD: Standard Deviation

UNESCO: United Nations Educational Scientific and Cultural Organization

GTP: Growth and Transformation Plan

GDP: Gross-Domestic Product

STEM: Science, Technology, Engineering and Mathematics

Abstract

This study was conducted to investigate the existing situations of Student perceptions towards the practice of science education stream choice and its implication for 70:30 admissions. Descriptive survey design was employed. Cluster sampling technique and was employed to select the sample Woredas, schools, school principals, teachers and students. Quantitative data collected through questionnaires were analyzed by using mean scores and standard deviation. Consequently, the main findings reveal that there is no career advice, guidance and information provided by schools. Students' were forced by school administrators to science education stream. It is also perceived that Science education is difficult to get job opportunities in labor market when compared to social science education. Students perceive Science education as more difficult to do than social science. Moreover, Students' lack Science laboratory practices in earlier grades. Regarding implications of students perceptions for 70:30 admission to tertiary education; students do not complete their studying in science education because they have the plan to drop from science stream, Schools are not preparing students to become familiar with science initiative activities in the school. Therefore, respondents were still lacking positive perceptions towards science education streaming practices at school level. Hence, in order to attract students' participation in science education stream and to enhance countries' manpower in science and technology, it is better if more attention was taken by education offices ,particularly, Kembata Tembaro Zone Town administration. To improve students' participation, *Schools also practice students streaming based on students interest and ability rather than forcing students to be enrolled in natural science stream. Finally, further studies can be conducted in same area considering data from rural schools to get the full picture of problem.*

Chapter One

Introduction

This chapter is deals with the introductory aspect of the study. It includes the background of the study, statement of the problem, Objective of the study, significance of the study, Scope of the study, delimitation of the study, definitions' of key terms and organization of the study.

1.1 Background of the study

The major aspect of challenges in science education, and the aspect causing most direct governmental concern, is the lack of students positive perceptions' in proportional undertaking post-compulsory science stream or fields, especially in the physical sciences such as chemistry, physics and biology, (Osborne, 2006). Based on this insight, the need to think of the science curriculum, not simply as recruiting ground for science-talented students' but rather as the setting for development of a culture of interest in science by all, and an opportunity for all students to engage with science ideas and learning to overcome the major aspects of challenges in science education.

This problem of diminishing numbers in science is occurring against a background of concern that post-industrial societies need to increase involvement in science and technology-related innovation and enterprise, if they are to remain competitive in a global environment.

According to Victorian Parliament Education and Training Committee (2006) expressed concern at the declining enrollment of school graduates into mathematics and science-related university and trade studies and careers. Within the science community itself, there is increasing alarm at the declining number of students opting to undertake science studies at the tertiary level. By considering this issue, the government has organized conferences and is currently developing policy on science education and science related fields as their contribution to this problem (FASTS,2003, the Federation of Australian Science and Technology Societies).

The other policy point of view towards science education is also the issue of developing countries. Such as, the development of Education and Training second Medium Term Plan (Kenya,2013), is part of the road map towards the actualization of the social transformation hinged onto the social key of Kenya Vision 2030 which is implemented over five year medium-term rolling plans.

Ethiopia also needs rapid improvement of science education and seem to have prepared to solve issues of development in science and technology through education and training policy the Government has recently introduced the five-years economic development and transformation plan of Ethiopia (2010), states that “the vision of the country is to detach the country from poverty and achieving the long term vision of transforming Ethiopia in to middle income country in 2025 ” in favor of science and technology transfer. The reason for this initiative plan is the belief that science and technology are the driving force of development and that Ethiopia’s prospect hinges on the availability of sufficient stock of countries expertise in these fields by its higher institutions. This shows that, the country has intended to reduce its dependence on the imported expertise and technology.

In addition to this, the Ministry of Ethiopia has published a professional mix guideline based on a 70:30 annual intake ratio favoring placement of students into science and technology programs over in the social sciences and humanities (MoE, 2008). In light of these trends, the federal government in 2015 green lighted the construction of 11 new universities; Ethiopia is now on the average of having 44 working Higher education, (up from 30). Most of these are now opening science and technology related fields based on the countries’ priority issues. This strategic policy will aim to strengthen the organization and delivery of science education in both primary and secondary education to promote development and help the way for the 70:30 professional mixes. It will also reinforce implementation of strategic interventions that are critical and useful for meeting the nation’s needs.

According to Ethiopian Education and Training Policy (ETP, 1994), the education system in Ethiopia is structured in a such a way that, preparatory students’ must choose a path to either science education stream or social science stream in their junior year of High School. Science subjects such as physics, chemistry, and biology are given starting from grade seven and continue to general secondary education (grade 9 and 10) as compulsory subjects for all students. This early experience of streaming believed to help students in developing positive perceptions to select it as their future career and ultimately helps to promote scientific thinking and technology transfer in the society. Similarly, schools are expected to show effort to match the learners perceived interests and ability with the country’s future human resource need and aware the young learners to project themselves in the world of work of the future.

However, students lack the early scientific experiences and perceived interest in choosing science studies and careers. This condition slows down the country's economic prospects in the future. The reasons for this found in the lack of knowledge and negative perceptions are about science and scientific careers. A recent study by Samson, (2010) has in fact indicated early experience with science is likely to have an effect on the likely hood that students pursue science in their career. In any stage of development, a given society requires some type of knowledge and skill related to its stage of development. This disinterest of students to choose science courses and physical science courses in particular in their last years of secondary education has important implications not only for the health of scientific attempt in these countries, but for scientific literacy of future generation.

Students' in secondary schools have often faced with the problem of indecision when they are about to make science education stream in their last years of the secondary school education. Choice of the stream is often complex, multi-faceted decisions and often boils down to key factors. Everyone has to make choices of decision at different stages. Decision making phase is very crucial in an individual's life since the career of the student depends on it. Student's decision to choose a particular stream deploys critical and complex discourses. Students at secondary level of education do not select stream in a hasty manner, choosing a particular stream at secondary level of education is the most crucial decision which determines the career and future of an individual.

Students, who choose not to take science studies, imagine science careers as having no opportunities for future self-development and positions of influence (Holmegaard, Madsen. Choosing particular stream at secondary level of education is the most crucial decision which determines the career and future of an individual. Ozga and Sukhnandan (1997:708) highlighted that choice of stream is a critical issue: "poor choice can lead to consumer dissatisfaction and impact negatively on motivation and academic success, affecting progression rates". This practice of indecision when making stream choice, affect the perceived interest of students in general and the achievement in particular, if students placed in stream in which they cannot interested "students should be aware of various factors that can affect their academic field of choice before they formulate decision to be effective in their learning and future life plan (Amare Sahile and Mekonnen Abebe, 2008). Therefore, students are to be aware of these affective factors before they formulate decision to be effective in their learning and future life plan. Thus the purpose of this study was to investigate existing conditions of students' perceptions' towards a choice of science education stream in Secondary schools of Kembata Tembaro Zone and its implications for 70:30 admissions to tertiary educations, particularly government tertiary education.

1.2 Statement of the Problem

Education in general and science education in particular, is viewed as development of life process and universal practice, (Agrawal, 1998). One might expect the increasing significance of science and technology to be accompanied by a parallel growth and interest in the subjects and understanding of scientific ideas and ways of thinking. A major goal for education in the 21st century is to create scientifically literate citizens, who are able to think critically, make sense of complex data, and solve problems.

The investigation of students' perceptions towards studying science has been a substantive feature of the work of the science education research community. Its current importance is emphasized by the now mounting evidence of a decline in the interest of young people in pursuing scientific careers (Robinson, 1988). Combined with research indicating widespread scientific ignorance in the general populace and an increasing recognition of the importance and economic utility of scientific knowledge and its cultural significance, the falling numbers choosing to pursue the study of science has become a matter of considerable societal concern and debate,(House of Lords, 2000). Science education is increasingly a matter of concern that many countries' have given priority to development of science and technology, as both are crucial for the modernization and growth of economic and social systems (UNESCO, 1999). The need to keep abreast with the advancement of technology will need personnel with scientific knowledge and skills. It is therefore not surprising that huge investments are made in science education and development of human resources in this field. One issue that remains a concern in many countries is whether the products of the school system are able to meet national manpower needs in science-related fields in terms of both quantity and quality, UNESCO (1999). To what extent is provision for science education in schools meeting desired expectations and have goals at the school level been met in practice? It is with these concerns that several countries undertook to study their own respective situations on provision of science education in schools. It is envisaged that a deeper understanding of current practices in this area could provide indications (UNESCO, 1999).

According to Lavigne, & Miquelon (2007), students' participation and persistence in science and science related field is very little in comparison to other fields. Quoting the 2003 National Center for Education statistics, the authors point out those percentages of graduates in Science, Technology and engineering was only "18.1% in France, 18.2% in the United Kingdom, 20.3% in Italy, 14.5% in New-Zealand and 11.8% in the United States" (p. 351). This indicates the declining rate of pupils' participation in science related fields. According to another report from the Computing Research Association, enrollment in undergraduate degree programmer in computer Science is more than 50% that is lower than that of five years ago. Between 2005-2006 and 2006-2007, number of new entrant students' declaring computer Sciences as a major fell 43%, to 8,021 (School News, 2008). This declining interest in pupils learning and importance of science education at the same time calls for having recognized vision towards enhancing science initiative plan in area of the science and science related fields.

As recognized vision towards enhancing science initiative plan in the area of the science and science related fields of other countries, after Finalizing the first Growth and Transformation Plan (GTP-I), the Ethiopian Government has launched its second, the GTP-II (2015-2020), aimed at boosting the economy and transforming Ethiopia into a middle-income country by 2025. The main objectives in the GTP-II are economic growth and industrialization. In order to materialize such a national vision, this requires transforming the country's economy from one that is reliant on agriculture to one based on industry. Such an economic transformation can only be achieved through the application of science, technology and innovation as the major instruments. Ethiopia is now on the average of having 44 working public universities (up from 30). Most of the universities are now opening science and technology related fields based on the countries' priority issues.

However, the underlying assumption of the question is "how to increase students' enrollment in science education stream at preparatory level?" in Kembata Tembaro Zone Secondary schools in terms of students low perceived interest towards science education stream choice regarding enrollment inequalities between science education stream and social science. The challenge begins at the time of enrollment of students in these two streams. From the researchers experience in working in high school, lots of problems were observed especially students interest toward science education stream, Students in the preparatory grades had low interest in science stream participation when compared with other streams. Students were forced by school to enroll in natural science stream; there is a high rate of dropping from science education stream, absence of clear cut streaming practices (based on their abilities/achievement in science subjects plus interest). But tracking students based on achievement only may not be enough itself to deep understand of their interest towards stream choice and they may want their level best even if they have scored good results in science stream subjects. Few students of preparatory students choose natural science stream only to join health related fields when they will be admitted to higher educational institutes, this maybe that they assume to get immediate job opportunities rather than fields like engineering and technology. In addition to this, the following table of statistical annual data report of Kembata Tembaro Zone, (2008-2010 EC), shows the existing situations of student's participation in science education stream/social science stream.

Table 1: Students Participation

YEAR	Students enrolment			Dropout		Sat for grade 12 national exam		Passed to Higher education	
	Natural science	Social science	Total	N. sc	S. science	N. SC	S. Sc	N. SC	S. sc
2008	900	1300	2200	100	30	800	1270	300	1000
2009	850	1050	1900	150	20	700	1030	240	700
2010	855	1000	1855	180	40	675	960	250	750

Source: from Kembata Tembaro Zone Education, (2008-2010 EC)

The above table of statistical data of Kembata Tembaro Zone (2008-2010 EC), shows that from total of2200 students who passed EGSCE in 2008, 900 students were enrolled in natural science stream while 1,300 students were enrolled in social science stream and 100 students were dropped out from a total of 900 from natural science stream and only 300 students were passed the Ethiopian Higher education entrance examination from a total of 800. Similarly, in 2009, 1900 students who passed EGSCE in 2009, 850 students were enrolled in natural science stream while 1,050 students were enrolled in social science stream and 150 students were dropped out from a total of 850 from natural science stream and only 240 students were passed the Ethiopian Higher education entrance examination from a total of 700. In 2010, 1855 students who passed EGSCE, 855 students were enrolled in natural science stream while 1,000 students were enrolled in social science stream and 180 students were dropped out from a total of 855 from natural science stream and only 250 students were passed the Ethiopian Higher education entrance examination from a total of 675.However, if the situation will remain unresolved, soon there will be a serious scarcity of crucial and important experts. The lack of scientific experts will result to poor economic and social development in our country. To explain the problem, there is a need to understand students' perceptions towards science stream.

This persistent problems in enrollment, drop out and performance in science stream field of study is a contrasting situations with the stated developmental and initiative policy of the country and this indicates that the problems remained unsolved and needs the investigation.

In terms of earlier research gap, regarding this study, there was a few related researches conducted such as (**Fraser et al., 2005)** in Singapore on Student Perceptions of Chemistry Laboratory Learning Environments; Student–Teacher interactions and Attitudes in Secondary School Gifted Education Classes and concluded that between students' attitudes towards chemistry and both the laboratory classroom environment and the interpersonal behavior of chemistry teachers influences students perceived interest towards science education.

The study **by Mabula** (2012) on promoting Science subjects choices for secondary school students in Tanzania revealed that poor quality of Science classroom teaching and a serious decline in interest of students in Science subjects and concluded that, teacher-students interaction and relationships in classroom teaching and learning of Science need improvement.

Rawate Maharaja-Sharma, (2012), studied on what are upper primary school students perceptions of science, The Trinidad and Tobago context in Singapore, and found that the students' perceptions of science were wide- ranging, and that these perceptions were linked in large part to the way that science is delivered at the upper primary level. In general, students expressed high levels of liking for the discipline when it is delivered to them using practical hands-on approaches.

When we Synthesis these empirical review and identify the Knowledge Gap, Most of these findings focused on teacher and students interaction which in turn affects the students perceptions about science education stream for instance, (**Fraser et al., 2005),** Learning Environments, Student–Teacher Interactions, **by Mabula,** (2012), teacher-students interaction and relationships in classroom teaching and learning of Science, **Rawate**

Maharaja-Sharma, (2012), students' perceptions of science were different dimensions, and that these perceptions were linked in large part to the way that science is delivered.

In generally, these previous researchers ignored the variables such as support/ career advice and information's students that make decision towards the choice of science education stream and the wide range of student expectation factors, such as perceptions of remuneration and ease of finding a job in science related to what Eccles refers to as utility value (Eccles 2005, 2009), Self-efficacy, or one's abilities to succeed, Enjoyment of school science, gender differences, Family Background and School related factors. Thus, this study was fulfilled above mentioned research gaps and addressed these variables by supporting theoretical literatures and was tried answers for the following basic research questions which were raised by the researcher.

Research questions

1. To what extent do students get support, advice and information to make decisions towards the choice of science education stream?

2. To what extent do Students expectation factors influencing their perceptions towards the practice of science education stream choice?

3. What are School related factors influencing student's perceptions towards the practice of Science education stream choice?

4. What is the implication of student's perceptions for 70:30 admissions to tertiary education particularly public tertiary education?

1.3 Objectives of the Study

1.3.1 General Objectives

The major objectives of this study was to investigate the existing situations of students perceptions towards the practice of science education stream choice and its implication for 70:30 admissions to tertiary educations by identifying potential factors that influence the choice of science education stream in selected government secondary schools of Kembata Tembaro Zone.

1.3.2 Specific Objectives

1. To find out the degree of support, career advice and information that students get to make decisions towards the choice of science education stream?

2. To investigate the degree of influence related to student's expectation factors that affect their perceptions towards the choice of science education stream.
3. To investigate school related factors influencing student's perceptions towards the choice of science education stream.
4. To understand the implication of students perceptions for 70:30 admissions to tertiary education?

1.4 Significance of the study

The main purpose of this paper was to bring the existing situations of student's perceptions towards science stream and its implications for 70:30 admissions to tertiary education by conveying its message to the concerned authorities and participants in relation to enhance students perceived interest towards science education stream And it provides feedback on the strength and weakness of the streaming practice to all stakeholders particularly for Kembata Tembaro Zone schools, Education Officers and Education Departments.

1.5 Scope of the Conceptual delimitation

This study was focused to bring the existing situations of student's perceptions towards natural science education stream and its implications for 70:30 admissions to tertiary education in selected government secondary and preparatory schools in three Town administrations in Kembata Tembaro Zone. Such as Durame, Shinshicho and Mudula schools. Regarding the participants, students, teachers and principals of the schools were included under this study.

1.6 Limitations of the Study

Time constraint, uncooperativeness of respondents, in filling the questionnaires and return on time were some of the problems I have encountered while conducting this study. Initially it was difficult to collect all the questionnaires as planned. School Principals were always too busy. I was however able to cope some these problems. Thanks to the good rapport I have with school principals, I was able to meet my busy subjects after office hours and interview them. The return rate of the questionnaires also maximized because some of colleagues helped me by encouraging respondents to fill in the questionnaires and return them.

1.7 Operational Definitions

Students Perceptions; The understandings and attitudes that influence students' Constructions' of reality or, the subjective process of acquiring, interpreting, and organizing sensory behavior of their learning environments' positively or negatively.

Science education; is the major field of science such as chemistry, physics and Biology or specialized work in selected field of study.

Stream; is a field of study as natural science/ social science stream

Implication; is the effect that an action or decision will have on.

Tertiary education; is referred to as third stage, third level (educational level)

1.8 Organization of the Study

This research thesis is organized in to five chapters. The first chapter deals with the introductory part which includes the background of the study, statement of the problem, objective, significance, scope, the limitation, operational definitions of terms and Organization of the study. The second chapter presents the review of literature relevant to the research. The third chapter is concerned about research methodology and chapter four deals about data interpretation and analysis. The last chapter presents summary, conclusions and recommendations of the study. Reference and appendixes are also the parts of this paper.

1.9 Conceptual Framework

There is much documented evidence for the possible reasons for the loss of perceived students interest in science such as the association between science education and the cost of studying (Van Langen & Dekker, 2005); the relationship between school selectivity and science uptake (Smithers & Robinson, 2007); the availability of separate sciences at GCSE level (Gill, Vidal Rodeiro, & Bell, 2009); well-qualified and enthusiastic teachers (Smithers & Robinson, 2007); and opportunities to experience science-related careers (Bennett, Lubben, & Hampden-Thompson, 2013).

Okeke (2000) indicated that, parents have significant effect on students' choice of career and subjects. According to (Malgwi et al., (2005), Parents are more likely to influence students' decisions than guidance counselors or teachers. Teachers do have more influence over a student's decision than guidance counselors (Malgwi et al., 2005). Even though, there are other shared variables that diminish the perceived interest of the pupils' towards science education in secondary schools. However, this conceptual frame work will be focused to investigate the preliminary magnitude of students perceptions towards science education stream choice based on the following dimensions of students perceptions towards science education stream and based on identified deficiencies in the empirical literatures by supporting theoretical literature.

Different researchers have classified factors affecting student's perceived interest towards the stream choice in various ways. For example, Woolnough (1994) identified them as School related and out of school related factors.

The variables considered are, support/career advice and information, individual level or out of school related factors and School related factors. Each variable in the dimensions affects the student's science education stream choices.

Conceptual Frame work

Independent Variables

- Support/career advice and Information
  - ✓ School administrators role and teachers
  - ✓ Role peers and parents
  - ✓ School guidance &counselor

- **Students expectation factors**
  - ✓ Job opportunities and remuneration
  - ✓ Perceived abilities/ Self-efficacy
  - ✓ Gender differences
  - ✓ Enjoyment-interest
  - ✓ Family background
  - ✓ Career status

- **School Related factors**
  - ✓ Subject Teacher/effectiveness
  - ✓ Teaching methods
  - ✓ Science curriculum content
  - ✓ Laboratory practice/facilities
  - ✓ Role model/out of school learning
  - ✓ Extra- curricular activities

Dependent Variable

Choice of Science education Stream.

Source: Adapted from Peninah (2012) but modified **by researcher, 2019**

Chapter Two

Review of Related Literature

This Chapter deals review of related literature that gives supportive information on students' perception' towards science education stream choice and its implication for 70:30 admission to tertiary education. This chapter also highlights the role of schools in providing career advice and information students make stream choice, possible factors influencing students' perceptions towards the choice of science education stream.

2.1 Ethiopian Education and Training Policy (ETP, 1994)

The Military Government was defeated and replaced by Transitional Government of Ethiopia in May 1991. Among other changes, the change in ideas brought the inception of a new Education and Training Policy, which was proclaimed in April 1994. The major areas the policy brought were the curriculum. The previous curriculum was criticized for lacking its relevance, clearly defined objectives and having too much dependency on theoretical knowledge with little concern to everyday life of individuals (MOE 1994). To overcome this challenged shortcoming the, policy addressed a major objective make education relevant by providing problem solving skills and all rounded education catering to the need of individual at all levels' (MOE 1994,p: 13).

Based on the stated objectives; a new curriculum has been formulated and implemented in most regions. Regarding the assessment and evaluation procedures to be applied, the policy has stipulated establishment of national organization for educational measurement and evaluation and assessment would be continuous in academic and practical subjects including aptitude tests to ascertain the formation on all-round profile of students. National examination will be given at grade 8 and 10. The policy changed the educational structure from 6:2:4 to 8:4. Hence eight years of primary education is followed by four years of secondary education. The primary education is divided in two basic educations (grades 1-4) and the general primary education grades (grades 5-8). The secondary education is divided in to general secondary education (grades9-10) and the preparatory education (grades 11-12) this is where students are expected to choose between natural and social Science streams.

2.2 The Second Growth and Transformation Plan (GTP II)

The Second Growth and Transformation Plan (GTP II) has set out an objective to achieve an annual average real GDP growth rate of 11percent per annum with in a stable macro-economic environment. The plan envisions transforming the Ethiopian economy into a lower middle-income category by 2025 through increasing the productivity, quality and competitiveness of the productive sectors; enhancing the capacity, participation and equitable benefit of citizens and thereby realizing developmental political economy through strengthening democratic developmental state. In tandem with the national development policies, strategies and programs and the lessons drawn from the implementation of the First Growth and Transformation Plan (GTP I), the globally agreed Agenda 2030 for Sustainable Development and Agenda 2063 of “the Africa We Want” have been taken as the bases for the formulation of GTP II.

The ESDPV indicates how education at all levels should contribute to GTP II. Accordingly, the priorities for higher education include

• Increasing the participation rate, from 9.4 percent in 2014/15 to 15 percent by 2019/20;
• Giving priority to sciences and technology fields
• Developing the research capacity of universities; and
• Promoting technology transfer.

The Government has reached remarkable progress in expanding access and is making bold steps to improve quality. In line with GTPs I and II, contrary, the share of enrollment in agriculture and life science, medicine and health sciences, and natural and computational sciences increased at the postgraduate level.

Currently, in Sep. 2007 MOE designed new strategic plan for higher education for four years (2007- 2010). One of the goals of this plan is to increase the student's enrollment in higher education in 2010 up to 110,000. The plan gives priority to the science and technology subjects, as they are the bases for the development of the country. But the question is "how to increase students' enrollment in science and technology subjects at grade 11 level?"

From the ETP policy, document grade 11 preparatory students are expected to choose their field of study as either natural science or social science. Science subjects such as physics, chemistry, and biology are given starting from grade seven and continue to general secondary education (grade9 and 10) as compulsory subjects for all students. This early experience of science education is believed to help students in promoting interest to select it as their future career and ultimately helps to promote scientific thinking and technology transfer in the society. According to Berhanu (1999) the aim of science education for the country is,

1. To produce citizens capable of identifying and solving problems by strengthening individual's physical and mental potential beginning from basic education for all and at all levels.
2. To produce citizens that show positive attitude and contribute towards popularization, dissemination and development of science and technology in society, creativity and experimenting skills.
3. To cultivate citizens who are capable of knowing, observing, and understanding changes and who appreciate the environment by making education appropriate and relevant to environmental and social needs. Regarding to this, Science education, starts from the primary school. Environmental Science is offered in grades 1-4. Science, handicraft, agriculture, environmental issues etc. are integrated in environmental science. Science in grades 5-6 is split into basic and social sciences. Linear approach to science starts at grade 7 and continues into the secondary education. Science subjects are compulsory up to grade 10 for all students. Technology education is offered as integral with the teaching of sciences. Practical activities, project work and social issues help the development of technological skills and attitudes, (Berhanu 1999). Science is one of the top popularized subjects in the policy. A recent 70:30 students' streaming policy in the preparatory schools of Ethiopia is a new document for the country.

2.3 Roles of School in providing career advice and information for Students' to make decision to science education stream choices

2.3.1 Roles of Parents and Teachers

Okeke, (2000) concluded that students' family backgrounds have significant effect on students' choice of career and subjects. According to (Malgwi et al., 2005), Parents are more likely to influence students' decisions than guidance counselors or teachers. Teachers do have more influence over a student's decision than guidance counselors (Malgwi et al., 2005). We want to encourage more young students into science, then students need rich alternatives to find out about the many ways sciences can be used in interesting careers, most of the students have not been helped by their parents when making their study.

Students are likely to enroll in more classes if they talk with their parents first, which implies that parents do have an effect on their child's decisions (Tenenbaum, 2008). Parents look forward to their children having new teachers and classes with the end result of them getting good grades (Smith et al., 2006). Therefore, parents will encourage their students to take a variety of classes where they think they can excel. Tenenbaum (2008) further argued that fathers are more likely to discourage their children from taking certain difficult classes, especially with daughters.

Furthermore, the school has a great role to play in influencing students' choice of science stream particularly in Africa. The school should support subjects and careers in decision making. This will go a long way to encourage students' choice of science subjects. In addition, students need information about the structure and content of the science subjects they want to study. This will help to influence their choice of the subject.

2.3.2 Roles of school guidance and Counselors

It is obvious that students need detailed career and/ or subject advice when making choices about selecting subjects. Interestingly, while many schools provide a range of career related services and information resources to facilitate the decision-making process, only limited research addressed how useful and meaningful this assistance is for students (Chapman, 1993), Dellar (1994) also found that with regard to obtaining relevant information, students appeared to access informal channels such as parents and siblings, rather than career education or counseling resources available in the school. According to Siann et al., (1998) most students choose subjects or career from a narrow viewpoint with short-term focus, often failing to fully consider their options beyond school. In the Australian context, Watron and Cooney (1997) found little evidence that subject choice by a school student was considered, planned exercise. About their findings, 30% of students indicated they had not received information booklet about subject choice, which had been distributed by all schools in the study.

Teachers, guidance and counselors are not likely to discourage students from enrolling in classes, but to encourage the enrollment in certain classes (Anderson et al., 2008).Guidance and services prepare students to think increasing responsibility for their decisions and grow in their ability to understand and accept the results of their choices. The ability to make such intelligent choices is not innate but must be developed. When guidance and counseling services are missing in schools, students' adaptation becomes difficult thus leading to low performance, misbehavior and dropout. The role and responsibility of the counselor in educational institutions is much complex as compared to other organizations since there are legal, professional and organizational issues involved in counseling with school children. .

2.4 Students expectation Factors influencing their perceptions towards the practice of science education stream choice

2.4.1. Job Opportunities and Remuneration

Student perceived interests towards issues related to payment and ease of finding a job in science relate to what Eccles refers to as utility value (Eccles 2005, 2009). For example, a number of studies have found that choosing post-compulsory school science is strongly related to its strategic value for university and career options (Lyons, 2004; Osborne & Collins, 2001).

Students become increasingly aware of job opportunities and the availability of vocational pathways during their final years of senior Secondary school (Harvey 1984). According to career theorists caution against making early decisions in relation to careers, institutional and societal challenges often require that a choice be made by students when they are still relatively young age (Stead & Watson 1994). According to the same authors, in Australia it is often the case that students are asked to identify future study and potential goals when choosing subjects for senior school. For the majority of young people, decisions about their future are embedded in their decisions about school subjects and further education (ANBET, 1995). Particularly, in terms of subject choice, Sian, Light body, Nicholson, Tait and Walsh (1998) observed that the majority of students in their study choose streams that they liked or that facilitated progression to a future career aspiration.

2.4.2 Career Status

Much of the commentary on falling science enrolments in Australia has suggested that external issues, such as perceptions of the low status of science careers have been drawing students away from science courses (Werry, 1998). According to Woolnough 1994 p: 29), perceived low salaries and status of jobs in science and engineering were factors, which most discouraged students from pursuing science fields.

2.4.3 Family Background

According to Lyons (2004), Majority of students choosing a natural Science fields described parents or other family members who advocated or encouraged an interest in science. This was done through the provision of science related materials, such as books, magazines, kits and toys; frequent discussions of science related issues; help with science projects, and homework; and shared viewing of science TV documentaries. Several parents were also involved in science related occupations, such as medicine; engineering or science teaching, indicating to students that science was valued.

According to ANBEET (1995), for students from families without high levels of education, parents' advice often seems to increase rather than to clarify the confusion about desirable education and training pathways. Children from families where the parents have attained high levels of education are more likely to continue their education than those from families where parents' educational experience is more limited. The difference in participations appear to come about because highly educated families understand how the 'system' works, have more useful networks, and are in general, better equipped to provide high levels of support for their offspring to continue in education than is the case ill low-status families (ANBEET, 1995)

2.4.4 Interest-enjoyment

Interest or enjoyment is an individual's enjoyment experience in engaging in the activity. A person values a task once he or she is interested in it and this interest value can become an attainment value (Eccles, 2009; Eccles & Winfield, 1995). Interest value is considered to be important within some career decision-making models (e.g., Lent *etal*. 1994; Super, 1980). The importance of interest value in selecting business majors has been highlighted in a number of studies (e.g., D. Kim et al., 2002; Malgwi et al., 2005; Mauldin et al., 2000). Interest value is salient to major choice as well as career decisions.

2.4.5 Personality/self-efficacy

Self-efficacy has been defined as belief in one's capability to successfully manage future situations (Bandura et al., 2001). A number of studies used social cognitive theories in studies of students' choice of major and career (Mau, 2000; Mcnerney et al., 2006) and some studies (Betz & Hackett, 2006; Lent & Brown, 2000; Lent, Sheu, et al., 2008) conducted with university students have shown a consistent relationship between self-efficacy beliefs and career choice behavior. It is noteworthy that researchers in career and motivation .Lent and Brown (1984) identified a significant relationship between self-efficacy for scientific educational requirements and persistence in science and engineering majors. Within self-efficacy theory, an individual's behavior or change in behavior is influenced by their expectations, which are based on belief in ability to successfully complete a task or behavior.

Self-efficacy both influences one’s choice of behavioral activities, and one’s persistence in pursuing courses of actions (Bandura, 1977, 1986; Bandura et al., 2001). Bandura explained that “Efficacy beliefs play a key role in shaping the course lives take by influencing the type of activities and environments people choose to get into by choosing and shaping environments, people can have a hand in what they become” (Bandura et al., 2001, p. 10). Bandura contends that, self-efficacy influences the productive functioning in both individualistic and collectivistic cultures. However, self-efficacy tends to be individualistic. Thus, people who are in collectivistic cultures where their decisions are dependent on others may be considered as having lower levels of efficacy (Bandura, 2001). Self-efficacy expectations are associated with the level of persistence and success in academic and career choices (Mclnerney et al., 2006). In short, Bandura’s (1986) social cognitive theory is a fundamental theory that has laid groundwork to other theories. Bandura’s theory has been applied to career development (Betz & Hackett, 2006; Betz, Klein, & Taylor, 1996) and social cognitive career theory has been developed (Lent & Brown, 1984, 1987)

2.4.6 Gender differences

Just, academic choice patterns of men and women in MST have been expressed using social cognitive theory in various school and country contexts (Ashby, Baylor, Doerr, Kima,& Rosenberg, 2009). In general, research outcomes reveal that boys and girls do indeed differ in perceived self-efficacy, even after controlling for achievement levels. Girls tend to hold lower self-efficacy levels than boys on tasks perceived as typically masculine (Allen, & Darlington, 2007).Research further deals that boys and girls attribute their success or failure in mathematics to different sources. Girls attribute their success in mathematics and related school subjects such as physics and science more often to external factors, for instance, learning time, luck, or support, than their male peers. Boys attain their success in mathematics and related school subjects on average more often to internal factors, such as, excellent (Burg, 2006; Britner, 2008; Glienke, &Meece, 2006; Pajares, &Zeldin, 2008). Research indicates that gender disparities in mathematics, self-efficacy is larger among students in higher secondary and tertiary education than in primary and lower secondary education (Pajares, 2005; Thomson, 2008). Boys and girls found similar confidence levels in their natural science ability in primary school, but girls start to lose confidence as they enter puberty and enter higher secondary education, for example, middle school and high school (Archer et al., 2010). Research on social role congruity, similarly, has conveyed that college students look careers in science, technology, engineering, and mathematics (STEM), as opposed to careers in other fields, to impede the endorsement of communal goals. The achievement of such goals, according to the researchers, negatively predicts STEM interest and as such mediates gender differences in STEM careers (Diekman, Brown, Johnston, & Clark, 2010). Research among computer science students also indicates that interaction with a gender stereotype role model, irrespective of role model gender, negatively influences women's beliefs of success in computer science, whilst leaving men's beliefs intact (Cheryan, Drury, & Kim Siy, Vichayapai, 201

Now days research also gives that boys and girls differ in the subjective task values they attach to mathematics and related school subjects, even after controlling for achievement levels (Watt, 2006).To sum up, girls display much greater value and enjoyment in biology, chemistry, and life science than boys. Boys, on the other hand, show much greater value and interest in mathematics and physics than girls (Baumert, Garrett, Köller, Nagy, Trautwein, 2006). This is also evidenced by the fact that female pupils, when given the choice between various MST-related subjects, prefer biology and chemistry to mathematics and physics.

Research assessing the beliefs, expectations, attitudes, and images of young adolescents regarding academic careers in science and scientific occupations also make these differences visible (Christidou, 2011; Delwel, & Emons, 2010, Rommes, Van Gorp, 2010). Girls associate science more often with developing medicines and finding cures to cancer, whilst boys relate science to building machines, rockets, and inventions (Baram, Jenkins& Pell, 2006, Tsabari, Sethi, & Yarden, 2006, 2009, 2006). Additionally, gender differences in the uptake, interest, and the perceived value of mathematics and mathematics-related subjects become larger as pupils grow older (Archer et al., 2010; Baram-Tsabari& Yarden, 2008, 2011).

2.5 School related factors influencing students perceptions towards the choice of science education stream

Science education teaching in upper secondary school level needs especial facilities. Showalter (1984) in Akalewold (2001: 30) observed that the advantages of facilities by saying, "Research can explore that without adequate laboratory facilities and materials, most students cannot learn biology in any meaningful way". Davis (1972) also expressed that provision of equipment and materials had improved patterns of teaching science. In his research, science education teachers also found that adequate supply of materials made teaching more convenient and more effective, increased the amount of students' experimental work, and enabled teachers to broaden the science education curriculum (Akalewold, 2001, p: 30). Ainley (1978) found that better facilities were associated with what students perceive as an enriched learning environment, namely greater involvement in purposeful activities and more stimulation to study.

2.5.1 Subject Teacher

Schools require large numbers of well-qualified teachers, but still many countries face a problem of both quality and quantity in recruiting Science education teachers. Well-qualified and enthusiastic teachers are the key to any enhance in the teaching of science and technology in schools, not least in laying the foundations for the future development of the knowledge, interest, and attitudes of ordinary citizens, once they have left school (Jenkins, 2002). Students appreciated science teachers who explained the content in an engaging manner (Lyons, 2003). According to UNESCO, 2000; 2001 b, one of the underlying reasons for present difficulties in recruitment to scientific and technological studies, from the view of European countries is a lack of qualified Science teachers. Science and technology are often poorly articulated in the preparation of children of secondary School age. Moreover, those students who decide to become primary schoolteachers are often those who did not study, or did not like science themselves in school. The present decline in recruitment of science teachers in many countries is especially evident in secondary schools. The long-term effects of a lack of good Science and technology Vs science teachers can be very damaging, although they may not be as immediately evident as a comparable shortage in industry and research (Jenkins, 2002). According to Woolnough (1994:34), as per the student responses, the most Students expectation factors for choosing science career and continuing science education were the quality of science teaching, encouragement of science teachers, the practical nature of science, the intellectual satisfaction in science lessons and so on. Qualified teachers, through role model influence, can encourage students to attend their science teachers in pure science Woolnough (1994 p: 37). Under the topic "What the students want to say?" for question, "Do the teachers of science make a difference?" Woolnough found the response of two girls as dull, unenthusiastic teacher’s .Having teachers who were interested, enthusiastic about what they were teaching increased to develop my love of science, and learning about science make me off sciences wholly.

2.5.2Teaching Methods and Means of Transmission

During the teaching learning process, methods of teaching and means of transmission play a great role in bringing the assumed objectives. According to Akalewold (2001), many investigators found that cooperative learning methods increase students' academic performance and self-esteem and enhance their classroom-learning environment (p.33). Hegartz-Lazarwitz, et al (1984) in Akalewold (2001) presented that laboratory settings produce the highest frequency of natural interaction and cooperation on task compared with other modes of instruction in science. This goal can be achieved when curriculum material is planned to encourage such cooperative interaction.

The learning environment in the cooperative classroom was more flexible than the frontal classroom. The approach facilitated more interaction among students and teachers and thereby created a positive learning climate. Woolnough (1994) argues that the best method of effective Sciences teaching is through student research projects, in which students take a problem of personal concern to themselves and tackle it, worry at it, persevere in it and meet its challenges, producing their own solution. Woolnough further argues that; doing science should be a holistic and not a reductionist activity. It should involve the affective as well as the cognitive aspects of a students' life. It is not sufficient to be concerned only with what students know and can do; one must also be concerned with whether they want to do it. It is of fundamental importance to develop students’ emotional involvement with their work; to develop their motivation, their commitment, and their enjoyment and creativity in science, for without this any knowledge and skill they acquire in the subject will be of no avail (p.9).

Concerning Science students, Woolnough (1994) said that the more responsibility we encourage them to take for their own learning, the more their enormous potential will develop and the more they will appreciate, enjoy and mature in science. Many of the organizational issues, which have dominated science teaching in England and Wales, have been based on the principle that learning science is about doing science and that the best way to learn science is by doing practical activities in science. Teachers have almost felt guilty if they have not had their classes doing practical work in any particular lesson (Woolnough, 1994:25).

2.5.3 Nature of Subjects (Curriculum Factors)

Related to the curriculum factor Jenkins (2002) identified two main reasons for the reluctance of students in enrolling in natural science subjects.

1. Irrelevant Curricula; Many studies show that pupils perceive school Science as lacking relevance. It is often described as dull, authoritarian, abstract and theoretical. The curriculum is often crowded with unfamiliar concepts and laws. It leaves little room for enjoyment, curiosity, and a search for personal meaning and significance.' It often lacks a cultural, social

or historical dimension and it seldom treats the contemporary issues related to science and technology.

2. Science: Difficult and Unfashionable; Scientific knowledge is naturally abstract and theoretical and often contradicts common sense (Wolpert, 1993). It is often developed through controlled experiments in artificial and 'unnatural' and idealized laboratory settings. Learning science therefore, often requires hard work and considerable intellectual effort, although there is little doubt that school science could, and should, be better tailored to meet the needs and abilities of pupils. Concentration and sustained hard work do not seem to be a dominant feature of contemporary youth culture. In a world where so many 'Channels' compete for the attention of young people, subjects such as Science and technology are readily perceived as unfashionable. According to Lyons (2003) students were departing from school science in Australia due to the following four reasons:

1. It was described as a subject that focused on facts, which were transmitted from expert sources-teachers and texts- to relatively passive recipients.
2. Curriculum content was often presented in a decontextualized manner, leading many of the students to consider school science irrelevant and boring.
3. The students considered physics and chemistry to be the most difficult of all science courses and generally more difficult than most other subjects.
4. Finally, physics and chemistry were regarded as subjects having a primarily strategic value, in that they would enhance the students' university and career options. "Science curricula are key factors in developing and sustaining pupils' interest in science. There seems to be a broad agreement about shortcoming of traditional curricula that still prevail in most countries. According to UNESCO (2000), the implicit image of science conveyed by these curricula is that it is mainly a massive body of authoritative and unquestionable knowledge. Most curricula and textbooks are overloaded with detailed facts and information on a few big concepts and key principles. UNESCO further argues that there seems to be an attempt to cover most, if not all, parts of established academic science, without any justification for teaching material in schools that cater for the whole age cohort.

Many new words and 'exotic' concepts are introduced on every age of most textbooks (Jenkins, 2002). The same author further argues that, although very few pupils will pursue further studies in science, preparation for such studies seems to be a guiding curriculum principle. There is often petition, with the same concepts and laws presented year after year. Such curricula and textbooks often lead to rote learning without any deeper understanding so that, not surprisingly many pupils become bored and developed a lasting version to science. Moreover, this textbook of science is often criticized for its lack of relevance and deeper meaning for the learner and their daily life. content is frequently presented without being related to social and human needs, either present or past, and the historical context of discoveries is reduced to biographical Moreover, the implicit philosophy of textbook of science is considered by most scholars to be a simplistic and outdated form of empiricism (UNESCO, 2000).

According to Woolnough (1994,p: 29), difficulty of the physical sciences in schools was mentioned as the most discouraging factor blocking students from pursuing studying science. According to Ajeyalemi (1990), in Sub-Saharan African countries the current secondary science curricula are unsuitable for achieving the objectives of producing scientifically literate graduates. Furthermore, Ajeyalemi (1990) argues, most of the graduates from the system can only read and memorize scientific information but may not be able to think in do, or use science as their counterparts in developed countries. According to Temechegn (2000) in Amare et al., (2000), the Transitional Government of Ethiopia (TGE**,** 1994a) documented the inadequacy of the education system to prepare the learner for useful participation in the community.

Pointing out the fact that objectives and relevance of education became questionable in the last 30 years, the Education Sector strategy (TGE) stated that: It is generally agreed that the impact of modern education on the day-to-day life of the society at large has been negligible. The science and cultural components are weak and inadequate to prepare the learner for useful participation in the community. The Government thus developed the New Education and Training Policy (NETP) that states, among others, that the education system is entangled with complex problems of relevance, quality, accessibility and equity (TGE, 1994b: 2). Based on the NETP, new science curricula and textbooks are being developed for both primary and secondary schools. There is a strong belief that students of science should know the practical applications of the science contents and the resulting social implications Temechegn (2000) in Amare et al (2000). Socially relevant curricula have their own benefits. When students have exposure to socially relevant curricula, they can understand the role of science in their society, apply their science knowledge to real life situations and develop skills of decision-making and problem solving (George, 1988). Such exposure can be achieved by including indigenous knowledge and native technology in the science curriculum (Ajeyalemi, 1990; George, 1988; Swift, 1992; Temechegn, 1996; Ogunniyi, 1996).

2.5.4 Extra-curricular Activities

Enhancement of extra-curricular activities (Fretwell, 1931; Fozzard, 1967; Miller, Moyer &Patrick, 1956; Sybouts & Krepel, 1984) claim that this informal aspect of education has a good deal to contribute to developing good citizens, enabling pupils to communicate adequately, preparing them for economic independence, developing healthy minds in healthy bodies, preparing them for family life, directing their use of leisure time, developing a set of moral and ethical values, developing social competency, discovering especial interests and capacities and developing creative expression. According to Woolnough, (1994, p: 29) schools using different extracurricular activities had relatively high degree of 'successes'. Schools, which encouraged extra-curricular activities and student Science projects, through clubs, competition, projects and school-industry links, were the ones, which sent a large proportion of their students on higher education to continue with their sciences or engineering. Through extra-curricular activities, students gain knowledge, understanding and appreciation of the Sciences, confidence and competence at doing Sciences, and enjoyment, enthusiasm and commitment to the science appropriate for their own lives (Woolnough 1994, p: 43).

2.5.5 Laboratory practices

The role of laboratory work in science education has been documented as paying attention to questions for investigations, what is to be done, observed, interpreted, and finally how data is communicated. Laboratory experiences are likely to make learners understand and enjoy sciences. Learners with a positive attitude towards science are more likely to be found in classrooms that use LIs. This implies that positive attitudes towards science may also lead to better performance (Connell 2000) .The challenge in most cases is how to make sure that learners develop positive attitudes towards science. The challenge in Africa as a developing continent has been exacerbated by poor infrastructure (Crawley an Black 1992). Nevertheless, there are some successful stories. For instance, in Nigeria there are insufficient laboratory facilities, consequently, secondary school learners are taught physics using guided discovery notes, demonstrations and expository teaching approaches. These methods are highly effective in improving learners' attitude towards physics in such under-resourced schools. Laboratory work provides learners with an opportunity to experience science by employing scientific research procedures. Thus, in order to attain meaningful learning, to understand scientific theories and their application methods, learning should be done using LIs. Moreover, engaging in practical work should encourage the development of critical thinking skills and create interests in science (Ottander and Grelsson 2006). However, there are concerns about the effectiveness of laboratory work in aiding learners to understand various aspects of scientific investigations. Improving quality requires both the design (ways of things intended to work) and implementation considered explicitly. Outcomes may differ from intention, because of either the design may be impractical or due to poor quality of implementation (Massay, Graham and, Chort, 2007). Thus, the best design may produce poor outcome if facilities and teaching standards are not maintained. Well designed curricula thought by poorly trained and poorly motivated teacher will not produce the desired learning out comes. Therefore, quality is achieved by meeting the predefined specification (design) in a consistent manner (implementation).

Science teaching in upper secondary school level requires especial facilities. Showalter (1984) in Akalewold (2001: 30) showed that the importance of facilities by saying, "Research can show that without adequate laboratory facilities and materials, most students cannot learn biology in any meaningful way". Davis (1972) also found that provision of equipment and materials had improved patterns of teaching science. In his research, science teachers also reported that adequate supply of materials made teaching more convenient and more effective, increased the amount of students' experimental work, and enabled teachers to broaden the science curriculum (Akalewold, 2001: 30). Ainley (1978) found that better facilities were associated with what students perceive as an enriched learning environment, namely greater involvement in purposeful activities and more stimulation to study.

2.5.6 Role model/Industry site visiting

In their literature review, Lavonen et al. (2008) found that role models met during visits may be important when students are planning their future. Students' different motivational aspects bring a thought-provoking aspect to the dynamic system of a classroom. What works with some students may not be the optimal means for others. The contemporary curriculum for basic education emphasizes considering students' individual needs and preconditions .The contribution of this research to this multifaceted problem of students' low motivation and interest in investing their cognitive capacity in science studies employs out-of-school industry site visits in the context of school science. In this framework, industry site visits are seen as a means of improving students' understanding of the varied career possibilities within the field of science and of the importance of choosing science courses at school if later pursuing a scientific career.

The philosophy of inquiry-based science teaching (IBST) constitutes the grounds for the design, and the design solution offers science teachers means of optimizing the social context of the learning situation in order to enable students' inner potential to flourish, while taking the students' existing motivational profiles into account. Based on the literature review, differences in students' motivational profiles are taken for granted in this research, and therefore, instead of examining the motivation and interest development of the entire group, it was deemed more relevant to consider which aspects of a certain teaching sequence appeal to Various classroom phenomena related to learning, interactions, motivation, and interest represent themselves more than as complex and dynamic systems than predictable causal relations between teachers' teaching and students' learning.

2.6 The overview of 70:30 students' admission to tertiary education policy in Ethiopia

2.6.1 Policy descriptions

Policy and programmatically initiatives of "annual intake and enrollment growth and professional and program mix of Ethiopian public higher education strategy and conversion plan of 2001-2005" was aimed to believe that science and technology are the driving of development. Hence, Ethiopia's future for building a knowledge economy and propelling its economic growth hinges on the availability of sufficient stock of skilled work forces specializing in those fields and produced by its higher education institutions. In addition to this, the government goal seems to assume that the quality of higher education in the fields of science and technology would keep pace on a per with the explosion in enrollment in science and engineering 40 percent, in natural and computational science stream (20 percent) 5 percent agricultural science and life science, 5 percent in pharmacy and health science and 30 percent in to social science and humanities stream. To meet professional and program mix in higher education as a policy strategies, the ministry of education (MoE, 2010) plans as a policy components such as train 10, 000 undergraduate instructors at the masters level and 2000 Ma/M.sc holders at the PhD levels. The training of these instructors is a lined with the proportion allocated to the streams.

2.6.2 Links between science, engineering and technology programs and labor market as a policy stage design

Most current and planned industrial parks are built near the top ten public universities, which train 63% of all undergraduate students in public engineering and technology programs. These top ten HEIs, together with the recently established Addis Ababa science and Technology University (2011), could help Ethiopian overcome the disadvantages of being latecomer in technological catching-up and support the national industrialization and growth agenda. The most current and planned industrial parks support massive industrialization projects. For example, Hawwasa industrial park houses large local and international manufacturers specializing on textile and apparel and aims to generate over US$ 1billion export revenues and create 60,000 jobs. The government has also constructed and leased the Bole Lama-I Industrial Park in the suburbs of Addis Ababa. Additional industrial parks such as, Dire Dawa, Mekelle, Adama and Compolcha are almost completed, while Bole Lemi- II industrial park, Jimma, Bahir Dar, DebreBirhan, Aysha Dewalle and Kilinto industrial parks are expected to be operational in 2017. Development may cover various aspects of teaching and learning pedagogy, research methods, computer literacy soft skills and other competencies according to the identified needs.

Chapter Three

Research Design and Methodology

This chapter discusses the research methodology used in this study and provides a general framework for this research. The chapter presents details of the research design, research methods, sample and sampling procedures, reliability of instruments, data collection procedures, data analysis techniques and ethical considerations while conducting the study.

3.1 Research Design

The aim of this study is to investigate the existing situations of student's perceptions towards the choice of science education stream and its implications for 70:30 admissions to tertiary education. To secure the required information descriptive survey research design was applied. The design used as it is useful to study a large segment of the population as samples and obtain accurate description of a situation (Brown and Dowling, 1998; Kothari, 2006).

Descriptive research design helps to describe and interpret current condition (Best and Kahn, 2003).Best and Kahn(2003) state that descriptive research concerned with conditions or opinions that are held, processes that are going on, and effects that are evident or trends that are developing.

3.2 Research Method

Mixed methods were used to merge quantitative and qualitative data in order to provide a comprehensive analysis of the research problem. These mixed studies were used for quantitative questions and qualitative semi structured interviews. Robinson (2004), mixed-methods research attempts to bring together methods from different perspectives (i.e., quantitative and qualitative methods). Mixed-methods studies provide a basis for triangulation, attempt to view the research questions from different points of view, and facilitate deeper exploration on the research topic.

3.3 Sample size and Sampling technique

In kembata Tembaro Zone, there are seven woreda and three-town administrations. The area is so geographically dispersed and divided as Districts and town administration. To get sample population, cluster sampling techniques were applied. Then Districts and town administrations were selected. Three town administration schools were taken purposely because of having a lot of populations and convey detail information's for researcher. Therefore, (Shinshicho, Mudula and Durame preparatory schools were taken). The respondents (subjects) included in this study were students, teachers and school principals. 95 students, by using simple random sampling technique as being equal chance selection of respondents out of 315 and 14 teachers (natural science stream) out of 48, that they easily examine the students perceived interests towards the choice of science education stream because of being they are making daily contact during teaching and learning process,6 (six)Students who volunteered to participate in the research for interview were selected as case study and school principals (12 in number), 6(50%) taken purposely as they are believed to be rich as a source of information for the study and they are easy to manage as being small in numbers. Generally, a total of 115 respondents were included in the study as source of information.

3.4 Tools for Data Collection

The data collecting tools used for this study were questionnaires, interviews, and document review

•Questionnaire

Questionnaire was **c**hosen as an instrument since it helps to collect data in a more efficient and manageable way from a large population. According to Selinger and Shohamy (1989) a questionnaire is widely used as one of data collection tools, in particular to collect data on phenomena which are not easily observed, such as attitudes and self-concepts. It is also used to obtain background information about the research subjects Koul (1984). The questionnaire was used to collect information from teachers and students. There were no literacy challenges, since the preparatory level students were able to read the questionnaire themselves because they are ready to take the higher education entrance examination that makes the researcher confident.

Two sets of questionnaire were prepared to collect information from two groups of respondents. Therefore, students and teachers because they are familiar with students in teaching learning process and easily grasp the student's perceptions about a subject learning. Under this study, there were four parts and sections. The first and the second parts for both are concerned with personal background information's and, the third and last part concerned with school principals background and structured interview questions related to document review, support, advise and information's related to students stream choice decision- making.

Pilot study was conducted to check the relevance of each item in the questionnaires. The subjects in the pilot study were 20 students and 4 teachers. All subjects in the pilot study were from KT Zone Town administration secondary Schools. Total respondents will be 24. A pilot. run of the survey was conducted in four different settings. The researcher used high school seniors outside of the sample schools. The students were asked to comment on the survey as a whole; they were asked to keep track of their time and mark the questions that resulted in the most confusion. Each trial resulted in revision until the end of pilot studies when the researcher felt that ambiguous questions had been eliminated. During the holyday's of easterly session at Shinshicho town, Dr. Baru who is the expert in the fields of education that invited to check the survey questionnaire and provided feedback as to the appropriateness of the surveys. The survey was edited for grammar, and a time range of three to five minutes was established for completing the survey instrument. After the modifications made on few items and then questionnaires was administered to the actual subjects in the study. Accordingly, the researcher found the Coefficient of Alpha ($\propto$) to be 0.74, which recommended as acceptable by (Cohen et al., 2007) also suggest that, the Cronbach's Alpha result >0.9 excellent, >0.8 good, >0.7 acceptable, $\propto$< 0.6 questionable, and < 0.5 poor.

• Interview

According to Patton (1987), interviewing enables a researcher to gain insights into the internal world of the participant and to get an in-depth understanding of that participant's perceptions (Merriam, 2001). Semi-structured interview was employed in this study because they provide a clear set of instructions for interviewers. An interviewer can vary the questions as the situation demands which enable more flexibility then a structured interview (Lichtman, 2010).

Interview used because of the potential for obtaining naturalistic, detailed and complete information that would otherwise be almost impossible to obtain using other methods (Gall et al., 2007). This helps to collect information on the student's perceptions towards science education stream choice regarding how students get advice, guidance and information's that students perceived before making any decisions towards science stream choice, to collect information on the students level factors that influence stream choice and other school related factors that influences their best of choice. The school principals and staff arranged for me to introduce my research to the participants, and they were encouraged to ask questions about the research before they decided to volunteer. Students indicated their willingness to be involved in the research as case study. In order to gain more information or to triangulate data collected through questionnaires and in-depth understanding of participant's perceptions (Merriam, 2001), 6 students from grade 10 were selected by using criterion sampling techniques as a case study for interview and the results cannot be generalized or summarized as being smaller population that cannot represent the whole population but as case helps to gain deep understanding of their own perceptions towards the practice of science education stream choice. Students involved in the research and provided basic information such, telling their stories, gender, address, their family background; how they made their stream choices, advice and information they obtained during stream choice.6 School Principals also were interviewed. The sources of the items were from literature review. The interview has two parts: the interviewees' personal characteristics and items relevant to student's perceptions towards science education stream and implications for 70:30 admissions to tertiary education in governmental preparatory schools in Kembata Tembaro Zone.

3.5. Method of Data Analysis

Based on the types of data gathered and instrument used, quantitative and qualitative techniques of data analysis employed for this study. To get the collected data ready for analysis, the questionnaires checked for completion, and then classified and tailed by the researcher himself. The characteristics of respondents analyzed by using frequency and percentage, whereas the quantitative data of all basic research questions were analyzed by using mean scores with standard deviation. Scores of each research questions item was statistically organized and imported in to SPSS V.20.0. Mean scores were used to interpret data. To check sample mean differences, independent sample men t-test was employed.

Since the purpose of survey questionnaire was to obtain participants' demographic information and determine the extent to which they agreed or disagreed with 5 point Likert-scale questions. The Likert-scale questions were answered using the scale of responses ranging from 1 to 5. Participants asked to circle the corresponding number based on their agreement with the statement. Response possibilities included: strongly disagree (1), disagree (2), Undecided (3), agree (4), and strongly agree (5). On the other hand, qualitative data was analyzed by narration and description. Therefore, interview was utilized as a supplementary data to the survey questionnaire.

3.6 Ethical Consideration

Protecting human subjects is a very important issue that all researchers should consider when conducting research. Throughout the study (planning to data reporting) researchers should work in humanly possible ways to minimize potential harm and ethical issues that may arise regarding research participants (Gall et al., 2007), to ensure that participants that are protected throughout the study. The researcher also was discussed with participants bout their rights during the study and the significance of the study and confidentiality issues.

Chapter Four

Presentation Analysis and Interpretation of Data

In this section, collected data are presented, tallied and interpreted. Once the research data, collected using different types of data collection procedures as described in the earlier chapter, the next step was to analyze those data. The tallies were counted and registered frequency that showed the number of respondents. Then, the percentage, mean standard deviation were computed. The data collected through Interviews and documents have been also reported.

4.1 Participants' background data

The following table 2 indicates, that the participants' background of this study subjects and those were students, teachers and principals in selected sample preparatory school. They were included with the assumption that they would light on the major data collected through the questionnaire and interviews.

Table 2: participants' background data

Characteristics	Participants					
	Students		Teachers		Principals	
	Fr	%	Fr	%	Fr	%
Gender/sex						
male	51	51.0	8	57.1	4	67
female	49	49.0	6	42.9	2	33
total	100	100.0	14	100.0	6	100.0
Economic status			-	-		
Low	64	64.0	-	-		
high	9	9.0	-	-		
medium	22	22.0	-	-		
Total	95	100.0	-	-		
Qualification						
degree	-	-	10	71.4	2	33
Msc and above	-	-	4	28.6	4	67
total	-	-	14	100.0	6	100.0
Work experience						
1-5 years	-	-	-	-	-	-
6-10 years	-	-	4	28.6	1	17
11-15 years	-	-	7	50.0	2	33
16-20	-	-	3	21.4	2	33
21-25 years	-	-	-	-	1	17
Greater than 25 years	-	-	-	-	-	-
total	-	-	14	100.0	6	100.0

As illustrated in Table 2 above, 51(51%) male out of (95) and 49(49%) females of students which indicates almost the equal participations of both males and females in the stream, regarding economic status of students, 64(64.0%) low,9 (9.0%) high and 22(22.0%) is medium, Whereas regarding teachers, 8(57.1%) male,6(42.9) females out of 14 and this implies that majority of the students family background is poor family that influences the learning process of pupils. Whereas in terms of qualifications of teachers, 10(71.4%) degree holders, 4(28.6%) has M.sc and above. Majority of the respondents were degree holders and indicates that the low qualifications of M.sc and above in the sample schools. Regarding work experiences of teachers,4(28.6%) between 6-10 years, 7(50.0%) range of 11-15years and 3(21.4%) range of 16-20 years. Whereas regarding school principals, 4(67%) male and 2(33%) females, regarding qualification,2 (33%) degree holders,4(67%) has M.sc and above. Whereas regarding work experience of school principals 1(17.0) range of 6-10 years, 2(33%) range of 11-15 years, 2(33%) range of 16-20 years and 1(17%) range of 21-25 years.

4.2 Students' and Teachers Response

As indicated earlier the role of schools in providing career advice and information that students make their decision towards the practice of science education stream choice play a great role for better decision that students decide regarding their own interest in varies government preparatory schools of Kembata Tembaro Zone. Thus, to identify the more degree of career advice and information provided by schools to the required preconditions Students themselves, Teachers and Principals are more closed, respondents were asked to s indicate their opinions by choosing from the given alternatives through the scaled liker types ranging from strongly disagree (1) strongly agree (5).

4.2.1. Students response about the extent to which the role of Schools in providing career advice and information

Table 3 students and teachers response bout career advice and information

	Items	Respondents'	N	Independent t-test		
				Mean	S.D	Mean difference Sig(2-tailed)
1	own interest	students	95	2.23	.84	.028
		teachers	14	2.5	1.22	
2	From school administrators	students	95	3.69	.93	.032
		teachers	14	3.28	1.2	
3	From teacher	students	95	2.14	.61	.822
		teachers	14	2.0	.67	
4	from friends	students	95	2.37	.96	.012
		teachers	14	2.78	1.36	
5	From parents	students	95	2.35	.95	.048
		teachers	14	2.50	1.34	
6	From school counselor	students	95	2.12	.623	.031
		teachers	14	2.1	.624	
7	exam results	students	95	2.24	.79	
		teachers	14	2.57	1.22	.011

Key: = Strongly Disagree 1, Disagree 2, Undecided 3, Agree 4, Strongly Agree 5, **M-** is mean, **SD-** is standard deviation, **t-** independent t-test and Sig. (2-tailed) or **P**-value)

In table 3 item one shows that, the perceptions of students' and teachers regarding career advice and information students make their respective stream, both students'(m=2.23,SD=.84) and teachers(m=2.5,SD=1.22) both students and teachers perceived career advice and information is less regarding students interest towards stream choice. Therefore, no statistically significant differences existed between students and teachers sample mean t (107,m= .028, $p\leq 0.05$), suggesting that students' do not get career advice and information to make their respective stream as teachers believed about streaming practice. To gather more information on this, during interviews the researcher asked students as case study participants, that where and when they got information regarding the role of schools in career advice, supporting and informing, students reported that, they cannot get any information about streaming from schools and the schools forced us to enroll in science education stream without own interest and ability. On the same table item two shows that the perceptions of students' and teachers regarding career advice and information students make their respective stream, both students'(m=3.69,SD=.93) and teachers(m=3.28,SD=1.2) both students and teachers perceived career advice and information is less regarding school administrators towards stream choice. Therefore, no statistically significant differences existed between students and teachers sample mean t(107= .032, p≤ 0.05), suggesting that students' do not get career advice and information to make their respective stream from school administrators.

Whereas item three shows that the perceptions of students' and teachers regarding career advice and information students make their respective stream, both students' (m=2.14, SD=.61) and teachers (m=2.0,SD=.67) both students and teachers perceived career advice and information is less regarding students interest towards stream choice. Therefore, statistically significant differences existed between students and teachers sample mean t(107,m= .822, p≤ 0.05), suggesting that students' more perceive than teachers and do not get career advice and information to make their respective stream from teachers about streaming practice.

On the same table item two shows that the perceptions of students' and teachers regarding career advice and information students make their respective stream, both students'(m=2.35,SD=.95) and teachers(m=2.5,SD=1.34) both students and teachers perceived career advice and information is less regarding information career advice provided by parents' towards stream choice. Therefore, no statistically significant differences existed between students and teachers sample mean t(107=.048, p≤ 0.05), suggesting that students' do not get career advice and information to make their respective stream from parents'.

Whereas item five shows that the perceptions of students' and teachers regarding career advice and information students make their respective stream, both students' (m=2.12, SD=.623) and teachers (m=2.10, SD=.624) both students and teachers perceived career advice and information is less regarding career advice and information provided by school guidance and counselors towards stream choice. Therefore, no statistically significant differences existed between students and teachers sample mean t(107,m= .001, p≤ 0.05), suggesting that both students' and teachers perceive negatively. In addition to this, the data gathered through interview from school principals, All 6 heads of schools reported that there were no special programs for guidance and support about streaming in their schools. The head of school "1" reported that in her school they don't offer counseling for academic issues but they had a special counselor for students' social affairs. In school "2", the head of school reported that they form subject clubs and students are free to have membership in any subject club they want. He believed that during these clubs that meet once a week, teachers including science teachers encourage students to work hard on those subjects. He was not sure, though, if this was related to streaming advising. 50% (3/6) of heads of schools believed that providing career advice, support and information services was a great idea but their schools could not offer it simply because they did not have enough science teachers. One head of Schools emphasized that:

> *"I have only two science teachers employed in my school; the remaining three teachers are part time teachers that the school finds using its money and they may leave anytime to university. I'm afraid to give them other work load of counseling"*

During interviews, 75% (5/6) of heads of schools believed that advisory services were important but not a priority for their schools. They believed that the best way to improve students' participation in science and mathematics is to improve students' performance by providing enough science teachers science laboratories and science teachers' motivation. The head of school "3" said that science laboratory practical motivate students to do science in her school. With regard to policy that guides subject streaming in schools, all three heads of schools reported that there were no policy documents that guide subject streaming in schools.

4.2.2 Students' expectation factors influencing their perceptions about stream choice

Table 4 Students' and Teachers response about expectation factors

No	Items	Respondents'	N	Independent sample test		
				Mean	Std. Deviation	Mean difference (Sig),2-tailed
1	Competitive in labor market	Students	95	2.24	.80	.013
		teachers	14	2.57	1.22	
2	good employment opportunities	students	95	2.27	.88	.047
		teachers	14	2.57	1.22	
		teachers	14	3.57	1.15	
3	science education is not difficult	students	95	2.13	.708	.442
		teachers	14	2.21	.89	
4	More difficult to do than social science	students	95	3.83	.66	
		teachers	14	3.71	1.06	.028
5	Own ability and interest	students	95	2.12	.67	
		teachers	14	2.28	1.06	.019
6	difficult for females	students	95	2.22	.801	
		teachers	14	2.57	1.22	.012
7	difficult for males	students	95	2.20	.73	
		teachers	14	2.50	1.28	.001
8	science is interesting	students	95	3.78	.72	
		teachers	14	3.71	1.06	.066
		teachers	14	2.57	1.22	.002
9	I get support from my family	students	95	2.21	.88	
		teachers	14	2.57	1.22	.038

Key: = Strongly Disagree 1, Disagree 2, Undecided 3, Agree 4, Strongly Agree 5, **M-** is mean, **SD-** is standard deviation, **t-** independent t-test and Sig. (2-tailed) or **P**-value)

In table 4 item one shows that, the perceptions of students' and teachers regarding expectation factors influencing students about their respective stream choice, both students'(m=2.24,SD=.80) and teachers(m=2.57,SD=1.22) both students and teachers perceived less regarding students expectations about future easy of finding job opportunities. Therefore, the analysis of independent t-test value is less than the p, 0.013≤ 0.05, revealed that there is no statistically significant differences existed between students and teachers sample mean, suggesting that students' were affected by expectations about job opportunities.

This was also cross-checked by the data gathered through interview of as case study participants (students). As the participants' of the case study indicated, as follows,

> *"Su'mmui kiijaan yamamaamm, umurui 16. Rosayyoommiihu qooccato Sayins roshsha hagaan ihanyan, waalleemmiihu buxichcho miniichcheet. Hizooi ingineeringa 2009 m.w maa'ssamm teesoo iillanqaxeechhi hujita afu hoogus qooccato sayinsi haga aagu culassumbaeikk. Ikkodaa roshshai minu gonbansi sayins roshsha hagaan xaaffee".*

Kiijaan is a 16-year-old male. He is following science education stream, and he was from a poor family his father is a Guardians and his mother is a house worker. His brother is the engineering graduates of 2009, and he is still searching job opportunities. As a result, Kiijaan is not interested in becoming science education stream students because, his brother is still unemployed person of engineering graduates, but the school forced him to enroll in science education stream by giving few days (Researcher transfer)

On the same table item three shows that the perceptions of students' and teachers regarding self-efficacy to make their respective stream, both students' (m=2.27, SD=.88) and teachers (m=2.57, SD=1.2) teachers perceived less. Therefore, the analysis of independent t-test value is less than the p, .047≤ 0.05, revealed that there is no statistically significant differences existed between students and teachers sample mean, suggesting that students' were affected by expectations factors. Similarly, data gathered from case study participants' interview as follows,

> *"Nita 17 woggee umur rosaanchuta ikkanyan, biiro hujita hujatu iittitaaiita ikkan qooccato sayins roshata ha'yitaaba'a gajaajjuntis, qooccato sayins roshhat abbissi kee'mmitaataa yitaa a'mma'nnanchu yoosebikkiihaat".*

She likes working in an office, and she dislikes science stream subjects because these subjects need scientific investigation, abilities and thinking in laboratory practices and she has no the ability to do science subjects well. However, she enrolled in science stream without her interest in giving limited time during school enrolment for social science stream rather than science stream. Since she has not interested in science stream (Researcher transfer). Whereas item four shows that the perceptions of students' and teachers regarding career advice and information students make their respective stream, both students' (m=3.75, SD=.76) and teachers (m=3.57, SD=1.5) both students and teachers perceived less regarding the opinions of science education is difficult to do than social science . Therefore, no statistically significant differences existed between students and teachers sample mean (m= 0.18, $p \leq 0.05$), suggesting that both students' and teachers perceived negatively. On the same table item five shows that the perceptions of students' and teachers regarding on the opinions of making stream choice based on own interest and ability, both students' (m=2.12, SD=.67) and teachers (m= 2.28, SD=1.07) teachers perceived more than students. Therefore, there is statistically significant differences existed between students and teachers independent sample mean t(107=.-.019, $p \leq 0.05$), suggesting that teachers expect more than students' that influence stream choice in study area.

Whereas item six and seven shows that the perceptions of students' and teachers regarding gender differences, both students' (m=2.22, SD=.80) and teachers (m=2.27, SD=.122) both students and teachers perceived less regarding gender differences. Therefore, there is no statistically significant differences existed between students and teachers sample mean t(107,m= .012, $p \leq 0.05$), suggesting that both students' and teachers perceive negatively. On the same table item eight, and nine respectively shows that the perceptions of students' and teachers regarding on the opinions of science is interesting and support from family , both students' (m=3.78, SD=.72) and teachers (m= 3.71 ,SD=1.06) perceived more and supposed to be influential factors. Therefore, there is no statistically significant differences existed between students and teachers independent sample mean t(107=.-.038, $p \leq 0.05$), suggesting that students' and teachers expect more and influence stream choice in study area. In addition to interview of case study participants data indicates as follows,

> *"Su'mmui Zannaba yamamaamm, umurui 17 annui oodu zaazzalaanuhaa, amai mini qorabaanchuta ikkobikkii qooccato roshsha hagaan aaggoommida roshshai aleen dikkisu kotanoebikkii gajaajjuntis 5 woggaa aaqqanobikkii qooccato sayins haga aagumbuhaa ikk yaadui, ikkodaa roshshai mini gashshaanu 70:30 miin yeennoo wiinshii iittu' nnaachin xaaffee".*
>
> Zenebe is 17 years old and His father is retailer and his mother is a house worker. His parents have not support all of him during his education. He is also not interested in science education stream because he believes that if I choose science education stream, may I join science and engineering related fields, and it must take 5 years. (researcher transfer).

4.2.3. Students response about the influence of Students perceptions towards Science education stream choice regarding to School related factors

Table 5 Students and Teachers response on school related factors

No	Items	Respondents	N	Independent sample mean test (t-test)		
				Mean	Std. Deviation	Sig(2-tailed) or p value
1	Teachers tell practically	students	95	2.1	.87	
		teachers	14	2.5	1.20	.040
2	Science curricula are relevant	students	95	2.2	.73	
		teachers	14	2.57	1.22	.003
3	Units involve local industry practice	students	95	2.22	.90	
		teachers	14	2.57	1.22	.049
4	Courses are content based	students	95	2.30	.946	
		teachers	14	2.57	1.22	.012
5	Science club	students	95	3.85	.65	
		teachers	14	3.71	1.06	.015
6	Experience from extra-curricular activities	students	95	2.16	.82	
		teachers	14	2.57	1.22	.013
	Scientific investigation	students teachers	95	2.2	.95	
8	Clear step by step instruction	students	95	2.96	1.14	.004
		teachers	14	3.71	1.06	
9	Learning science outside of school	students	95	3.80	.83	.022
		teachers	14			

Key: = Strongly Disagree 1, Disagree 2, Undecided 3 , Agree 4, Strongly Agree 5, **M-** is mean, **SD-** is standard deviation, Sig. (2-tailed) or **P**-value).

In table 5 item one shows that, the perceptions of students' and teachers regarding school related factors influencing students about their respective stream choice, both students'(m=2.1,SD=.87) and teachers(m=2.5,SD=1.2) both students and teachers perceived less regarding opinions that teachers teach practically. Therefore, the analysis of independent t-test value is less than the p, 0.04≤ 0.05, revealed that there is no statistically significant differences existed between students and teachers sample mean, suggesting that students' were affected by teachers practical teaching. On the same table item two and three shows that the perceptions of students' and teachers regarding science curriculum factors, both students' (m=2.2, SD=.73) and teachers (m=2.5, SD=1.22) perceived less. Therefore, the analysis of independent t-test value is less than the p, .003≤ 0.05, revealed that there is no statistically significant differences existed between students and teachers sample mean, suggesting that students' and teachers were affected by science curriculum factors.

Whereas item five and six shows that the perceptions of students' and teachers regarding extra-curricular activities, both students' (m=3.85, SD=.65) and teachers (m=3.71, SD=1.065) both students and teachers perceived less regarding the opinions on extra-curricular activities that influenced students perceived interest. Therefore, the analysis of independent t-test value is less than the p, $0.015 \leq 0.05$, revealed that there is no statistically significant differences existed between students and teachers sample mean, suggesting that both students' and teachers perceived negatively. On the same table item eight and nine shows that the perceptions of students' and teachers regarding laboratory practices, both students' (m=2.2, SD=.95) and teachers (m= 2.5, SD=1.22) teachers perceived more than students. Therefore, there also no more statistically significant differences existed between students and teachers with p, $.022 \leq 0.05$, revealed that both students and teachers perceived as negatively regarding laboratory practices that influenced stream choice in study area. Whereas item seven shows that the perceptions of students' and teachers regarding scientific investigation both students' (m=2.2, SD=.95) and teachers (m=2.5, SD=.122) neither students nor the teachers perceive negatively with p, $.08 \leq 0.05$. Therefore, there is no major problem justified by students and teachers.

4.2.4 Implication of students' perceptions for 70:30 admissions to tertiary education

Table 6 school completion, career aspiration and orientation regarding 70:30 admissions to tertiary education

No	Items	Respondents	N	Independent sample mean test		
				Mean	S. D	Sig(2-tailed) or p value
1	studying science education stream	students	95	2.11	.69	
		teachers	14	2.42	1.15	.010
2	the link between science and engineering	students	95	2.22	.81	
		teachers	14	2.57	1.22	.013
3	industrial parks that provide job opportunities	students	95	2.16	.73	
		teachers	14	2.50	1.22	.004
4	orientation regarding 70/30	students	95	2.16	.73	
		teachers	14	2.28	1.06	.063
5	career aspiration in the future	students	95	2.27	.88	
		teachers	14	2.57	1.22	.038
6	preparing students knowledgeable and skillful	students	95	2.24	.84	.022
		teachers	14	2.57	1.22	
7	being successful in labor market	students	95	3.83	.612	.020
		teachers	14	3.64	1.0	
8	future science plan to be scientists and engineer	students	95	2.25	.86	
		teachers	14	2.57	1.22	.029
9	aware of government future plan	students	95	2.22	.840	
		teachers	14	2.57	1.2	.017

Key: = Strongly Disagree 1, Disagree 2, Undecided , Agree 4, Strongly Agree 5, **M-** is mean, **SD-** is standard deviation, Sig. (2-tailed) or **P**-value)

In table 6 item one shows that, the perceptions of students' and teachers regarding implication for 70:30 admission to tertiary education, both students'(m=2.11,SD=.69) and teachers(m=2.42,SD=1.15) both students and teachers perceived negatively for implementation of 70:30 admission in terms of students completion in studying science education stream. Therefore, the analysis of independent t-test value is less than the p, 0.01≤ 0.05, revealed that there is no statistically significant differences existed between students and teachers sample mean. On the same table item two and three shows that the perceptions of students' and teachers regarding the implication, both students' (m=2.22, SD=.81) and teachers (m=2.55, SD=1.22) perceived less. Therefore, the analysis of independent t-test value is less than the p, .013≤ 0.05, revealed that there is no statistically significant differences existed between students and teachers sample mean, suggesting that students' and teachers were negatively perceived about students' admission to tertiary education.

Whereas item five and six shows that the perceptions of students' and teachers regarding extra-curricular activities, both students' (m=2.27, SD=.88) and teachers (m=2.57, SD=1.22) both students and teachers perceived also negatively and influenced students perceived interest. Therefore, the analysis of independent t-test value is less than the p, 0.038≤ 0.05, revealed that there is no statistically significant differences existed between students and teachers sample mean, suggesting that both students' and teachers perceived negatively. On the same table item eight and nine shows that the perceptions of students' and teachers regarding laboratory practices, both students' (m=2.25, SD=.86) and teachers (m= 2.57, SD=1.22) students and teachers also perceived negatively regarding implication for 70:30 admission to tertiary education. Therefore, there is no statistically significant differences existed between students and teachers with p, .029 ≤ 0.05, revealed that both students and teachers perceived as negatively regarding students perceptions in study area. In addition to this, the data obtained through interview from case study participants that indicate as follows,

> *"Maluyoos 18 umur rosaanchu ihanyan, annus ka alamiichch rehoon annanna ikkeehaa amas ikkodaa min soqqamaanchuta .Hizoos ingineeringiin rashshase xoophphit hujita affimba'a ikkee. Maluyoose wona qulxus mexxooma hagi roshshata ikk gajaajjunts wonaa 10 kifilaan rosano jaan gaazeexa anabbabano jaan matu huje xaaxxittu hoolama ka rosha kifila hasayyoobikkii yaadas yaajjoo. Xawu ikkodaa isu iittu'nnaachchin qooccato sayin kifilaan roshshas minu xaaffos. Maluyoosee teesu yoosi yaadu roshas mereero murr biizinessina iikkonoome roshah again gagi xaaxxittaan aaguaa".*

Maluyoos is 18 years old. His father has passed away and his mother stays at home. His older sister is an engineering graduate. He firstly interested to choose social science stream when he was a grade 10 students. When he reads about job vacancies that need a lot of business and economics graduates to be employed in a sugar factory, he made his decision to become social science stream students in grade11. However, after grade 10 examination, he has been enrolled in science education stream because the school forced him to be enrolled in science stream by saying you had a good science background and you have scored A” grades in most science subjects. But he is not interested even if, he has a good performance in science subjects. Now Maluyoos has a plan to drop from science stream, and he has a plan to attend a business and economics degree in private college (Researcher transfer)

Chapter Five

SUMMARY OF MAJOR FINDINGS, CONCLUSION AND RECOMMENDATIONS

The major purpose of this study was to bring the preliminary investigation of the student's perceptions towards the choice of science education stream in secondary schools of Kembata Tembaro Zone and its implication for the 70:30 admissions to tertiary education. With this moment, this part concerned with the summary of findings, the conclusions reached at and the recommendations given on the basis of findings.

5.1. Summary of Major Findings

The Summary of the major findings reported in chapter four summarized along the following themes that reflect the basic research questions.

Studying about students perceptions with regard to participation towards science education provide the answers for the problems faced in secondary schools level in a case that what motivates the students towards the choice of science education stream and what diminishes the pupils interest in participation towards science education stream choice. Thus, the schools are responsible to cultivate students or prepare in line with stated policy direction in providing career advice support and information students make their respective stream. The teaching and learning process is not well as expected to promote the national policy particularly in Kembata Tembaro zone in regard with science, engineering and technology transfer of the country. Therefore, the purpose of this study was to investigation the existing situations of student's perceptions towards the choice of science education stream in secondary schools of Kembata Tembaro Zone and its implication for the 70:30 admissions to tertiary education. The study also tried to answer basic research questions. Accordingly, three town administrations, 95 students 14 teachers and 6 school principals were included using purposive and multi-stage sampling techniques. Questionnaire was the main data gathering tool. An interview conducted to substantiate the quantitative data. The quantitative data collected by using questionnaire was analyzed and interpreted by using the analysis of numerical data; descriptive statistics (mean, standard deviation and percentage) score were computed. The qualitative data collected through interview as case study from five students. And 6 school principals were analyzed qualitatively by narration in line with quantitative data.

According to the result of data analysis, the following major findings were identified. Therefore, based on the analysis of data, the findings of the study summarized as,

1. Regarding the extent to which the schools provide career advice and information students make decision before science education stream choices;

- Students were forced to join science education stream by schools. The mean scores of 3.4 with SD 1.2 reported that, majority of respondents were agreed on their opinions such as you are forced to join natural science stream. This finding supports with the finding of Student perceived interests towards issues related to payment and ease of finding a job in science relate to what Eccles refers to as utility value (Eccles 2005, 2009) that affects students' choice of their respective stream.
- There were no special programs for guidance and support about streaming in their schools. 50% (3/6) of heads of schools believed that providing career advice, support and information services was a great idea but their schools could not offer it simply because they did not have enough science teachers.
- School administrators, teachers, peers, parents and school guidance and counselor were less concerned with guiding and informing students on streaming practice. Students had at least made a clear link between subject choices and their career goals. The findings also supported by Chapman,(1993) and found that with regard to obtaining relevant information, students appeared to access informal channels such as School administrators, teachers, peers, parents and school guidance and counselor.

2. Regarding with the extent to which Students expectation factors influencing their perceptions towards the practice of science education stream choice;

- Students' expectations about future job opportunities or easy of finding good job is one of the influential factors for the absence of positive students' perceptions towards science education stream choice. Students become increasingly aware of job opportunities and the availability of vocational pathways during their last years of senior Secondary school (Harvey 1984).
- Self-efficacy or ability believe is one of students expectation factors that, the mean score of 2.5 with SD of 1.2 response rate of respondents perceive science education as difficult to do than other social science. Self-efficacy both influences one's choice of

behavioral activities, and one’s persistence in pursuing the stream choice, (Bandura et al., 2001).

- Students’ family background is also seemed to be one of the influential student’s expectation factors that the mean score ranges from 2.3 to 3.2. and standard deviation ranges from 1.2 to 1.3 on their opinions that in getting support because science education need additional support in school and funding from family to study science or engineering in college or university which is supposed to be the influential factors for absence of positive students perceptions towards the choice of science education stream.

3. The study revealed regarding the extent to which the School related factors influencing students’ perceptions towards the choice of science education stream practice;

- ✓ School science curriculum reported that majority of the respondents (teachers) were not agreed on idea in that school science curriculum is not relevant to the daily life of the students, units not involve partnership with local industries and develop skills in students researching issues and content prescribed and taking this as one of influential factors for presence of diminished students perceptions towards science education stream choice.
- ✓ Students were not oriented in earlier grades with science practical projects and experience from laboratory practices through scientific investigation. This early experience with science practical activities affects students’ perceived interest towards the choice of science education stream. The mean score of 2.6 with SD of 1.2 indicated regarding to laboratory activities, learning science through scientific investigation and students feeling when happen clear, step by step instructions are given when doing labs indicated that one of the influential factors that causes low perceived interest of students towards the choice of science education stream.

4. Regarding implications of their perceptions for 70:30 students admission to tertiary education; Schools are not preparing students to be knowledgeable and skilled graduates in required quantity and quality in the future by orienting them before stream choice regarding to 70:30 admission to tertiary education. Students will not join tertiary education with science and engineering career aspiration in the future because they cannot complete their studying in

Science education stream because they were not interested to continue with it.

5.2 Conclusion

The main Objective of the study was to investigate the existing conditions of students perceptions' towards the choice of science education stream in secondary schools of Kembata Tembaro Zone and it's implication for 70:30 students admission to tertiary education by identifying the possible factors influencing students perceptions towards science education stream choice and suggests strategies may help to improve preparatory schools students existing situations regarding science education stream choice. On the basis of the overall findings of the study the researcher could be drawn the conclusions as follows:-

- Schools cannot play a great role in providing career advice and information students' make their level the best decision towards stream choice. As a result, students lack positive interest towards science education stream choice, available knowledge of career aspiration and clear links between stream choice and career goals. Guidance, support and information services are very important and enable students to make informed stream choice. This helps them through their life since for their future career aspiration with particular field of study.

Therefore, one may conclude that, students do not obtain career advice, support and information about stream choice in the school. This caused for absence of positive students perceptions towards the choice of science education stream.

- Based on the findings, students' expectation factors influenced their perceptions towards the choice of science education stream. Students' Choosing to stream in their secondary school is strongly related to its strategic values in the future that those students expect. A positive attitude towards learning leads to a positive commitment to continue with science education. Because the knowledge a student gained in a class become beneficial and desired by a student because they simply want to gain knowledge; however, students ma In general, before any stream choices students' expect for both future life and careers and these affects their perceptions towards the choice of science education stream.

- School related factors also influenced students' perceptions towards the choice of Science education stream. One of the goals of science is to promote laboratory investigations to improve conceptual development and understandings of learners to continue or familiar with science education. Therefore, to conclude that, science education practical activities or early experiences' with science initiative activities in the school affects students perceived interest towards science education stream.

- At national level designed policy of 70:30 student's admission to tertiary education cannot meet its strategic plan regarding with implications' of students 'perceptions towards science education stream choice.

  Therefore, one may be concluded that, 70:30 students' admission to tertiary education doesn't get its achievement, and this trend affect the human resource development in science and engineering related field's in the country in the future. In addition to this, the country Ethiopia is not at right track about implementations of vision 2025, to become a group of middle income countries through science and technology transfer.

Therefore, it can be conclude that the respondents were still lacking clarity on the goals, objective, advantages and streaming practices of science education at school level. This leads to additional efforts to exert on communicating the streaming practice, rationales and benefits of science education to the transfer of the country to be enhanced through Science and technology transfer.

5.3 Recommendation

Based on the findings of the study, the following recommendations were drawn to minimize and solve the problems that impede the Students perceptions towards the choice of science education stream in Kembata Tembaro Zone and its implication for 70:30 Students admission to tertiary education:

1. Regarding to what extent schools provide career advice and information;
   Students were forced to join natural science stream by school administrators without their interest and supposed to be high degree of impact for students having low interest and dissatisfaction for their continuing with science education stream choices; To attract students participation towards science education stream, it is recommended that, Schools should practice students streaming based on students interest and ability rather than forcing students to be enrolled in natural science stream. School administrators, teachers, peers, parents and guidance and counselors should provide career advice and informing students on streaming practices.

2. Based on the findings, students' expectation factors were found a major influential for absence of positive students' perceptions towards the choice of science education stream. This is because of;

- Students' expectations about future job opportunities or easy of finding good job is one of the influential factors for the absence of positive students' perceptions towards science education stream choice. To tackle this, Science education fields should provide job opportunities by expanding different industries in the future because today's learner expects about future life.
- Self-efficacy or ability believes affects students perceived interest towards the practice of science education stream choice. To enhance students' perceived interest towards the choice of science education stream, schools should develop students with science education concepts or thinking by making available environments for teaching and learning.
- Expectation with Students' economic status (family background) also influences the perceived interest towards the science education stream choice. Because students expect for future, since some science and engineering related fields that require more time to join a college or university and needs extra-funding from their family. Therefore, in order to overcome this challenge and

promote students participation in science education stream, those students who come from poor families, should get support from different stake holders such as governmental and none governmental organizations.

3. The study revealed regarding School related factors influencing students' perceptions towards the choice of science education stream practice;

- Since students' pre-experience or practices with science laboratory activities attract students' to become interested in science education such as , laboratory learning science through scientific investigation and practical projects should show students what science is liked and gets students interested in it. Therefore, it is recommended that, school promote students' with such earlier practical activities in order to make students' familiar with science and science related activities in school.

4. Regarding with the opinions on implications of their perceptions for 70:30 students admission to tertiary education;

- Students will not join tertiary education with science and engineering career aspiration in the future because they cannot complete their studying in science education stream. They drop from schools because they were forced by their schools streaming practice without their own interests and abilities to join science stream. It is recommended that, Schools should track or place students based on clear cut practice of students ability and interest to promote students to join tertiary education. Schools attract Students to be familiar with science education by developing students through different practical projects, laboratory practices and employment opportunities to enhance future aspiration.
- Schools should be expected to prepare students to be knowledgeable and skilled graduates in required quantity and quality in the future by orienting them before stream choice by different practical projects and laboratory practices in both cognitive and affective domains of knowledge. Based on these findings it is recommended that, in order to attract students' participation in science education stream and to enhance countries' man power in science and technology, more attention should be taken by Woreda education offices and school administrators. Schools also practice students' streaming based on their ability and interest. Finally, further studies can be conducted in same area considering data from rural schools to get the full picture of problem.

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Appendix-1

Annex I-The research Questionnaire for students

Jimma University College of Education and Behavioral Science

Department of Educational Planning and Management

This research questionnaire will be filled by students. The objective of questionnaire is to collect data for the study on the student's perceptions towards the choice of science education stream in secondary schools of Kembata Tembaro Zone: Implications for 70:30 admissions to tertiary education and to bring the preliminary investigation towards the magnitude of students perceptions in choice of science education stream and to come up with some suggestions that need for better participations of students towards science education stream. Therefore, you are kindly requested to fill this questionnaire. Since the success of this research study, will be directly depends on your genuine response to the questionnaires for better understanding of students perceptions towards the choice of science education stream. Your response will be kept.

Thank you for your cooperation.

<u>Directions</u>

1. No need of writing your name
2. Make a tick mark **(**√**)** in the boxes provided.

Respondent's information.

Section A: The extent to which the roles of school in providing career advice and information students to make decision towards choice of science education stream.

You are kindly requested to show your level of filling by making a tick mark **(√)** in the boxes ranging from 1 to 5 scaling:

1 strongly disagrees, 2 disagree, 3 not decided, 4 agree, 5 strongly agree.

N/S	**Items**	**Scales**				
		1	2	3	4	5
1	You are decided to make the stream choices by your own interest					
2	You are forced to join in natural science stream by school administrators without your choice.					
3	You decided to make stream choices because you have got career advice and information from your teacher					
4	You decided to make stream choices because you have got career advice and information from your friends					
5	You decided to make stream choices because you have got career advice and information from your parents					
6	You decided to make stream choices because you have got career advice and information from your school guidance and counselor					
7	You decided to make the stream choices because you have got information based on your national exam results					

Section B: The extent to which the Student expectation factors influencing their perceptions towards the choice of science education stream.

You are kindly requested to show your level of filling by making a tick mark **(√)** in the boxes ranging from 1 to 5 scaling:

1 strongly disagrees, 2 disagree, 3 not decided, 4 agree, 5 strongly agree.

N/S	**Items**	**Scales**				
	a) Job opportunities/ remuneration	**1**	**2**	**3**	**4**	**5**
1	I get good job opportunities/payment immediately in the future after degree graduation because science education is easy to get good job opportunities in labor market.					
2	I have chose science stream because science and engineering related graduates had good employment opportunities and salaries in the future.					
3	Science education is not easy to get good job opportunities in labor market.					
	b) Self-efficacy/ students ability					
4	I perceive science is not more difficult to do than social science stream.					
5	I perceive science more difficult to do than social science stream					
6	I like school science stream subjects better than most other school subjects.					
	c) Gender differences					
7	I cannot do science subjects well because science is difficult for females.					
8	I can do science subjects well because science is not difficult for females.					

9	I cannot do science subjects well because science is difficult for male.					
10	I can do science subjects well because science is not difficult for male.					
	d) Enjoyment/interest					
11	I enjoy studying science stream because science is interesting.					
12	I do not enjoy studying science stream because science is not interesting.					
	e) Career status					
13	If I choose science subjects I will be respected in the society.					
14	If I choose science subjects I will not be respected in the society.					
	f) Family background					
15	I get support from my family because science needs extra- equipments to learn, such as calculator, supportive books and others.					
16	I do not get support from my family b science need funding from family to join a college or university.					

Section C: Other school related factors influencing their perceptions towards the choice of science education stream.

You are kindly requested to show your level of filling by making a tick mark **(√)** in the boxes ranging from 1 to 5 scaling:

1 strongly disagrees, 2 disagree, 3 not decided, 4 agree, 5 strongly agree.

No	**Items.** **a)Subject teacher/ teaching effectiveness**	**Scales**				
		1	2	3	4	5
1	Teachers tell for you practically what you have learnt about things that happening in class room.					
2	In your school, there are enough science teachers					
3	There are sufficient ICT teachers in the school.					
	b) School curriculum					
4	Science curricula are relevant to you daily life.					
5	All units are of relevance to lives, for instance a unit on science and art pigments, solvents etc. The units give choice so your own topic.					
6	Units involve partnership with local industry practice.					
7	Develop skills in your researching issues; courses are too content prescribed and issue based.					
	c) Extra-curricular activities					
8	Involvement in science clubs is helpful in the learning of real science.					
9	You obtained experience from extra-curricular activities in the school.					
	d) Laboratory practices					
10	You are decided to join Science because your school has a good library.					

11	Have enough text books.					
12	You are decided to join Science because your school has a lot of Science facilities such as laboratory facilities					
13	School science should be about learning to do science through scientific investigations.					
14	You feel happiest when clear, step by step instructions are given when doing labs.					
	e)Role model/out of school learning					
15	You enjoy learning about science in school.					
16	You enjoy learning about science outside of school by industry site visiting.					
17	You find science difficult to understand in school.					
18	Practical project shows you what science is like and gets you interested in it.					

Section D: Implication of student's perceptions towards the choice of science education stream for 70:30 admissions to tertiary education.

You are kindly requested to show your level of filling by making a tick mark **(√)** in the boxes ranging from 1 to 5 scaling:

1 strongly disagrees, 2 disagree, 3 not decided, 4 agree, 5 strongly agree.

N/s	**Items**	**Scales**				
		1	2	3	4	5
1	You are so interested to choose science stream you cannot drop out from natural science stream because you are motivated in studying science education stream.					
2	Schools are preparing you to the policy direction.					
3	You complete your studying in science education stream.					
4	You will join tertiary education with science and engineering career aspiration in the future.					
5	You do not join tertiary education with science and engineering career aspiration in the future because you are not interested with science stream.					
6	You are ready to be knowledgeable and skilled graduates in required quantity and quality in the future.					
7	You will be successful in labor market in science and engineering after you graduation in the future.					
8	You are taking Science because of you have future Science plan to be science and engineering graduates.					

Annex: II :Questionnaires for teachers

Jimma University College of Education and Behavioral Science

Department of Educational Planning and Management

This research questionnaire will be filled by teachers. The objective of questionnaire is to collect data for the study on the student's perceptions towards the choice of science education stream in secondary schools of Kembata Tembaro Zone: Implications for 70:30 admissions to tertiary education and to bring the preliminary investigation towards the magnitude of students perceptions in choice of science education stream and to come up with some suggestions that need for better participations of students towards science education stream. Therefore, you are kindly requested to fill this questionnaire. Since the success of this research study, directly depends on your genuine response to the questionnaire. Your response will be kept.

Thank you for your cooperation.

Directions

1. No need of writing your name
2. Make a tick mark (√) in the boxes provided.

Respondents information.

1. Gender: Male ☐ Female ☐

2 Qualification: Degree ☐ Msc and above ☐

3 Work experiences: 1-5 years ☐ 6-10 years ☐ 11-15 years ☐ 16-20 years ☐

21-25 years ☐ Greater than 25 years ☐

Part Two: Filled by teachers

Section A: The extent to which the role of school in providing career advice and information students to make science education stream choice.

You are kindly requested to show your level of filling by making a tick mark **(√)** in the boxes ranging from 1 to 5 scaling:

1 strongly disagrees, 2 disagree, 3 not decided, 4 agree, 5 strongly agree.

No	**Items**	**Scales**				
		1	2	3	4	5
1	Students make stream choices by their own interest.					
2	Some students are forced to join in natural science stream by school administrators without their .choice					
3	Students decided to make stream choices because they have got career advice and information from the teacher.					
4	Students are decided to make stream choices because they have got career advice and information their friends					
5	Students get career advice and information to make stream choices from their parents.					
6	Students can make stream choices because of they have got career advice and information from school counselor and guidance.					
7	Students decided to make the stream choices because they have got information based on national exam results practices					

Section B: The extent to which Students' expectation factors influencing their perceptions towards the choice of science education stream.

You are kindly requested to show your level of filling by making a tick mark **(√)** in the boxes ranging from 1 to 5 scaling:

1 strongly disagrees, 2 disagree, 3 not decided, 4 agree, 5 strongly agree.

	Items	**Scales**				
	a)Job opportunities/payment	1	2	3	4	5
1	Students get good job opportunities/payment immediately in the future after degree graduation because science is easy to get good job opportunities in labor market.					
2	Students have chose science stream because science and engineering related graduates had good employment opportunities and salaries in the future.					
3	Science education is not easy to get good job opportunities in labor market in the future.					
	b) Self-efficacy/students ability					
4	Students perceive science education more difficult to do than social science stream.					
5	Students perceive science more difficult to do than social science stream.					
6	Students like school science stream subjects better than most other school subjects					
	c) Gender differences					
7	Female students cannot do science subjects well because science is difficult.					
8	Female students do science subjects well because science is					

	not difficult.					
9	Male students cannot do science subjects well because science is difficult for.					
10	Male Students can do science subjects well because science is not difficult.					
	d)Enjoyment/interest					
11	Students enjoy studying science stream because science is interesting.					
12	Students do not enjoy studying science stream because science is not interesting.					
	e)Career status					
13	If students choose science stream they will be respected in the society.					
14	If Students choose science stream and are not respected in the society.					
	f) Family background					
15	Students get support from their family because science needs extra- equipments to learn, such as calculator, supportive books and others.					
16	Students do not get support from my family because science need funding from family to join a college					

Section C: Other school related factors influencing student's perceptions towards the choice of science education stream.

You are kindly requested to show your level of filling by making a tick mark (√) in the boxes ranging from 1 to 5 scaling:

1 strongly disagrees, 2 disagree, 3 not decided, 4 agree, 5 strongly agree.

No	Items.	**Scales**				
	a)Subject teacher/ teaching effectiveness	1	2	3	4	5
1	Teachers tell for you practically what you have learnt about things that happening in class room.					
2	In your school, there are enough science teachers					
3	There are sufficient ICT teachers in the school.					
	b) School curriculum					
4	Science curricula are relevant to you daily life.					
5	All units are of relevant to daily life of the students					
6	Units involve partnership with local industry practice.					
7	Develop skills in your researching issues; courses are too content prescribed and issue based.					
	c) Extra-curricular activities					
8	Involvement in science clubs is helpful in the learning of real science.					
9	You obtained experience from extra-curricular activities in the school.					
10	**d) Laboratory practices**					
11	You are decided to join Science because your school has a lot of Science facilities such as laboratory facilities					

12	School science should be about learning to do science through scientific investigations.					
13	You feel happiest when clear, step by step instructions are given when doing labs.					
	e)Role model/out of school learning					
14	You enjoy learning about science in school.					
15	You enjoy learning about science outside of school by industry site visiting.					
16	You find science difficult to understand in school.					
17	Practical project shows you what science is like and gets you interested in it.					

Section D: Implication of student's perceptions towards the choice of science education stream for 70:30 admissions to tertiary education.

You are kindly requested to show your level of filling by making a tick mark **(√)** in the boxes ranging from 1 to 5 scaling:

1 strongly disagrees, 2 disagree, 3 not decided, 4 agree, 5 strongly agree.

n/s	***Items***	***Scales***				
		1	2	3	4	5
1	Students drop out from natural science stream because they are not motivated in studying science education stream.					
2	Students complete their studying in science education stream.					
3	Students will join tertiary education with science and engineering career aspiration in the future					
4	Students do not join tertiary education with science and engineering career aspiration in the future because they are not interested with science stream.					
5	Students are ready to be knowledgeable and skilled graduates in required quantity and quality in the future.					
6	Students will be successful in labor market in science and engineering after their graduation in the future.					
7	Students are taking Science because of they have future Science plan to be science and engineering graduates.					
8	Schools are preparing you to the policy direction.					

Annex III: case study by kembatissa

<u>Kifil Sasu</u>: Kann maleesina insi hujeen beeqqamaamm yit iittantoo rosaannii Qixxammee xa'ammaakkata, xa'ammaatuntis qixxanteeii wona binnaeemma xa'ammuta fanqashshitooriichch mammatussa gagissa heessiichch keiin teesu yooba iillanqaxee kultaa

<u>Part Three</u>: Interview Questions for students who completed questionnaires and Selected as a case study for depth understanding of their perceived interest towards the practice of science education stream choice (Researcher transfer)

1. Hanno gagikkitannee hakkabeereech insitoontindoo, teesu hakka roshsha hagaan, roshshas haga hattita doo'rritoontindoo gabbanchon caakkis

Please tell me briefly a little bit about yourself as a student/ your history from when you were a student to where you are today and how did you become a student of science education stream? (Researcher transfer)

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…………………………………………………………………………………………………
……

2. Rossaantis roshsha hagiintas bajiqqanteentindo? Aa yitoontida mii?

Have you ever been interested in choosing science education stream? If yes why? (Researcher transfer)

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…………………………………………………………………………………………………

………………………………………………………………………………………………

3. Gagiintakkeetindo doo'rriteentiihu te roshsha mini horooma woggee keenato laalogiineet

Did you make the choice by yourself or the school did it for you basing on the practice of exam scores in national exam and own interest? Researcher transfer)

………………………………………………………………………………………………

………………………………………………………………………………………………

……………………………………………………………………………………………….
4. Roshshas haga doo’rriichch bireen sazanata daqqiteent? Aa yitoontida ayeechch daqqiteent?

Did you get any career advice and information before making stream choices? If yes who advised you? (Researchers transfer)

………………………………………………………………………………………………

………………………………………………………………………………………………..
5. Hagas doo’rrii habankat jeechchut aassantee’nne? (Baru, hezzeettu)?

What amount of time (days, weeks) were you given to make the choices? (Researcher transfer)

………………………………………………………………………………………………….
6. Lankii doo’rri yeemmaikkeran yoontihannenin fa’an? Miiha?

If given the chance to make a choice again, would you remain in the same stream? Why?

(Researcher transfer)

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……………………………………………………………………………………………….

7. Meereero agurtota sawwi yit kasa? Miiha?

Do you ever think to drop from the stream/your pathways? Why? (Researcher transfer)

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………..
8. Hagas 12 kifiliichch zakkiin doortanindo? Miiha/Hattita?

Did you change the stream after grade 12? Why/how (researcher transfer)

…………………………………………………………………………………………………..

……………………………………………………………………………………………………

9. Cannikin xuuddontigiin qooccato sayinsu 70:30 Xoqqeema gardabbi roshsha aleen ma genita eebano?

What is the implication of your perceptions regarding to choice for 70:30 admission to tertiary education? Does it get its achievement? If yes why? (Researcher transfer)

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Annex IV: Interview guiding questions for school Principals.

1 .When and who inform students to be required to make stream choices?

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2 .What do the schools do in general to encourage more students into the science stream?

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…………………………………………………………………………………………….

3 .Do students choose by themselves or t teachers/the school use exam scores (students' Abilities in science) to place them in respective streams?

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4 .Is there any program (Guidance and support) that the school/ to help students during the process? If yes, tell me more about it?

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…………………………………………………………………………………………

5 .How many days are students given to make choices?

…………………………………………………………………………………………….

6. As you observed the students perceptions towards the choice of science education stream, what is the implication of this for 70:30 admission to tertiary education? Does it get its achievement? If yes why?

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