

## INVESTIGATING THE POSSIBLE REASONS BEYOND STUDENTS' LOW ACHIEVEMENT IN MATHEMATICS IN THE TAWJIHI EXAM: A CASE STUDY

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### Abstract

Research on students' achievement has a long tradition. This study examined the possible reasons behind students' low achievement in Mathematics in the Tawjihi exam. Since this study is a case study, the researchers conducted their study at Al-Ezaia Girl's Secondary School. The motivation for this study stands beyond understanding whether there are additional reasons behind their low achievement in Mathematics. The population of this study consists of many parties, which are (5) teachers, (1) principle, (3) parents, and (12) Tawjihi students. The selection of the participants was as a focused group (single and multiple). For data collection, semi-structured interviews were adopted as a tool for the study. This study seeks to answer three main questions and different minor questions to investigate the reasons behind students' low achievement in mathematics in the Tawjihi exam. It also seeks to understand how teachers, school environment, curriculum, instructional material, the policy of the Ministry of education, and students' numbers affect their achievement. Data was collected and analyzed to find out the reasons behind students' low achievement in Mathematics. The researchers collected the data and compared each participant's response with the other to reveal the contradictions between their responses. The study found that there are many reasons for students' low achievement in Mathematics. One of the recommendations is that teachers should change their way of teaching, encourage students, and give continuous suitable feedback on students learning.

**Key words:** Mathematics, Tawjihi Exam(Final Secondary Exam), Mathematics Teachers, Student's Low Achievement, Instructional Material.

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## 1. Introduction

Mathematics is one of the most important subjects in our life. Without it, everything would be impossible. It has been accepted as an important component of formal education from the past till nowadays. Besides, it is the body of knowledge in the area of science and technology (Zeidman, 2017). Moreover, it is an interesting subject and the main part of the human lifestyle.

However, unfortunately, Mathematics has a massive emphasis, as language subjects, as most of the students have been failed in it as a difficult subject (the Federal Republic of Nigeria, 2013).

In fact, it is still the most difficult subject because of its nature or students' impression. Most of them are afraid of it (Ale, 2007). Students keep failing in Mathematics in national exams, particularly at the secondary stage. Their achievement in Maths still declines. Saad's et al. (2014) revealed some reasons behind students' low achievement in Mathematics, which are the teacher's method of teaching, students, and the quality of teaching. Mathematics has been one of the major challenges and concerns of educators. It is often considered as a subject that students find it hard to understand so that they went far away from it (Prakash, 2014).

As teachers, the researchers noticed that teachers complain about students' low performance at both internal and external examinations. There are many reasons for that according to the previous literature. This study contributed to explore the main reasons behind student's low achievement in Mathematics in the Tawjihi exam in Al-Ezaia Girl's Secondary school. So, this study sheds the light on the possible reasons behind student's low achievement in the Tawjihi exam at Al-Ezaia Girl's Secondary School and other schools. It found the reasons for their low achievement related to the students themselves, teachers, parents, curriculum, school, home environment, educational system, class size, and instructional material. Furthermore, it is found that there are more reasons behind student's low achievement in mathematics in the Tawjihi exam such as their friends. It revealed the perceived importance of mathematics among school students. Students and their parents may appreciate Mathematics' significance in life. It showed the importance of mathematics as a science among students and its relation with other sciences.

After revising the previous studies it was clear that most of them dealt with students' low achievement in mathematics in the Junior stage but this study came to deal with student's low achievement in mathematics in the Tawjihi exam in (Senior). Besides, there is a lack of qualitative researchers about the reasons behind students' low achievement in Mathematics, most of them are quantities, so responding to this gap. The researchers decided to conduct a qualitative study to find out the reasons behind student low achievement in Mathematics in the Tawjihi exam. The researchers revised more studies to summarize the exact reasons and they conducted multiple interviews and single ones to reveal the reasons behind students' low achievement in Mathematics. There are additional reasons behind that so they will be revealed to benefit from. This research poses three main questions:

1. What are the possible reasons behind student's low achievement related to the students, teachers, parents, curriculum, school environment, and educational system?
2. What are the other possible reasons behind student's low achievement in mathematics in the Tawjihi exam.?
3. What is the perceived importance of mathematics among school students?

Following a theoretical overview of the literature on the reasons behind students low achievement in Mathematics, so the design of the study is a qualitative study, the interviews are the tool of this study, it conducted to collect information and analyze it

to discover the reasons behind students low achievement in Tawjihi exam and if there are other reasons to reveal.

In fact, achievement in Mathematics depends on many factors; teachers, students, curriculum, parents, school and home environment, and educational system also socioeconomic like parents' education (Lithner,2011).

This is a qualitative study that adopted( single, semi-structured, and multiple focused groups)interviews, it adopted a case study approach to collect data from the participants who are the principle, math teachers, Tawjihi students, and their parents to listen to their narrative about the reasons behind student failure in math. According to Creswell(2009), there are three research design-qualitative, quantitative, and mixed-methods. In this study, the researchers used a qualitative research design to get a deeper understanding of the participants and the phenomena(Khan,1999). The researchers compared data analyses to check the validity of the answers. The sample of the study is the population itself; the principal, math teacher, students in Tawjihi, and their parents. Single and multiple(semi-structured and focused group) interviews were used as tools of the study.

General speaking, students achievement is low in Mathematics in eternal and external exams, their attitudes towards it are negative and they keep staying away from it because they fear this "difficult subject", "it needs higher-order thinking" as the participants said in the previous interviews(the Federal Republic of Nigeria,2013).Despite many studies(Islip,2010;Jega et al.,2018,Kalhotra,2013)revealed that there are many reasons behind students 'low achievement in Mathematics such as unqualified teachers, material, parents, and school environment, this study conducted to see the exact reasons behind that low achievement. After revising the literature review the researchers prepared the interview questions, prepared(time, place, and the procedure) for conducting the interview, the data will help teachers to solve student' slow achievement in Mathematics, the researchers recorded the interviews to be able to analyze and classify it to find the reasons and other reasons behind student's low achievement in Mathematics.

## **2. Literature review**

### **2.1 Definition of Mathematics and its importance**

Salman et al. (2015)mentioned that Mathematics is the science of numbers and the language of science and technology. It is an essential requirement by every field of science and human development to cope with the challenges of life. It is a school subject that affects all aspects of human life .For instance ,mathematics is relevant in economics ,political, geographical ,scientific, and technological aspects of humans. It is the language used to describe the appearance of problems arising in most branches of science and technology(Ashiaka,2010). Salman et al.,(2015)considered Mathematics as a gateway to future professions in many fields .In universities, for example ,most programs of study require Mathematics. The ability to master Mathematics skills is a very important indicator of the potential for students' success in all levels of academic fields. Students should master Mathematics to enter University with a good ability to succeed in all courses(Salman et al.,2015).Merriam Webster Dictionary(2018)defined the word "Mathematics "as a Greek word, means things that are learned. It is a science of counting measuring describing the shape of objects. It deals with logical reasoning and quantities calculation. According to (Wikipedia,2018),Mathematics as a subject is recognized as a foundation of science and technology. Anibueze(2015)sees Mathematics as the science that studies the relation between qualities, numbers, measurement. According to (Fajemidagba et al.,2012)mathematics can be described as a tool for the development of any science-based discipline such as astronomy, graphics, technology, and industry. Mathematics is a key to economic development it is a core skill in life (Anibueze et al.,2015).According to

Attwood(2014)& Umemeh(2011), maths is very important because it is useful for everyday activity and it has a relation with a variety of life fields. That's why Maths has to be taught at all levels of education(Wikipedia,2018).

## **2.2 Perceptions of Mathematics among school students**

The bright future for a country depends on the investment in education. Mathematics worse as a tool to understand other subjects and languages. Its basis of many sciences such as science, physic, and engineering(Onham, 2010). Mathematics allows the advancement of technology as well as science and technology. Mathematics is called “a queen of science” because it plays a vital role in all aspects of social development(Umar,2013). It plays an important role in exploring new facts. It is the foundation of science and technology. Mathematics is considered as part and parcel of human thought and logic to understand the world and ourselves. Knowing Mathematics is fundamental(Umameh,2011).Most life programs require Mathematics(Li,2010).

Mathematics is very important in our daily life since it deals with the real-life situation in our daily activities(Ojose,2011).It is a requirement for science. It has become a part of our daily life and daily life activities. Despite the importance of Mathematics ,learners continue to fail the subject(Fez-Piyose,2012).Low achievement in Mathematics in Palestine is everywhere in Comparison with other countries(UNESCO, monitoring learning achievement project,2005)&(Chireshe,2013).It is defined by Odeh et al. (2016)when the students get a mark of less than 50% according to the Ministry of Education standards of success.

## **2.3 Mathematics and other sciences**

There is a direct impact between Mathematics and other sciences. It is regarded as one of the most important subjects in schools. Zeidmane (2017) revealed that it has a direct connection with other school subjects, especially science, and technology. Mathematics learning enables students to communicate their ideas of Mathematics providing such learning outcomes as the skills to formulate, solving engineering problems ,use the language of symbols, make long chains of logical conclusions (Acharya,2017). Everyone will be aware of the direct impact of Mathematics, which is considered as a key for solving and calculating many problems.

## **2.4 The reasons behind students' low achievement in mathematics**

Arikins (2005)said that although the importance of Mathematics, most students still run away from it. This aspect becomes complex when Mathematics get to be taught by an unqualified teacher, improper curriculum, and school environment, are responsible for the poor achievement in mathematics by the students. Odeh et al.(2015)defined a math teacher as a teacher of Mathematics for Secondary school students in all streams(literary, scientific, technical, and vocational).Teaching Mathematics is complex while the lack of students' interest overwhelms the abilities of adults is the main factor for poor performance in Mathematics(Grabowski,2007).Mathematics teacher isn't satisfied with the performance of students in Mathematics. Low achievement in Mathematics leads to students and teacher's disappointment. Metacognitive training enables the low achievers to make progress in Mathematics. Most students in elementary and secondary schools feel that Mathematics is boring and difficult subject. According to Ndudzo,(2015), the main reasons behind low achievement in Mathematics are related to the development of the curriculum and the way the teacher teaches. Different teaching approaches, techniques, methods can influence the outcomes in Mathematics. Teachers who teach Mathematics have no or little training, Mathematics is not taught by giving a proper understanding of reasons and logic, it needs types of equipment, teachers don't make the teaching of Mathematics practical and exciting because they don't have competences to teach Mathematics which leads towards negative attitudes towards Mathematics(Sadiq et al.,2014).Lack of fundamental Mathematical conceptual-based play materials, lack of basic guidelines, typical teaching methodologies, poor Mathematical background, and excessive use of advanced computations system leads

students to low achievement in Mathematics. Nearly 90% of high school graduates in America are bored by math, science, and engineering and have no interest in Mathematics classes (Ahmad,2013;Tali,2014 and Ndudzo,2015).

Suliman(2012) revealed that the problem causes of students 'low achievement in Mathematics are the insufficient number of qualified teachers, lack of teaching aids, lack of instructional material ,frequent transfer of Mathematics teacher from one school to another ,poor socio-economic background of the students ,poor teaching methodology. They also added that inappropriate periods allocated for Mathematics as well as a large number of students in one class are causes of student's low achievement in Mathematics. Some studies (Jameel,2016)showed that the effect of small class size was positively significant in Mathematics, class size had been implemented in California, China, Taiwan. While some politicians and policymakers didn't believe that there was no proven connection between class size and quality of education. On the opposite, Hanushek(1999)suggested that students perform better in the big class.

Adepoju et al(2011)have identified factors as the reasons for the poor performance of students in school examinations, among them, over population of students in classrooms, poor content and context of instruction, and lack of good textbooks. Environment factors can be a reason behind students' poor performance, it subdivides into students, home, teachers, and school factors (Amazingbo et al.,2010).Students aid that mathematics is highly structured and required special intellectual ability(Daudaet al.,2016).Students refer to insufficient availability of mathematics teachers and students of socio-economic background in the classroom(Amazingboet al.,2010). Since researchers showed that previous studies focus on student's performance in mathematics, therefore the present study examined the causes of student's failure in mathematics in the Tawjihi exam.

A fangideh,(2013)pointed out that students low achievement in Maths because of socio-economic background and lack of qualified teachers. Fakunde(2001)found that the lack of qualified teachers is one of the factors responsible for students' dismal performance in Mathematics. He stressed for qualified teachers in the teaching of secondary school. He added that teacher factors are important to be examined with respect because of the lack of qualification of teachers causes low achievement in Maths teaching. Teachers play an important role in learning mathematics. Their attitudes towards students can also create a suitable atmosphere for students to learn well.(Popoola,2010)revealed that the lack of qualified is the main reason for students 'low achievement in Mathematics in Nigerian Secondary schools (Salman et al.,2015).Parental attitudes are also an important role in forecasting students' tendency in continuing their school. Parents shouldn't expect too little or too much from their children. This causes pressure, failure, and hateful mathematics. Parents should encourage their children and enhance their attitudes towards mathematics. Attwood et al.(2014)called parents to follow their enhancing and achieving with their teacher. Korau(2006)found that parental dominance can discourage children's learning. Students from poor families can't get good learning facilities and textbooks. Attwood(2004) added that parents' attitude affects students' performance in Mathematics.

Eze(2000)&Obikwere(2008)found that unqualified teachers employ wrong teaching methods of learning; they pointed out that teachers must use good teaching methods that can stimulate students to attend mathematics class. Ncube(2013)in South African Secondary school found that improper use of teaching methods leads to confusion. The result will be student' slow achievement in Mathematics, Unameh(2012)concluded that using aids in teaching mathematics is essential because mathematics is an abstract subject, aids remove abstractness shortage of instructional material causes low performance. The study of Saad et al., (2014)concluded that students' negative attitudes towards mathematics, anxiety, and fear of mathematics, poor teaching methods, overpopulation also cause poor performance in mathematics in secondary school. Salman(2012)studied the

negative effect of teachers' instructional strategy on students' performance in mathematics. Oluwale(2010)in his study concluded the positive influence of instructional material on students' performance in mathematics. It also enhances the teaching and learning process.

It is clear from the above studies that the majority of them conducted on the cause of students' low achievement in mathematics but limited to secondary school. According to (Suleiman et al,2019)study, he concluded there are several factors behind student' slow achievement in Mathematics which include the insufficient number of a qualified teacher, inadequate textbooks, socio-economic background ,lack of interest in mathematics, in the conducive classroom, the frequent transferee of mathematics teachers, lack of constant study of mathematics and too many students in mathematics classes. According to (Haliruel et al.,2018)revealed that the poor performance of students is because of teachers' methods of teaching, the content, or the curricula of mathematics. He added that the school environment mismatch learner effects, too. In addition ,students see mathematics as highly structured, it requires a special intellectual attitude.

According to Obikwere (2008), he said that the shortage of instructional materials in mathematics causes low performance of students. Instructional material is “those things are intended to help the teacher to more effective or better and enable the students to learn more effectively” .It is important in teaching and learning because it enhances the effective communication between teacher and learner. Poor mathematics background is another reason for students 'low achievement in mathematics. It is a highly structured subject and learned at a high level, it depends on what was learned at a lower level(Zeidman,2013).

The (Acharya,2017)study result showed that students, teachers, principle, and parents consider Mathematics is a complex subject which leads to anxiety so this anxiety leads to low achievement in Mathematics. Prior knowledge of students or their background. The previous knowledge of students towards mathematics. Those who don't have prior knowledge don't want to learn. Besides, Lack of student labor; some mathematics teachers say students don't try to learn Mathematics and don't want to do extra work. They are engaged in an unnecessary task in the classroom during the learning process. Mathematics is a more complex subject to understand the other subject. But students aren't serious to do hard labor in the process of learning Mathematics(Islip,2010).Most of them are weak in Mathematics and they are unable to pass in it. Teacher-related factors; Teacher is a person who provides education for students and motivates teaching-learning activities. The students' education depends on the role of teachers in teaching activities. The positive attitudes of teachers create positive attitudes toward students. A positive attitude towards Mathematics plays a valuable role in learning Mathematics knowledge in all stages of education. Students should be motivated to learn Mathematics. They feel that Mathematics is different to learn(Tega et al.,2018).

The environment-related factors additional factors that affect teaching Mathematics; Teaching-learning environment and home environment, too. They play an important aspect in students learning. The teaching-learning environment is the environment inside the classroom but the home environment is the family environment. These environmental factors affect students learning .Also learning achievement of students. Teaching-learning environment is a Mathematical knowledge and how they change their behavior. The teacher should manage the learning process ,and motivate students in the classroom. Teachers don't address learners' desires in class(Salman et al.,2015).Home environmental: the home is the first school of the child and the mother is the first teacher. A good home environment enhances learners' learning. An uneducated person does not care about Mathematics. They don't support children's education. Parents related factors: Parents play an important role in their children's education, educational background for parents plays an important role in studying Mathematics(Bo'nani,2013).Children's education depends on their parents' awareness interest in knowledge about guiding their children at home. An uneducated

person doesn't aware of the importance of Mathematics in life. Socioeconomic factors education of parents and their economic status is another reason for student's slow achievement in Mathematics in Tawjihi exam according to (Mlougua,2012&Acharya,2017).Tawjihi exam or general secondary exam is the exam which conducted by the Palestinian Ministry of Education to measure students' achievement in literary scientific, technology, and vocational streams each year(Odeh, et al.,2016).

### **3. Conceptual framework**

Mathematics is a gateway to future professions in many fields(Salman et al.,2015).It is important to master all sciences in life as a science of counting and measuring .It is also key to economic developments(Anibueze et al.,2015).It has perceived importance among school students, it is also the key role of investment in education, it stands behind all advancements in Technology(Umar,2013)and helps to understand the world and ourselves. Mathematics has a connection with other sciences, school subjects, Technology, Sociology, and Economy(Achary,2017).Previous studies about Mathematics showed that Students suffer from low achievement in Mathematics all over the world including Palestine. There are several reasons for that to mention, unqualified teachers(Arikins,2015),improper curriculum, school environment(Odeh et al,2015),Student's and teacher's disappointment, less cognitive training and of Mathematics pieces of equipment (Sadiq et al.,2014).The poor student's Mathematical background, the lack of instructional material, the large number of students in one class(Jameel,2016),full content are reasons behind student's low achievement in Mathematics .Mathematics is highly structured requires the special intellectual ability(Duada et al.,2016).Parental attitudes and support, their expectation leads to anxiety and fear, a student from a poor family can't get good learning(Attwood,2004).The lack of using aids of teaching; aids facilitate and remove abstractness(Umameh,2012).The lack of interest and motivation(Suleiman et al.,2019).Prior knowledge of students, lack of their labor, they don't try to learn Mathematics, learning environment and home environment, an uneducated person don't care of Mathematics(Bo'nani,2013).All the above reasons lead to student's low achievement in Mathematics. The conceptual framework underlying this study, therefore ,this study discussed the reasons for students' low achievement in Mathematics ,the other reasons for that, and the perceived importance of Mathematics as fundamental science. It concluded with some recommendations to help teachers, parents, and students to deal with Mathematics and enhance student's achievement.

### **4. Methodology**

#### **4.1 Research Method**

This study is a large part of different studies about low achievement in Mathematics. This study aimed to find the reasons behind a student's low achievement in Mathematics. A qualitative research study using a narrative method was deemed appropriate for this research, this method facilitate a detailed understanding of the meanings, attitudes,and intention(Cohen et al.,2011).Expressed by those who experience the studied phenomenon. Using this method enabled the construction of a rich description of the varied and multi-dimensional world of the interviewees(Lieblich et al.,1998).From the narrative of the respondents using their own language and meanings .The research was conducted within a collective case study framework defined by Stake(2005),where by the researchers examines a case in order to investigate a phenomenon, population,or general condition. At the same time, this approach enables each participant to tell the reasons behind student's low achievement in Mathematics. Specifically, the study employed semi-structured interviews with open questions, to discover the reasons behind student's low achievement in

Mathematics in Tawjihi exam. The interview was designed to glean the interviewees' views concerning their opinions beyond student's low achievement in Mathematics, the obstacles they encountered and other reasons behind low achievement.

#### 4.2 Participants

21 participants were interviewed to get the data needed to answer the research questions, the principle of the school and the teacher Nida'a has a master degree in teaching methods, the other four teachers are not qualified but they have good experience in teaching, the Tawjihi students are participated, too, to listen to their opinions, point of views and experience in this school:

1. Nidal the principal of the school has been a principal for 15 years, she has an MA degree in teaching methods, she's 53 years old.
2. Lina is a Mathematics teacher, she has been teaching Tawjihi for 12 years, she has a BA in Mathematics. She's 40 years old.
3. Nida is a Math teacher, she has been teaching for 5 years, she has an MA in teaching methods. She's 32 years old.
4. Rima'a is a Math teacher, she has been teaching for 10 years, she has a BA in Industrial Engineering. She's 42 years old.
5. Amal is a Math teacher, she has been teaching for 17 years, she Diploma in Maths. She's 52 years old.
6. Nisreen is a Math teacher, she has been teaching for 2 years, she has a BA in Mathematics. She's 26 years old.
7. 12 Tawjihi students as a focused group.

#### 4.3 (12) students as a focused group

These interviews have been conducted between 22/26 Nov.2020, each one between 10-15 minutes except for the focused group it took 35 minutes. In Al-Ezaria Gil's Secondary School. In the first semester. Their age is between 16/18 years old. They are from the Tawjihi stage, their level is between weak, good, v. good and excellent. I used a focused group to ask the for 35 minutes.

#### 4.4 (3) mothers

1. Nibal: she's 41 years old, she has a BA degree in English.
2. Dalal: she's 44 years old, she has a BA degree in biology.
3. Rima'a: she's 42 years old, she has a Tawjihi certificate, she doesn't work.

The above interviews have been conducted between 22/26 Nov.2020, each one between 10-15 minutes except for the focused group it took 35 minutes. In Al-Ezaria Gil's Secondary School. In the first semester. The reasons for the interviews are to find the answer to the research questions.

#### 4.5 Interview procedure

Two criteria determined the participants' selection: (a) their willingness to participate in a long interview and (b) their ability to represent their opinions about reasons beyond student's low achievement in Mathematics. My experience as a teacher in this school and as a student has as MA degree and PHD students allowed me to held interviews with participants and observe this phenomena and collect data about it. the interviews were conducted by the authors .interviewed were conducted in Arabic in the interviewee 's school and last approximately 35 minutes. Participants were asked to relate to three questions "what is the reasons behind student's low achievement in Mathematics?" "what are the reasons relate to teacher, school environment, curriculum....." then other reasons behind students low achievement in Mathematics". the interviewer asked clarifying questions and

occasionally conducted a brief conversation with the interviewees. The interviews were recorded and transcribed.

#### **4.6 Data Analysis**

After collecting the data from the participants by adopting a semi-structured and focused group, the researchers analyzed the data using thematic analysis by classifying the data into themes and sub-theme then they divided the theme into main and minor dimensions to answer each question from the protocol of the interview. The researchers found the answer for the questions from the dimensions of the interview and confirmed the results with the previous studies to find the exact reasons behind student's low achievement in Mathematics.

### **5. Findings**

The data collection methods highly supported the researchers to answer the research questions as shown in this section.

#### **-Reasons behind student's low achievement in Mathematics:**

##### **1- Students beliefs and perceptions**

###### **“They put borders between them and Mathematics”**

The main reasons behind student's low achievement in Mathematics are student's self believes towards it, besides, weakness in all schools not just in this school; both of the respondents and the previous studies ensured this opinion, N/the school principal said: "Weakness is just in the literary stream, it is known that they suffer in all schools not just in this school from the difficulty of Mathematics, they believe they are literary and never understand it, they put borders between them and Mathematics, they don't understand it or even try to understand it". Weakness started from the first school year. R/Mathematics teacher added: "students think that they are weak in Mathematics from the first grade, they can't understand it, this belief continues to Tawjihi stage that's why they are careless". Additionally, "N/is a teacher added: "students were disappointed, they believe Mathematics is difficult to understand because their brothers or sisters suffer from low achievement in Mathematics one day". Weakness in Mathematics is very old. A/is a student said: "Mathematics is so easy but sometimes students think that it is very difficult so they affect with that and don't achieve progress in it". Mothers also added that Mathematics is too difficult, too. N/is a mother: "students think that Maths is a difficult subject; they hardly understand it." This was confirmed by Acharya(2017)&Islip(2010) prior knowledge of students or their background and the lack of student's labor leads to less performance and achievement, besides.

A/a mother: "Mathematics needs higher-order thinking". R/a mother: "Maths need higher thinking to understand it, about me, my children are excellent at school but I say in general". This opinion is confirmed by Dauda, et al., (2016) they said that Mathematics is highly structured and required special intellectual ability.

Students themselves believe that Mathematics easy and difficult in the same way; Sh&T/they are students in Tawjihi added that: "Mathematics neither easy nor difficult, it depends on the student and the teacher way of teaching". T/a student said: "in the previous years, I didn't care with Mathematics but in this year, I study hard so I passed all my daily exam". This is confirmed by Sulieman's(2012) study ;the quality of education affects students' interests and work.

##### **2- Students background**

###### **” This problem has started since many years, students are weak”**

Generally, students are weak in Mathematics. A teacher from the same school, A/ revealed that: "this problem has started since many years, students are weak, no teacher from the previous stages tried to solve their problems until they reach Tawjihi stage, the problem continued". Similarly, R/ is another Mathematics teacher said that: "students suffer from shortage in basics of Mathematic, she added they reach the 11<sup>th</sup> and the 12<sup>th</sup> grade suffer from the basic background". L/ is a teacher added: "students reach the 12<sup>th</sup> grade with weakness in Mathematics background, they stay weak". These opinions confirmed by Ahmad, et al., (2013) said that the lack of fundamental Mathematical conceptual based play materials, lack of basic guidelines, typical teaching mythologies, poor Mathematical background lead to student's low achievement in Mathematics.

Besides, student's fear. T/a student added: "Student's weakness and fear are the main reasons for student's low achievement in Mathematics". M&T/ students: "we thought that Mathematics was difficult, but when we decided to study and understand it, we found it very easy". This opinion agrees with Arikins(2005) that although the importance of Mathematics, most students still run away from it but with hard-working, they will come over fear.

N/ mother said: "students in general including my children suffer from Mathematics, I am a teacher so I help my daughter to overcome her problems at home by encouraging her". Attwood et al., (2014) said that if parents encourage their children and enhance their attitudes towards Mathematics, they will achieve success. It is clear that fear against Mathematics is there but with encouragement, students will overcome obstacles.

### 3- Mathematics curriculum

**"There is a problem in Mathematics curriculum, it is full of information, it needs more efforts"**

Most of the participants agreed that the Mathematics curriculum is not suitable for the learners, there are lessons included are not suitable according to the students in the literary stream. N/ the principle commented on that by saying: "I help my daughter in her study, I noticed that there are some lessons are not suitable for students, they are above their mental capacity and hard to understand, she added that the Ministry of education keep changing and modifying the curriculum so this has its negative effect on students" this confirmed by Ndudzo(2015) that keep changing of Mathematical curricula is the main reason for student's low performance. Additionally, the suitability of the curriculum. A / is a teachers pointed out: "there is a problem in Mathematics curriculum, it is full of information, , it needs more efforts from the teacher in the same time students are weak, I can't cover all the topics because of this reason". R/ another teacher said that: "it is not suitable for their educational level". L/ added: "curriculum is full of information with few time, 3 classes are not enough to cover the material, besides, there is no connection between units". N/ added: "there is a problem in the curriculum design, this refers to the curriculum designer". Students also could evaluate their curriculum. D/ is a student said that: "Curriculum play a very important role in student's achievement, when I was a student in the scientific stream I hated Mathematics because it was full of information, not ordered very well and not easy". M&A/ added: "When we were in the tenth grade, the curriculum was very tuff and we weren't concentrate in understanding it. N/R/D/ mothers agreed that "curriculum is full of information it is sometimes over students understanding". These opinions agree with Haliruel et al., (2018) study, that the content of Mathematics affects student's achievement.

### 4- Student's motivation and interests

**"I strongly believe in motivation; it can strengthen or destroy human being"**

Motivation plays a very important role in students' achievement in Mathematics. Salman et al., (2015) stressed on teachers; they should motivate their learners. N/ the

principle said that: "I strongly believe in motivation, it can strengthen or destroy a human being, there are many stories about people reached higher ranks because of motivation and I keep motivating students by using words and praising" She added: "students have a low motivation that's why they got low marks. This means that motivation is basic in learning. R/a teacher added: "I use feedback, I consider it as a kind of motivation, positive feedback is a motivation, praising is important". This opinion agrees with (Tega et al, 2018). Thus, Odeh et al., (2015) said that the lack of students' interest overwhelms the abilities of adults is the main factor for poor performance.

On the other hand, teachers' positive attitude towards Mathematics can raise learners' learning achievement. Tega et al., (2018) pointed out that positive attitudes of teachers create positive attitudes of students. While, teachers sometimes try to motivate students. L/a teacher said: "I motivate students, it is an effective way to raise their achievement and enhance their attitudes towards Mathematics. In fact, I use stickers for that. Motivation enhances their psychology".

There are parents and principles try to enhance their children. Both D&A/mothers said that: "the principal, parents and some teachers keep encouraging children to study Mathematics and if they get high marks the principle praises them with beautiful words on the exam's sheet". D/a mother added: "I give my children money if they get high marks, we all hope our children get high marks, to achieve success in life,". It is clear that a positive attitude towards Mathematics play a valuable role in learning, learners should be motivated to learn Mathematics

## 5- Parent's support

**Home is the first school of children and the mother is the first teacher (Mlougua, 2012 & Acharya, 2017).**

Parents' support is very important in the learning process because children's learning depends on their parent's awareness interest in knowledge at home, but there is no much support from them to their children. This is confirmed by N/the principle: "parents support is very little, we sometimes need their cooperation with us to come over some obstacles which stay in front of their children's achievements but they don't do that, there is very little support from some parents but it is not sufficient, they don't support and don't interest in their children's achievement", Mlougua et al., (2012) said that home is the first school of children and mother is the first teacher; good home environment enhance learner's learning. Parents' support is very little. L/is a teacher added: "there are very few parents come to school and ask about their children's level and achievement, most of the mothers say I am weak in Mathematics so her daughter says the same words". This opinion is confirmed by Mlougua, et al., (2012); uneducated people don't aware of the importance of Mathematics in life. R/another teacher added: "those who come and ask have very good achievement children in Mathematics, parents of low achievement students don't come or ask, this is another problem". R/added: "parents don't motivate students to take care of their achievement in Mathematics, they don't offer a suitable home environment for them to study" this opinion agreed with Mlougua, (2012); good home environment enhance learner's learning". Most of the students added their parents encourage them; D/Sh/M/A/T/S said that: "our parents keep encouraging us because they think this is our future and we have to work hard to raise our achievement in Mathematics". D/N&R/mothers added: "We keep encouraging our children to study Mathematics because it is vital to their life". Expectation strongly affect students' achievement, too. N/added: "I highly expect from my daughter and sometimes I punish her if she doesn't get high marks". Expectation sometimes destroy their motivation. Salman (2015) pointed in his study that parental attitudes are also important in fostering students tendency in continuing their school, they shouldn't expect too little or too much from their children, they should encourage them and enhance their attitudes towards learning.

## 6- Teacher's qualification

### **Unqualified teachers employ wrong teaching methods of learning (Eze, 2000) & (Obikwere, 2008).**

Teacher's qualification plays an important role in students' achievement, the Insufficient number of qualified teachers, lack of teaching aids, lack of instructional material are factors for a dismal performance in Secondary school, this confirmed by Sulieman(2012)&Fakunde(2001)and R/ Math teacher, she added:"low achievement in Mathematics returns to many reasons, teacher's qualification is one of them, the teacher has to have a good knowledge". Unqualified teachers employ wrong teaching methods of learning, they pointed out that teachers must use good teaching methods that can stimulate student's to attend Mathematics class, this is also confirmed by(Eze,2000&Obikwere,2008). I asked L/a teacher about the assessment tools she uses, she answered:"I talk with students to be able to know her point of weakness, I seek trust, I let them trust me to know their weakness". This was the way that the teacher uses to evaluate her student's point of weakness, it seems she doesn't know more about assessment tools and evaluation, she uses worksheets as an assessment tools, as she said:"I used worksheets to help them learn more especially the weak, she added:"I summarize the material to facilitate their understanding. Eze (2000)& Obikwere,2008) pointed out that the unqualified teacher uses wrong teaching methods of learning. Students appreciate the value of using teaching methods. Sh/ a student added:"teacher way of teaching is very important, she can prepare PowerPoint to facilitate our learning. However, there are teachers give the material without any teaching methods or worksheets" .S/M students added:"teacher's way of teaching affect students learning, her way in teaching is very important, M/ a student added:"teacher supply us with positive energy.

## 7- Teaching methods the teacher use

### **"Aids remove abstractness" (Umameh,2012&Ndudzo,2015)**

Using different teaching approaches, techniques and methods can influence the outcome in Mathematics ,using aids in teaching Mathematics is essential because Mathematics is an abstract subject so aids remove abstractness, this confirmed by (Umameh,2012&Ndudzo,2015)and also confirmed by the respondents of the participants, N/the principle pointed out that:"traditional teaching methods are also another reason for students low achievement in Mathematics, all teacher have to use effective teaching methods especially the Tawjihi teachers".

Thus, R/a teacher said:"if the teacher doesn't use new teaching methods in teaching, it will lead to student's low achievement in Mathematics and the teacher's way of teaching is very important in student's achievement" .A/a teacher uses worksheets, flipped classroom and extra activities to enhance student's achievement" she added:"I use simple teaching methods to facilitate their learning ".R/added:"I use collaborative learning to facilitate their learning, it raises their achievement". A/works on their learning styles, "I let them choose what suits their learning style, they sometimes choose to learn by doing". Teachers' qualification is important in raising students' achievement. N/a teacher said:"I have an MA degree in teaching methods so I use many teaching methods and noticed some progress in their achievement in Mathematics, teacher's qualification is very important" this opinion confirmed by Sulieman(2012)qualified teacher employ suitable teaching methods. D/a student said:"Teachers play a vital role in achievement; there are teachers who logically introduce the material but there are others who introduce it without any warming up".

D/mother added:"all Mathematics teachers who taught my daughter never master their teaching, some of them didn't apply the lesson plan and the other keep deleting some lessons as she like". It is clear teacher is the most important reason behind student's achievement in Mathematics, their way of teaching and treatment with students affect their learning positively or negatively.

## 8- The policy of the Ministry of Education

Upgrading system is another reason behind student's low achievement in Mathematics: L/said "weak student reach the secondary level so they start to suffer from weakness in the basic information of Mathematics" .R/added:"student's upgrading is another reason behind student's low achievement in Mathematics" .D/a student added:"the policy of the Ministry of education is unfair, they don't take in account the individual differences between students". T&A/said that:"there is something wrong in the Ministry's policy; they upgrade weak students, this causes their low achievement in Mathematics".

## 9- School environment

Several Mathematics classes: There are three Mathematics classes weekly, this is not sufficient as the principle N/said:"if the teacher wants to solve students problems in Mathematics, she should work more to do so, three classes are not sufficient to master her teaching" .N/a teacher, added:"If I want to work with weak students, the administrator has to cooperate with me; give me fewer classes, this also needs more time and efforts" .Another reason explained by D/mother:"added, the classes numbers are insufficient ".This opinions confirmed by Sadiq et al.,(2014)the lack of fundamental Mathematical conceptual based play materials, lack of basic guidelines, and typical teaching methodology leads to low performance.

In addition, class size, students' number is a challenge. Saad et al(2014)said that overpopulation causes poor performance, anxiety, and fear. L/a teacher said:"students' numbers in one class is a challenge for me". R/added:"school environment plays a very important role in student's achievement also the administration, too". She said:"large number is a very big problem, we can't work with them or even divide them into groups or show them You Tubes" .A/said:"small number is better, it is suitable to give them suitable feedback" .N/added:"the large number is a problem because the student doesn't have the chance to ask, this may cause low achievement," A&S/students said that:"the number of students has a close relation with low achievement in Mathematics". All the above factors affect students' achievement. M/a student added:"sometimes weak students feel shy to ask questions, they stay weak". These opinions were confirmed by Jameel(2016)the effect of small class size was positively significant in Mathematics. While some policymakers didn't believe in that ;they think there is no connection between class size and achievement as Hanushek (1999)suggested that students perform better in a big class.

## 10- Mathematical pieces of equipment

### "The availability of Mathematics equipment facilitates our learning"

Mathematics needs tools to facilitate students' learning, Umameh(2012)suggested that using aids in teaching Mathematics is essential to remove abstractness. We asked the principal about the school budget and if she supply teacher with suitable equipment, she answered:"there is a school budget, I ask the teacher what kind of tools they need" .R/added:"there are problems in some equipment like the LCD".N/added:"Mathematics depends on practice sometimes so there is no place or equipment to do Mathematics activities there" she explained:"electronic material is not widely available, it is important in raising students achievement in Mathematics "A/a teacher added:"teaching methods like cooperative learning, hot chair, and flipped classroom helps the teacher to overcome weakness and fill the gaps between students and Mathematics, methods and tools lead to better education" Aids are important in teaching Mathematics .A&T/ students expressed that:"the availability of Mathematics equipment facilitate our learning, it makes us remember better."Umameh(2012)suggested that using aids is essential and leads to better learning. It is clear that teachers, parents, and students prefer aids as teaching method.

## 11- Cognitive practice

### “...it is a way to enhance their achievement”

The researchers asked the principal if the teacher uses cognitive practice with students before the exam, she answered: “I don’t know if she let them practice, she may do a quick revision”. The principle doesn’t know too much about the teachers’ way of teaching. Cognitive practice is essential in teaching. L/ a teacher added: “I don’t use cognitive practice because I believe it does not benefit in practicing them. They have to take rest before the exam.” It seems she doesn’t know the benefits of cognitive practice before the exam on students achievement. Oluwale(2010)concluded the positive influence of cognitive practice and instructional material, they enhance teaching and learning. R/ uses revision and practice before the exam; she said: “I revise them before each exam, it is important in raising their achievement”. A/said: “I use similar worksheets to let them practice before the exam, it is a way to enhance their achievement”. N/ “I revised them at the end of each class and before exams to focus on their main concepts, N/mother: “my child was searching through the internet about extra question to practice, sometimes her teacher gives her some”. R/a teacher added: “I keep revising students each class in some of Mathematics basic skills to use them as scaffolding to help them to understand it”. A/ “I put different exams worksheets with different levels”. T/said: “teacher is important because she helps us by letting us practice on different kind of questions from the previous year”. Sulieman(2012)revealed that poor teaching methodology leads to poor performance and achievement, teachers should use suitable teaching methodology to achieve educational quality.

## 12- Teacher’s and student’s interest

Student’s low motivation causes teacher’s low motivation, this opinion is ensured by Tegaet al., (2018) positive attitudes of teachers create positive attitudes of students. L/agreed that: “ student’s low motivation disappointed me as a teacher, I prefer to be the assistant of the principle than stay a Mathematics teacher”. Grabowski (2007)said that low achievement leads to teacher and student disappointment. R/ a teacher added: “Student’s careless and less of interests in Mathematics causes poor performance in secondary school”, comes in the study of Saad et al.,(2014) concluded that students negative attitude towards Mathematics, anxiety, and fear of Mathematics affects their achievement in Mathematics negatively.

## 13- Other reasons behind student’s low achievement in Mathematics

There are many reasons behind students’ low achievement in Mathematics, we asked teachers to name some, R/a teacher said: “ Mental abilities ,Mathematics need extra work and thinking, if they have a weakness, they will not enhance their learning in it” she added” health problems, some students suffer from the disease, social background, social problems, friends; students try to imitate their friend, bad nutrition; they eat fast and unhealthy food, this causes lack of concentration. Misusing of technology; they spend their time on social media such as Snapchat. This opinion confirmed by Dauda et al.,(2016)she confirmed on Mathematics needs highly structured and required special intellectual ability in addition to the poor socio-economic background of the students. N/the principle added: “in Corona virus pandemic, they stopped school suddenly, so this affected students’ achievement”. This refers to their family and family’s attitudes towards Mathematics; most of their families can’t get good learning or facilitate it because they are poor(Sulieman,2012)pointed out that poor families provide poor conditions for learning. A/a student said: “keep changing teachers, when I was in the 11<sup>th</sup> grade, they changed the teacher three times, this destroys concentrating and made us careless,” this confirmed by Sulieman(2012)said that frequent transfer of Mathematics teachers from one school to another leads to low achievement in Mathematics. D&M added: “Bully against the students who get low marks make them feel sad and their motivation towards learning will be low”. D/added: “less of concentration during the classes also connect student’s low achievement

.S/a student added: "Sometimes I face social problems so I tell the teacher, she refuses to listen and doesn't care of me" .N/mother: "Friendship plays an important role in raising achievement in Maths, students affect each other". N/a teacher added " reasons relate to students themselves; concentration; she pointed out: "the lack of concentration, they don't understand what the question requires, besides the lack in comprehension skill, she added that students don't connect between facts". All the above reasons are additional to the reasons in the literature review.

## 5.2 The perceived importance of mathematics among school students.

### Mathematics is called a "queen of Science" (Umar,2013).

Mathematics is the foundation of Science and Technology(Onham,2010).The researchers asked the participants about the importance of Mathematics and if they encourage students to study it. L/answered: "I encourage them to study Mathematics because it is important in life, they always use it . But of course they run away from it, they don't like Mathematics. They think it is very difficult. Instead they prefer to study economy and business" even though Onham(2010)said that Mathematics allows the advancement of technology and science..A/ a teacher added: "Mathematics has a relation with everything in life, they use it at school and out of it" Ojose(2011)said that Maths is a part of our daily life. R/said: "Mathematics has a relation with everything in life. We have to learn it "This opinion agree with Li(2010)opinion ;most life programs require Mathematics. S/a student said: "Mathematics is very important in life, we use it every day" .D/Sh/M&A students: "added that Maths is important in life and for future education" .A/ added: "I need to learn it to help my children in future" .She/added: "Maths is important for our future especially University education, however, S/a student added Maths is just important for people who will study Medicine and Engineering" .N/a mother: "Mathematics has a connection with everything in life" .The brightness of any country depends on investment in education focusing on Mathematics(Onham,2010).

## 6. Conclusion

In a very general overview, it seems that there is a general weakness in Mathematics (UNESCO monitoring learning achievement project,2005).Many reasons stand behind this weakness. The first and the most are the teacher's way of teaching and the methods that they use, methods and aids facilitate student's achievement. Many previous studies (Umameh,2012)& Fajemidagba,2012)resulted that the types of equipment facilitate student's learning because the unqualified teacher uses wrong teaching methods (Sulieyman,2012).Teacher's qualification and their awareness of the ways of assessment also important. Besides, students perceptions about Mathematics ;it's difficult and they don't understand it(Zeidman,2017).They put borders between them and it, this lead them to disappointment and weakness as shown in (Tega et al.,2018)study, they can overcome this obstacle by teacher and parents encouragement ,there are many studies like(Salman,2015) said: that parents can motivate their children's attitudes towards Mathematics.

The policy of the Ministry of education plays a vital role, too. Many participants commented on that by saying that the curriculum is full of information, students need more practice to understand and pass the exam, addition to the system of upgrading the weak students, they are weak until reaching the Tawjihi stage so they don't achieve high achievement. Besides, to the school environment, students confirmed that the size of the classroom; student's overload, and the overpopulation in one class, the number is a challenge(Jameel.2016),teachers will not be able to give students any feedback or at least understand their learning style. The shy students hesitate to ask; the place where they sit, the number of students and the teacher's control, all these factors lead to students suffering and disappointment.

There are other more reasons such as friends; they affect each other, social background and students conditions at home (Molugua, 2017 & Acharya, 2017), less of concentration, some of them don't think deeply (Douda et al, 2016), stress and fear are another reasons. There are others such as health conditions, bad nutrition, the Ministry of education keeps transforming teachers. Another reason for students' weakness in Mathematics is cognitive practice; students need to practice and revise not just before the exam but also at home to practice their thinking how to solve problems which leads to high achievement in Mathematics. Then, parent's support and attitudes encourage students to feel better without punishing them, or expect too much from them (Attwood et al., 2014), teachers and parents have to encourage children without destroying their abilities and desire towards learning, this was stressed by (Sadiq et al., 2014). Encouragement is very important; it can raise their internal motivation. There is no doubt that Mathematics is difficult and needs higher thinking. But it is a key for life (Ojose, 2011); people use it in all aspects of their daily life (Attwood, 2014 & Salman, et al., 2015). If teachers understand students they will achieve success.

## 7. Recommendations

This study recommended that teachers should change their way of teaching; they should use new teaching methods, they have to master their learning, understand students' differences, learning styles, and practice using different kinds of assessment and evaluation. Teachers should use new teaching strategies to overcome the problem the student's overpopulation. They have also revise students before the exam and give them suitable feedback. Besides, the teacher should use technology types of equipment; it facilitates their learning and leads to better education. Math teachers should visit each other and exchange ideas to raise a student's achievement in Mathematics. On the other hand, teachers should raise students' motivation and keep encouraging them to achieve progress. The Ministry of education should change its policy and conduct training sessions for teachers in test and measurement and also in teaching methods. General speaking, decision Maker has to revise the curriculum and try to suits it's subjected to students understanding levels. Their parents have to support their children to achieve more and more in school without any negative expectations or punishment, they have to understand their abilities and their desires. Finally, the school principal should activate her role in solving student's problems by keeping visiting the teacher, giving her advice and feedback. Putting a suitable remedial plan with supervisors conduct at the beginning of each Math class, she should keep motivating students, teachers, and held a meeting to their parents to follow student's achievement. Teachers should solve student's weaknesses by giving them extra worksheets and material that suits their level. School should stay in touch with student's parents trying to tell them about their children's level of achievement, some students need extra time to understand and comprehend.

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