**מכללה האקדמית הערבית לחינוך בישראל- חיפה**

**الكليّة الأكاديمية العربية للتربية في اسرائيل- حيفا**

**Students’ attitudes towards science among Arabic speakers in East Jerusalem: Dependence on demographic characteristics such as gender, grade level and disciplines**

اتجاهات الطلبة نحو مادة العلوم بين متكلمي العربية في شرقي القدس:

العلاقة بخصائص ديمغرافية مثل الجنس، المرحلة الدراسية، والتخصصات

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שם המנחה חתימה תאריך

أسم المرشد التوقيع التاريخ

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חבר צוות ההערכה חתימה תאריך

عضو لجنة التحكيم التوقيع التاريخ

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## Abstract

The study aimed to identify students’ acceptance of science curriculum, specifically in schools under the Palestinian Authority education system and in schools under the Israeli education system. The purpose of the study was to identify students’ acceptance according to a set of variables (gender, grade). The study was conducted in the 2017-2018 academic year. The study sample consisted of 1,200 male and female students from schools in East Jerusalem. In order to achieve the objectives of the study, the researcher used the descriptive analytical method.

The study found that students of all grades and levels in the Israeli education system showed a high level of acceptance for the science curriculum, while students in schools under the Palestinian Authority education system showed a medium level of acceptance, which was high in grades 3-6 and 7-9 and medium in grades 10-12. The results showed no statistically significant differences by the variables of the study among students in the Israeli system. Differences were found in all the variables among students from the schools under the Palestinian Authority system, in which the differences favored females according to the gender variable and favored grades 3-6 and 7-9 according to the grade variable.

The study also found differences in the science curriculum under the Israeli education system, with chemistry followed by biology then physics.

The study identified the need for the teachers to use different teaching methods and strategies, and the need to encourage the schools under the Palestinian Authority to use more attractive teaching methods and strategies to motivate students to learn sciences, especially in the higher grades.

## 1. Introduction

Normally, in educational settings, teachers are very concerned about their students’ grades. Most teachers hope that their students will achieve good grades. There are many factors that contribute to a student’s success. One of them is the student’s attitude towards learning. Understanding this is essential to support students’ interest and achievement in a particular subject (Akey, 2006). However, the attitudes of students could also be affected by environmental changes. Nowadays, young people all over the world are engrossed in computer gadgets and online social networking, which may decrease their interest in learning in general, and specifically in science.

In the educational process, science education is an important issue for students because it helps to improve science and technology education. Moreover, it will have a role in the scientific development in higher education and students’ attitudes towards science and technology in their journey of learning. Science curriculum planners should be able to develop an appropriate curriculum based on theoretical background, which is the learners themselves. In other words, the process of developing a modern and appropriate curriculum is based on three pillars: the learner, science and relevance. Each one has a significant role. Science includes observing the results of the experiments that the learners are conducting during their learning. This would help in understanding and experiencing the conditions of each experiment, this is like playing, which lead the students to enjoy the learning process because it let them to observe the steps one by one, leading to some results the students themselves discover and explored (Abed Elkhalick, Summers, Said, Wang and Culbertson, 2015).

Teaching is a deliberate process that assists the formation of students in an environment in order to enable them to carry out the behavior of a specific subject in specific conditions. Thus, the student becomes the focus of the educational process, and the role of the teacher is to help him/her to learn by creating a suitable environment for the student to carry out specific activities and to acquire certain behaviors. Teaching is a set of steps and skills performed by teachers and intended to achieve certain educational goals in the most convenient ways and in the least amount of time.

The concept of active learning is learning based on the learner’s active participation in the learning process. It makes students think, ask questions, analyze, speak and write about what they learn and relate it to their lives, leading to a positive impact on their understanding and enjoyment of what they are doing (George, 2006).

This study is part of a large-scale project focused on students’ attitudes towards science among East Jerusalem students in grades 3-12. It examines several factors, such as age, career interest (chemistry, biology and physics) and social view of science and scientists. In addition, the research will attempt to study the attitudes of these students towards science at schools; positive or negative, and intentions to pursue science. It also compares the differences between students’ attitudes and the science teaching methods at their schools.

The goal is to identify the individual’s ability to understand scientific laws, theories and phenomena. Scientific literacy can be divided into several categories, including cultural enlightenment in the sciences and cultures.

## 2. Literature Review

## 2.1 What is meant by “attitudes towards science”?

Many researchers have related attitude in this context to preference. George (2006) wrote about the preferential attribute of attitudes, that they represent our “likes and dislikes,” and further explored this quality and connected it to science by suggesting that Arabic-speaking students’ attitudes toward science refer to whether a person likes or dislikes science, or has “a positive or negative feeling about science.” He contended that the most important quality of the attitude concept is our favorable or unfavorable feelings toward objects, persons, groups, or any other identifiable aspects of our environment. As far as attitudes toward science are concerned, such favorable or unfavorable feelings have been explored in relation to science, scientists, science teachers, teaching, and curriculum, as well as the physical environment of science classrooms (Osborne, Simon, Collins, 2003).

Going beyond the evaluative component, researchers have identified and examined factors that are regularly related to students’ attitudes toward science. One study looked at the effectiveness of teaching the proposed unit with a built-in strategy in developing science skills and motivation towards the study of science in first-grade students in Qasim, Saudi Arabia. This was done by implementing a proposed built-in strategy for science teaching. The researcher designed the experiment based on the measurement of post-dimensional for the two groups. The results indicate the effectiveness of the proposed strategy and the motivation towards the study of science for both the experimental group and the control group (Ajaji, 2015).

Researchers have also studied the interests and experiences of students in physics and chemistry. Lavonen et al. (2008) conducted research on 3,626 secondary school students with an average age of 15 years old. Based on their results, students acquired many experiences outside of school related to science and technology. However, they had little experience in using technology tools such as mechanical tools. These results showed a diversity of science and technology experiences among students (Lavonen et al, 2008).

A second study examined students’ different conceptions of technology and environmental issues and school science among males and females. The results found that girls showed more concern towards environmental issues. The results also showed that both boys and girls believed in the potential and capabilities of science and technology (Manninen, Miettinen, & Kiviniemi, 2005).

In a third study, another investigation of students’ interests in physics was performed by a researcher who looked at the factors that contribute to students’ ideas about science in school, their out-of-school experiences with science, and their attitudes towards science and technology. Results showed that, overall, students’ interest in physics is neutral (neither positive nor negative); however, boys were more interested in physics than girls (Trumper, 2006).

Ogawa and Shimode (2004), in their study on 560 Japanese students (268 females and 292 males) with an average age of 15 years old, examined their views about the various components of the Relevance of Science Education (ROSE) project, an international comparative research project on the importance of learning science and technology. Results showed that there was no meaningful difference between girls’ and boys’ attitudes toward science. They considered school science important and easy to learn but were opposed to increasing the science content of their school curriculum.

Anderson (2006) conducted a fourth study that differentiated between boys’ and girls’ attitudes. The study investigated the views of 1,027 students from central Ghana. The results showed that the majority of students believed that science and technology are useful to society and can help reduce poverty and famine in the world. The results also showed that boys are more interested in becoming scientists than girls. There was a lower level of agreement that the benefits of science are greater than its possible harmful effects, although a majority of both boys and girls held this view. Only a minority of boys and girls agreed that science and technology will help to eradicate poverty and famine in the world. Most boys and girls disagreed that school science has made them more critical and skeptical, opened their eyes to new and exciting jobs or increased their appreciation of nature (Anderson, 2006).

## 2.2 Attitudes of Arabic-speaking students:

Many studies have addressed the trends in different branches of science and at different stages of learning, using multiple strategies. One of these studies considers the impact of the problem-based learning strategy on the development of achievement, reflective thinking and motivation towards science learning among second-grade preparatory students. The goal of this study was to determine the effect of PCL (problem-centered learning) strategy, which considers the problem in the development of achievement and getting students to think contemplatively and be motivated towards learning science. The study used the experimental method; the researcher tools were a science achievement test, a reflective thinking test, and a measure of motivation towards learning science. The study tools were applied in advance to the research sample, and then the unit (sound and light) was taught. The experimental group used a learning strategy which focused on the problem, while the control group was taught using the traditional method. After the completion of the teaching unit, the researcher applied the study tools. The study found statistically significant differences in terms of the average grades of the students in both the experimental and the control groups, favoring the experimental group. They were more advanced in the following: the achievement test, the reflective thinking test, and the measure of motivation towards learning science. In addition, the study identified a statistical correlation between academic achievement and motivation towards learning science, and between academic achievement and reflective thinking. This was also the case between reflection and motivation among students of the experimental group that used the problem-centered teaching-learning strategy (Denyor, 2016).

Another study on the same subject aimed to identify the impact of teaching using a method that involved learning a piece of information to determine the development of attitudes towards the study of science among students in the State of Kuwait. The study used a semi-experimental curriculum which consisted of tools to test the students’ motivation towards science. It found a statistically significant difference in the acquisition of motivation towards science in the students of the basic stage in the State of Kuwait due to the different method of teaching (I-LEARN: self-learning using information or data). There was no effect on acquiring attitudes towards the study of science at schools in Kuwait due to the interaction between the teaching method (I- LEARN) and the usual way (Al-Mane’, 2015).

Saidi’s (2015) study aimed to investigate the multiple patterns of intelligence among high school students in Oman and their correlation with academic achievement and attitudes towards chemistry. To identify the multiple patterns of intelligence that are common for the students’ sample, a new tool called the McCkenzie tool was developed. This tool is used even in chemistry today. The results identified a difference associated with multiple intelligences in the study sample. Moreover, there is a positive relationship between the patterns of intelligence towards chemistry. The study resulted in a number of recommendations, such as the need to carry out similar studies in different areas of Oman to determine the effect of multiple intelligences on academic achievement and the need to apply teaching methods that match said intelligences (Saidi, 2015).

Saidi (2015) also investigated the impact of science-teaching using the accelerated learning cycle model and the self-concept among tenth-grade students in the Sultanate of Oman. In order to achieve the objectives of the study, the researchers prepared a guide for the teacher using the accelerated learning model for Smith and his colleagues. Also, a measure of the self-concept was taken to determine motivation towards science. The study found no significant differences between the arithmetic averages in the two groups; however, the results show major differences between the students in the two groups in the average scores on the self-concept, favoring the experimental group.

Another study to understand the impact of teaching examined the brainstorming strategy’s impact on the acquisition of scientific concepts and attitudes towards science among eighth-grade students in the country of Jordan. To achieve the objectives of the study, the researchers prepared two measures; the first one reflects the extent of the students’ acquisition of scientific concepts, and the second one reflects students’ attitudes towards learning science. The results show significant differences in students’ acquisition of scientific concepts and attitudes towards learning science in the experimental group. The study concludes with a set of recommendations and most importantly encourages teachers to use this strategy in science teaching (Harahshi & Odayli, 2013).

Abdel – Fattah (2014) has studied preparation of science fiction test: To measure the level of fiction for middle school students. A scale showing motivation towards science was prepared with the aim of measuring middle school students’ trends towards science. Measures were identified, and after reviewing a number of previous studies that addressed trends towards science, four dimensions were determined: the utilitarian value of science, the tendency to enjoy learning science, the trend towards scientific activities, and the attitude towards the science teacher. The results show the effectiveness of science fiction in encouraging middle school students to develop and expand their scientific imagination. The results prove the strategy’s effectiveness on those in the research group who lack motivation towards science, and the strategy led to positive directions for science. The study determined that the strongest trends towards science developed as a result of the strategy that associated studying science with enjoyment. The strategy leads to growth in the students’ ability to use their imagination, which helps to change the students’ attitude (Abdel – Fattah, 2014).

Another study (Rakha, 2014) sought to answer the following question: What is the impact of employing interactive technology on the development of scientific concepts for students in the first grade? And what is the impact of employing interactive technology on the development of science trends for these students?

The following tools were used:

1. Test of scientific concepts.
2. Measure of attitude towards science.

The study found that the use of technology has a significant impact on the development of motivation towards science (Rakha, 2014).

Abdou (2013) compared the impact of new teaching methods with the usual method. One of the two groups was randomly chosen to be the experimental group, studying using a specific strategy; the other is a control group and studies it in the usual way.

The results of this research were as follows: First, there were major differences in physics achievements due to the teaching method, in favor of the experimental group. Second, there were statistically significant differences in the attitudes of students towards the teaching method, also in favor of the experimental group. Third, there were differences in the performance of the experimental group based on gender, in favor of females. Fourth, there were other differences in the pre and post-experimental trends of the experimental group. Fifth, there were no major differences between the performance of the experimental group and the control group on a scale of trends and an achievement test; this was likely due to the time of “retention” (Abdo, 2013).

The effect of using the format (4MAT) model on academic achievement in science and the attitudes towards it was examined in sixth-grade students at the UNRWA Schools in Jordan. 4MAT is a highly validated and world-renowned learning and communication tool, developed from a holistic perspective and based on essential human differences regarding how we perceive, process, understand and pass on information. The study had the following results: the existing differences between the averages of the experimental group and the control group on the collective test favored the experimental group, which learned with the 4MAT model. The higher motivation towards science of the students from the experimental group is attributed to this model (Zamil, 2013).

A study by Fatah Allah (2012) researched scientific concepts, critical-thinking skills, academic readiness and the trend towards science study among first-grade students. The goal was to submit a proposed model based on learning that is compatible with the brain’s understanding of scientific concepts, critical-thinking skills (content-driven and content-free), academic readiness (scientific, quantification, linguistic) and the attitude toward studying science in the seventh grade. To achieve this objective, the analytical descriptive approach, in addition to the Semi-Experimental Method System, was followed through the system of two equal groups and the construction of the following measurement tools: scientific concepts exam and critical thinking test, including the saturated content and liberated from content (General). The three standards of the study were scientific, quantification and linguistic, and a scale measures orientation towards science study. Following the previous procedures and the implementation of the study experience, a proposed model of brain-related learning consisting of five interactive and integrated stages was designed according to research on the brain and learning principles derived from its results and compatible with brain work. The results of the pilot study revealed the efficiency of the proposed model in improving all the variables of the study sample (Fatah Allah, 2012).

Ahmad’s study (2012) deals with the impact of the systematic teaching approach on the development of the trend towards science and science study among fifth-grade students. The researcher used an achievement test to measure the cognitive performance of fifth-grade students after studying an ecological balance unit, including spatial intelligence, natural intelligence and a measure of attitude towards science. The post-experimental results on the achievement test, comparing between the experimental and control groups, showed major differences in favor of the experimental group. There were also significant differences between the pre-measurement and the post-measurement of the experimental group in favor of the latter; collection of experimental group members. The results of the application of the spatial optical intelligence measure with its dimensions on both the experimental and control groups favored the experimental group, both before and after the application of the post-experiment measurement. The results of the application of the natural intelligence scale with its different dimensions on both the experimental and control groups showed significant differences in favor of the experimental group (Ahmad, 2012). Another study by Ahmad aimed to determine the effectiveness of methods to integrate the subjects of science and English. Based on the data collected, it identified the students’ attitudes towards articles before and after the unit was taught, and then identified the extent of correlation between the degree of achievement in science and students’ attitude towards studying all science and English courses. To achieve this goal, the study consisted of the selection of two third-grade classes, one to represent the control group and the other to represent the experimental group. Then a science unit was prepared on the subject of the environment in the English language and taught using the integration method. Then, a test was performed to measure the collection of literate research sample for the content of the scientific material to determine the effectiveness of the integrated approach in the collection and trend development. The study had the following results: students’ understanding of scientific material was better accommodated when the integration of science and English is used as a motivation for teaching the content of both science and English. The integration of science and English provides many ways for students to learn and gain competencies when dealing with information contained in the curriculum in multiple forms, acquiring the ability to distinguish and to draw comparisons (Ahmad, 2012).

Another study dealt with the critical education method of teaching science to seventh grade students and its impact on their education and development of trends towards science: The study sample consisted of 60 seventh-grade students randomly divided into two groups; the experimental group was taught using the critical education method, and the control group was taught in the usual way. The study tools used were a science achievement test and a measure of trends towards science. The results showed a significant difference at the level of μ = 0,05 between the two averages on the achievement test of the experimental and control groups in the pilot study, and on the scale of trends towards science according to the teaching method, in favor of the experimental group students (Salamat, 2012).

Meanwhile, a study by Zoubi and Salamat (2011) investigated the effect of using a strategy based on the Marzano model. (**The Marzano Teacher Evaluation Model** identifies a complete set of practices directly related to improved student performance, organized into domains that develop teacher expertise) to help secondary school students achieve an understanding of physical concepts and develop critical thinking skills and attitudes towards physics. The study involved 60 tenth-grade students distributed randomly and organized into two experimental and other controls. To answer the research questions, an analysis of variance (ACOVA) was done to analyze the results of the experimental school students systemic and control on the experimental collection of physical concepts and critical thinking skills and scale trends towards physics. The results showed a difference between the intermediate average grades for two sets of experimental study, and the control to test the collection of physical concepts, critical thinking skills and scale trends towards physics is attributed to the method of teaching for the benefit of the training group, which studies Marzano dimensions of learning strategy (Zoubi and Salamat, 2011)

What are the students’ achievements in science, their current attitudes towards it, and their awareness of their ability to succeed in it as predictors of their future? One study found that eighth graders with a higher awareness of their abilities had more positive attitudes towards science and tended to have more positive future attitudes towards science than their less conscious counterparts (Alwaher, 2008).

Khawaldeh’s (2007) study aimed to identify how two teaching strategies based on the constructivist approach impacted the achievement of first-year students compared to the traditional way of teaching biology. In a secondary school for males, the educational material was a unit of the biology curriculum for the first year of secondary education in the public schools in the Hashemite Kingdom of Jordan. The three groups were taught by a qualified teacher, and the experiment lasted about eight weeks. Statistical analysis of the study data showed the following results: There were major differences in the achievement of first-year students in biology based on the teaching strategy (learning cycle and traditional method); the level of achievement was higher for students taught with the learning cycle strategy and Woods strategy compared to their counterparts; but it rewards the impact of the learning cycle strategy with Woods’ impact and strategy. There are differences in the attitudes of the students towards biology due to the teaching strategy (learning cycle, Woods strategy, and traditional method); the results favored students who were taught with the learning cycle strategy and Woods strategy compared to students who learned in the traditional way but were rewarded the impact of the Learning Cycle Strategy with the Woods Strategy Impact (Khawaldeh, 2007)

## 3.2 Attitudes of Palestinian students:

A study by Zidan and Ghareb (2015) to identify the impact of basic training using scientific drawings on high school students and their attitudes towards science within the Palestinian curriculum. The study sample consisted of second-year students in Al-Ekhaa Islamic High School in Bethlehem. The students were divided into two groups for the research study. The first one was experimental, using scientific drawings as part of the curriculum, including images to train students. The semi-experimental approach was used twice. This study used an empirical test and a questionnaire for science. The results of this study showed a significant difference (0.05) between the average scores of the experimental group and of the control group on the achievement test in favor the experimental group. The study did not find significant differences between the average scores of the experimental group and the average scores of the control group in attitudes towards science due to the teaching method (Zidan and Ghareb, 2015). Another study involving the Palestinian curriculum is Zidane’s study, which examines the use of scientific graphics to teach high-school sophomores and how it impacts their achievement and motivation towards science. Two parts were selected to apply the study on, first the experimental group in which the normal way was used. Pictures were prepared to let the students practice drawing. The researchers use the semi-experimental approach which has the former and the latter design. They also use a collective test and a questionnaire for science. The results show differences between the grades of the experimental group (higher) and the control group (lower). The study does not find any differences between the averages of the experimental group and the control group at the directions toward science that could be attributed to the teaching method (Zidan and Ghareb, 2015).

The study by Miyari (2014) shows the extent to which the objectives of the educational process have been achieved for 1948 Arabs. The researcher clarifies that the Arab community is the original community in the country, and it needs to know a lot about its homeland. However, since the curriculum is designed by Israelis, these goals have yet to be achieved despite the Arab Commission for Education’s attempts to develop educational goals for these curricula. As a result of the obstacles created by the Israeli Ministry of Education, Arabs are prevented from building their own curriculum and setting the goal for their children to be educated about their homeland and their rights in the land (p. 16-19). The researcher explained that there is a strong hatred towards the Arabs by the Jews. This came as a result of the policies established in the Israeli curriculum that deal with Arabs as a minority who do not have the right to stand for election or to be part of a democratic procedure in education, labor and health (pp. 20-21). He concluded that the Arab educational process must be pursued with a committee that works to achieve these goals with the assistance of relevant bodies in the Israeli educational institution, following the principle of Arabs’ right to a private education as they desire (Miari, 2014).

Abu Asba (2008) clarified that the educational and curricular objectives lack any mention of the collective national identity of Arab society. The curriculum not only ignores the national identity of the Arab student, but also is full of subjects about Judaism and the history of the Jewish people. In 1971, the Yadlin Commission recommended that Arab education be based on the specific characteristics of the Arab public, but this document also ignored the Arab national identity. In order to implement the recommendations of the Yadlin Committee, a committee was formed under the chairmanship of Mate Bild in 1975 to formulate and define the objectives of Arab education in the eighties. This committee divided the objectives of Arab education into four basic groups: common goals for all students in Israel, specific goals for the Jewish student, specific goals for the Arab student, and specific goals for the Druze student. After the formation of the Bild committee, new objectives in various subjects were set. Reviewing these goals does not indicate a substantial change in terms of new and old approaches. For example, the fundamental change in the new curriculum was in the subject of history, in which there are points that refer to solidarity with the Arab nation as a central goal. However, this solidarity with the Arab nation was not aimed necessarily at deepening the national consciousness of Arab students as presented in the case of Jewish students. Rather, the Arab nation is mentioned in general without addressing the Palestinian people (Abu Asba, 2008).

## 4.2 Comments on previous studies

Through the presentation of previous studies, it is noted that:

1. The previous studies use different strategies and methods to identify the development of trends towards science among learners. Among these strategies are: structural orientation (Al-Khawaldeh, 2007), Marzano (2007), problem-based learning (Denyor, 2016), scientific drawings (Zidane and Ghareeb, 2015), the use of the Rakha interactive whiteboard (2014), the brainstorming of Al-Harhasha and Adaily (2013), the roundhouse diagram strategy (Abdo, 2013), the system entrance (Ahmed, 2012), and others.

2. Most of the previous studies find these strategies to be effective in the development of trends towards science. The results show that these strategies and teaching methods have been able to positively influence students’ attitudes towards science and to stimulate the learning of this content and statistical differences in experimental and control group performance on the trend scale and Zidane (2015). The results show that there is no significant difference between the mean of the experimental group and the average of the control group in the attitudes towards science due to the method of training.

3. All previous studies use the “Science Direction Scale” as a tool for measuring attitudes of students, their emotional state and their beliefs towards science at the various educational stages (basic, preparatory and secondary).

4. Previous studies indicate the dimensions of the “trend towards science” and its construction on the Likert scale.

5. The study samples in the previous studies are at all educational stages: basic studies such as Zidane and Ghareeb (2015) and preparatory studies such as Denyor (2016) and secondary studies such as the Saidi study (2015), which is consistent with the current study.

## 5.2 Purpose of the study

The primary goal of this study is to examine the attitudes of East-Jerusalem students in grades 3-12 toward science. It also aims to look at the impact of demographic characteristics such as age, gender and subject on students’ attitudes. Moreover, we aim to examine the influence of the different curriculum (Palestinian vs. Israeli) on students’ attitudes toward science.

## 6.2 Research questions

1. What is the distribution of attitudes among Arab students in East Jerusalem in grades 3-12 towards science?

2. Is there a statistically significant difference in attitudes toward science among students studying in the Israeli education system compared with students studying in the Palestinian Authority education system in relation to the science curriculum?

3. Is there a statistically significant difference in attitudes toward science among students studying in the Israeli education system and students studying in the Palestinian authority education system in relation to gender?

4. Is there a statistically significant difference in attitudes toward science among students studying in the Israeli education system and students studying in the Palestinian authority education system in relation to the grade variable?

5. Is there a statistically significant difference in attitudes toward science among students studying in the Israeli education system and students studying in the Palestinian authority education system related to the topic (chemistry, physics and biology) in grades 10 through 12?

## 7.2 Hypothesis

1. Students learning through the Palestinian curriculum will show more positive attitudes toward science than students who are learning according to the Israeli curriculum in East Jerusalem schools.
2. Girls will show more positive attitudes towards scientific literacy than boys.
3. High school students will show more positive attitudes towards scientific literacy than students in elementary and middle schools.

## 3: Methodology and Procedures

This chapter presents a detailed description of the methodology followed by the researcher in the study. The definition of the methodology, description of the population, definition of the sample, and preparation of the study tool (questionnaire) will be presented. Verification of the validity and reliability of the study tool and clarification of the procedure and statistical instruments used in the findings are also presented as follows.

## 3.1 Methodology

This study uses the descriptive analytical method, which is defined as a method used to study a recent phenomenon or a subject that provides data that answers the research questions without the intervention of the researcher’s opinion. The researcher attempts to use this method to describe the subject of the study, analyze the data, and clarify the relationship between the data, the opinions about the subject, the procedures and the implications of the subject or phenomenon. This method is a form of analytical and organized scientific explanation that describes, classifies, analyzes and examines the phenomenon or the problem.

## 3.2 Sample

The study sample consisted of 1,200 questionnaires from 545 Israeli system students and 655 students from the schools under the authority of the Palestinian government in the Al-Quda and Bethlehem districts. These students are in grades 3-12. Table 1 shows the distribution of the research sample.

* 1. **Description of the Variables of the Study Sample**.

Table 1: Distribution of the study sample according to the study variables

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | Level | **Israeli system** | | **Palestinian authority** | |
| Grade |  | **Number** | **Percentage** | **Number** | **Percentage** |
| 3-6 | 220 | 40.4 | 245 | 37.4 |
| 7-9 | 139 | 25.5 | 182 | 27.8 |
| 10-12 | 186 | 34.1 | 228 | 34.8 |
| Age | 8-11 | 186 | 34.1 | 186 | 28.4 |
| 12-14 | 164 | 30.1 | 283 | 43.2 |
| 15-17 | 195 | 35.8 | 186 | 28.4 |
| Sex | Male | 275 | 50.5 | 275 | 42.0 |
| Female | 270 | 49.5 | 380 | 58.0 |
| Place of Residence | Jerusalem | 496 | 91.0 | 638 | 97.4 |
| Bethlehem | 0 | 0 | 5 | 0.8 |
| Other | 49 | 9.0 | 12 | 1.8 |
| Father’s level of education | Less than secondary school | 14 | 2.6 | 201 | 30.7 |
| Secondary school degree | 111 | 20.4 | 182 | 27.8 |
| Vocational diploma | 59 | 10.8 | 24 | 3.7 |
| University degree | 97 | 17.8 | 89 | 13.6 |
| I do not know | 264 | 48.4 | 159 | 24.3 |
| Mother’s level of education | Less than secondary school | 5 | 0.9 | 114 | 17.4 |
| Secondary school degree | 76 | 13.9 | 186 | 28.4 |
| Vocational diploma | 33 | 6.1 | 32 | 4.9 |
| University degree | 203 | 37.2 | 181 | 27.6 |
| I do not know | 228 | 41.8 | 142 | 21.7 |
| Ability to use a computer | Yes | 100 | 18.3 | 530 | 80.9 |
| No | 445 | 81.7 | 125 | 19.1 |
| Number of books in the household | Few books | 125 | 22.9 | 178 | 27.2 |
| Have a bookshelf | 204 | 37.4 | 206 | 31.5 |
| Have a bookcase | 141 | 25.9 | 188 | 28.7 |
| Have many bookcases | 75 | 13.8 | 83 | 12.7 |
| Grades of the student in scientific subjects | Less than average | 5 | 0.9 | 6 | 0.9 |
| Average | 20 | 3.7 | 55 | 8.4 |
| Good | 48 | 8.8 | 190 | 29.0 |
| Very good | 182 | 33.4 | 167 | 25.5 |
| Excellent | 290 | 53.2 | 237 | 36.2 |

## 3.4 Study Tool

The researcher used a tool designed by Abd-Elkhalick, et al in his study, **Development and Large-Scale Validation of an Instrument to Assess Arabic-Speaking Students’ Attitudes Toward Science** (2015).The study tool consists of two sections. The first part contains information about the students (date, school name, grade, age, gender, place of residence, parents’ educational attainment, educational attainment of the birth). The second part contains 43 items that examine students’ attitudes toward science.

## 3.5 Study procedures

The researcher selected previous literature to establish the theoretical framework of the study, then selected the right tool and methodology for the study. Previous studies helped the researcher to identify the aspects and questions that she will work on. The researcher adopted the tool that she and her supervisors agreed on, then selected the study sample from primary and secondary schools in East Jerusalem, applying the tool to the individuals in the study sample.

The researcher applied the tool to the study sample and found a total of 1,200 valid questionnaires to undergo statistical analysis.

## 3.6 Statistical Processing

The validity of the collected questionnaires was verified for the analysis, and they were coded in order to enter the data into the computer, perform the appropriate Statistical Processing and analyze the data according to the survey questions. The data was processed by calculating the arithmetic averages, the standard deviations for each item, (T-test), one-way ANOVA, Pearson correlation coefficient, and Cronbach Alpha stability equation using Statistical Package for Social Sciences (SPSS).

## 4: Findings

## 4.1 Introduction

This section includes the study’s findings on “The Extent of Students’ Acceptance of Science Curriculum.” The implications of all variables are presented based on responses to the study tool by the study sample and statistical data analysis.

Table 2 shows the averages of the responses from the study sample:

|  |  |
| --- | --- |
| **Score** | **Average** |
| Low | Below2.33 |
| Medium | 2.34-3.67 |
| High | Above 3.68 |

The highest response is 5, the lowest response is 1 and what is in between = 5-1 = 4. Then it was divided into 3 scores as follows:

4/3=1.33

\* The low score from 1- (1+1.33) = 1- 2.33

\* The medium score from 2.34 -(2.34+1.33) = from 2.34-3.67

\* The medium score from 3.67 - (3.67+1.33) = from 3.67-5.00

## Results of Study Questions

**Q1: What is the distribution of attitudes of Arab students in East Jerusalem in grades 3-12 towards science?**

To answer this question, the researcher calculated the arithmetical averages and the standard deviations of the responses of the study sample to the questionnaire’s items representing the extent to which Israeli system students and students from the schools under the authority of the Palestinian government accepted the curriculum.

Table 3: This table shows the arithmetical averages and the standard deviations of the responses of the study sample reflecting the acceptance of science curriculum among Israeli system students and students from the schools under the authority of the Palestinian government.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| No | Items | Israeli system | | | Schools under the authority of the Palestinian government | | |
| AVG | SD | Score | AVG | SD | Score |
| 1 | I enjoy science | 4.12 | 0.970 | High | 3.85 | 1.040 | High |
| 2 | Learning science is not important for my future success | 1.95 | 1.304 | Low | 3.83 | 1.187 | High |
| 3 | We have many interesting activities in science lessons | 3.78 | 1.018 | High | 3.95 | 0.988 | High |
| 4 | All people should understand science because it affects their lives | 4.19 | 0.968 | High | 3.90 | 1.018 | High |
| 5 | I will study science if I go to the university | 3.78 | 1.210 | High | 3.23 | 1.177 | Medium |
| 6 | I am sure I can achieve good grades on exams in science subjects | 4.40 | 0.777 | High | 4.04 | 0.953 | High |
| 7 | Scientific discoveries are more harmful than useful | 2.09 | 1.151 | Low | 3.78 | 1.203 | High |
| 8 | When I can’t understand a subject in science, I don’t usually try to understand it again | 2.17 | 1.274 | Low | 3.80 | 1.170 | High |
| 9 | Science subjects are among the most interesting subjects in school | 3.83 | 1.140 | High | 3.41 | 1.259 | Medium |
| 10 | My teachers encourage me to understand the content of my science lessons | 3.98 | 1.110 | High | 3.70 | 1.059 | High |
| 11 | Science lessons will help me to go to university | 4.25 | 0.952 | High | 3.69 | 1.103 | Medium |
| 12 | Science is easy for me | 3.79 | 1.012 | High | 3.57 | 1.087 | Medium |
| 13 | The science teachers in my school are very good | 4.10 | 1.041 | High | 4.09 | 0.979 | High |
| 14 | I will not work in a career related to science in the future | 3.40 | 1.247 | Medium | 3.18 | 1.188 | Medium |
| 15 | I like watching scientific programs | 3.46 | 1.258 | Medium | 3.66 | 1.251 | Medium |
| 16 | I couldn’t understand science even if I studied harder | 3.89 | 1.234 | High | 3.60 | 1.345 | Medium |
| 17 | Science is important in solving our daily issues and problems | 3.75 | 1.081 | High | 3.46 | 1.126 | Medium |
| 18 | I want to be a scientist in the future | 3.29 | 1.297 | Medium | 3.12 | 1.376 | Medium |
| 19 | Working in a field of science would be boring | 3.74 | 1.136 | High | 3.43 | 1.189 | Medium |
| 20 | I want to learn more about science | 3.95 | 1.021 | High | 3.63 | 1.154 | Medium |
| 21 | I really enjoy science lessons | 4.05 | 0.876 | High | 3.96 | 0.996 | High |
| 22 | I will continue studying the field of science after I graduate from school | 3.75 | 1.062 | High | 3.37 | 1.105 | Medium |
| 23 | My family encourages my interest in studying science | 4.28 | 0.780 | High | 3.75 | 1.076 | High |
| 24 | I am sure I can understand scientific subjects | 4.33 | 0.723 | High | 3.87 | 0.995 | High |
| 25 | We live in a better word because of science | 4.29 | 0.764 | High | 3.72 | 1.160 | High |
| 26 | I would enjoy a career related to science | 3.87 | 0.991 | High | 3.38 | 1.088 | Medium |
| 27 | I will miss studying science after graduating from school | 2.91 | 1.218 | Medium | 3.02 | 1.255 | Medium |
| 28 | My friends like science | 3.59 | 0.933 | Medium | 3.17 | 0.991 | Medium |
| 29 | Knowledge of science helps me make better choices regarding my health | 4.28 | 0.819 | High | 4.02 | 0.940 | High |
| 30 | My family encourages me to have a career related to science | 4.00 | 1.016 | High | 3.33 | 1.112 | Medium |
| 31 | I really like science | 3.99 | 1.098 | High | 3.64 | 1.186 | Medium |
| 32 | If I could choose, I wouldn’t study any science subjects | 3.90 | 1.201 | High | 3.23 | 1.283 | Medium |
| 33 | Science knowledge helps me to protect the environment | 4.03 | 0.999 | High | 3.92 | 1.098 | High |
| 34 | Studying science in my mother tongue is easier than studying it in any other language | 3.93 | 1.157 | High | 3.71 | 1.087 | High |
| 35 | Work related to science is only important to scientists | 3.63 | 1.310 | Medium | 3.30 | 1.302 | Medium |
| 36 | Science helps me understand the world around me | 4.07 | 1.012 | High | 3.86 | 1.050 | High |
| 37 | My friends do well in science | 3.67 | 0.891 |  | 3.43 | 0.997 | Medium |
| 38 | If I studied harder, I could understand difficult scientific concepts | 4.41 | 0.785 | High | 3.83 | 1.174 | High |
| 39 | I will study additional science subjects in the future | 3.66 | 1.257 | Medium | 3.18 | 1.042 | Medium |
| 40 | Science lessons are a waste of time | 3.99 | 1.254 | High | 3.63 | 1.151 | Medium |
| 41 | People who work in scientific fields do not have time for fun | 3.57 | 1.174 | Medium | 3.37 | 1.196 | Medium |
| 42 | People who work in scientific fields live a normal life | 3.65 | 1.111 | Medium | 3.66 | 1.074 | Medium |
| 43 | I don’t like science | 4.13 | 1.206 | High | 3.78 | 1.282 | High |
| **Total Score** | | **3.77** | **0.463** | **High** | **3.60** | **0.533** | **Medium** |

The above table shows the arithmetical averages and the standard deviations of the responses of the study sample showing the extent of the Israeli system students’ acceptance of the science curriculum. The total average score is 3.77 and the standard deviation is 0.463. This indicates that Israeli system students’ acceptance of the science curriculum was high.

Among students from the schools under the authority of the Palestinian government, the acceptance of the science curriculum was as follows: The averages of the total score is 3.60 and the standard deviation is 0.533. This indicates that among students from the schools under the authority of the Palestinian government, acceptance of the science curriculum was medium.

The results in Table 3 show that 30 items were high, 10 were medium, and 3 were low. The item, “If I studied harder, I could understand difficult scientific concepts” has the highest average (4.41), followed by the item “I am sure I can achieve good grades on exams in science subjects” (4.40). The item “Learning science is not important for my future success" has the lowest average (1.95), followed by the item “Scientific discoveries are more harmful than useful,” with an average of 2.09.

The results for students from the schools under the authority of the Palestinian government show that 20 items were high and 23 were medium. The item “The science teachers in my school are very good” has the highest average (4.09), followed by “I am sure I can achieve good grades on exams in science subjects,” with an average of 4.04. The item “I want to be a scientist in the future” has the lowest average (3.12), followed by the item “My friends like science,” with an average of 3.12.

**Q2**: **Is there a statistically significant difference in attitudes toward science among students studying in the Israeli education system compared with students studying in the Palestinian authority education system (in relation to the science curriculum)?**

Table 4: T-test results for the responses of the study sample reflecting students’ acceptance of science curriculum according to the school variable

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| School | Number | AVG | SD | t | α |
| Israeli system | 545 | 3.7770 | 0.46302 | 5.865 | 0.000 |
| Schools under the Palestinian authority | 655 | 3.5800 | 0.53380 |

Table 4 shows that the “t” value for the total score is 5.865 and α is 0.000, which means there are differences in students’ acceptance of science curriculum according to school variable. The differences favored the Israeli system students. Thus, the first hypothesis was rejected.

**Q3: Is there a statistically significant difference in attitudes toward science among students studying in the Israeli education system and students studying in the Palestinian authority education system related to gender?**

The second hypothesis was examined by calculating the T-test results and arithmetical averages of the responses of the study sample reflecting students’ acceptance of science curriculum in the Israeli system/schools under the Palestinian authority according to the gender variable.

Table 5: T-test results for the responses of the study sample reflecting students’ acceptance of science curriculum in the Israeli system/schools under the Palestinian authority according to the gender variable

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| School | Gender | Number | AVG | SD | t | α |
| Israeli system | Male | 275 | 3.7742 | 0.48261 | 0.140 | 0.889 |
| Female | 270 | 3.7798 | 0.44306 |
| Palestinian authority schools | Male | 275 | 3.4873 | 0.59910 | 4.930 | 0.000 |
| Female | 380 | 3.6920 | 0.46320 |

Table 5 shows that the value of t is 0.140, and the value of α is 0.889, which means there are no differences in Israeli system students’ acceptance of science curriculum according to the gender variable. Table 5 shows that the total value of t is 4.930 and α is 0.000, which means there are no differences in the acceptance of science curriculum according to the gender variable among students from the schools under the authority of the Palestinian government. The differences were for females.

**Q4: Is there a statistically significant difference in attitudes toward science among students studying in the Israeli education system and students studying in the Palestinian authority education system in related to the grade variable?**

The third hypothesis was examined by calculating the arithmetical averages of the responses of the study sample reflecting acceptance of science curriculum among students in the Israeli system/schools under the Palestinian authority according to the grade variable.

Table 6: AVG and SD results for the responses of the study sample reflecting acceptance of science curriculum among students in the Israeli system/schools under the Palestinian authority according to the grade variable

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **SD** | **AVG** | **Number** | **Grade** | **School** |
| 0.50794 | 3.7826 | 220 | 3-6 | Israeli system |
| 0.29951 | 3.8857 | 139 | 7-9 |
| 0.49190 | 3.6892 | 186 | 10-12 |
| 0.45524 | 3.7761 | 245 | 3-6 | Schools under the Palestinian Authority |
| 0.53620 | 3.6710 | 182 | 7-9 |
| 0.52823 | 3.3714 | 228 | 10-12 |

Table 6 shows that there are differences in students’ acceptance of science curriculum in Israeli system/schools under the Palestinian authority according to the grade variable. To determine the significance of the differences, one-way ANOVA analysis was used, as shown on the following table.

Table 7: One-way ANOVA analysis results for the study sample responses reflecting students’ acceptance of science curriculum in Israeli system/schools under the Palestinian authority according to the grade variable

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| School | Source | Sum of Squares | Degrees of Freedom | Mean Square | F | α |
| Israeli system | Between groups | 3.081 | 2 | 1.540 | 7.352 | 0.001 |
| In groups | 113.54 | 542 | 0.209 |
| Sum | 116.62 | 544 |
| Schools under the Palestinian authority | Between groups | 20.402 | 2 | 10.201 | 40.080 | 0.000 |
| In groups | 165.94 | 652 | 0.255 |
| Sum | 186.34 | 654 |

Table 7 shows that the F value for the Israeli system students score is 7.352 and α is 0.001, and it is less than the significance level (0.05 ≥ α), which means there are differences in Israeli system students’ acceptance of science curriculum according to grade variable. The differences were for grades 7-9.

It also shows that the F value for students from the schools under the authority of the Palestinian government is 40.080 and α is 0.000 and less than the significance level (0.05 ≥ α), which means there are differences in the acceptance of science curriculum according to the grade variable among students from the schools under the authority of the Palestinian government. The differences were for the grades 3-6 and then the grades.

**Q5**: **Is there a statistically significant difference in attitudes toward science among students studying in the Israeli education system and students studying in the Palestinian authority education system related to the subject (chemistry, physics and biology) in grades 10-12?**

The fourth hypothesis was examined by calculating the arithmetical averages of the responses of the study sample reflecting the students’ acceptance of science curriculum in the Israeli system/schools under the Palestinian authority according to the science subject.

Table 8: AVG and SD results for the responses of the study reflecting the students’ acceptance of science curriculum in the Israeli system/schools under the Palestinian authority according to the science subject variable

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| School | Science Subject | Number | AVG | SD |
| Israeli system | Chemistry | 70 | 3.8851 | 0.46714 |
| Physics | 84 | 3.5053 | 0.46332 |
| Biology | 32 | 3.7436 | 0.44974 |
| Schools under the Palestinian authority | Chemistry | 43 | 3.8504 | 0.25849 |
| Physics | 128 | 3.1724 | 0.54928 |
| Biology | 57 | 3.4570 | 0.35015 |

Table 8 shows that there are differences in students’ acceptance of science curriculum in the Israeli system/schools under the Palestinian authority according to the science subject variable. To determine the significance of these differences, the one-way ANOVA analysis was used, as shown in the following table.

Table 9: One-way ANOVA analysis results for the study sample responses reflecting acceptance of science curriculum in the Israeli system according to the science subject variable

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| School | Source | Sum of Squares | Degrees of Freedom | Mean Square | F | α |
| Israeli system | Between groups | 5.620 | 2 | 2.810 | 13.136 | 0.000 |
| Within groups | 39.145 | 183 | 0.214 |
| Total | 44.764 | 185 |
| Schools under the Palestinian authority | Between groups | 15.351 | 2 | 7.676 |
| Within groups | 47.988 | 225 | 0.213 | 35.989 | 0.000 |
| Total | 63.340 | 227 |

Table 9 shows that the F value for the Israeli system students is 13.136, while α is 0.000 and is less than the significance level (0.05 ≥ α), which means there are differences in the extent of Israeli system students’ acceptance of science curriculum according to the age variable. The differences were for chemistry followed by biology.

## 5. Discussion

## 1.5 Discussion of the Results of the Questions

In the Israeli system, the results show a high level of acceptance of science curriculum for all grades, as the average is 3.77. This indicates that students are able to achieve good results on exams and need to focus and study hard in science subjects in order to understand the scientific concepts.

The researcher attributes these results to the fact that the science curriculum focuses on scientific discoveries, helping the student to learn a lot about his/her life. Science is a subject that requires thinking and concentration, and it boosts students’ memory and improves their knowledge about natural discoveries and the lives of humans and animals. It also explains everything related to earth, the atmosphere, gravity and other subjects that enable the students to understand life on earth; thus, it is considered one of the important subjects that is enjoyable to students. In addition, the use of different teaching aids has impacted students’ acceptance of science curriculum, as confirmed by other studies such as Abdu (2013), Adli and Harahsha (2013), Rakha (2014) and Al-Khawaldah (2007).

The results of the students in the schools under the authority of the Palestinian government show a medium level of acceptance of science curriculum. This indicates that students in the schools under the authority of the Palestinian government accept science subjects, but not as much as the Israeli system students. These students are able to achieve good results and have very good teachers; however, the researcher attributes the results to the fact that students in the schools under the authority of the Palestinian government have some problems that may obstruct the education process, such as the lack of teaching aids. Also, visual aids and videos are used less frequently because of the lack of LCDs and smart boards that are important in explaining the topics of science subjects. This is assured by Tek and Ruthven (2009), who showed that students prefer the use of teaching aids when learning science, which is also confirmed by Zamel (2013) and Fathallah (2012).

In terms of grades, the results show that students in grades 3-6 in the Israeli system have a high acceptance of science subjects, as families care about students in these grades learning science. This is because elementary school students need to learn about everything around them, and parents also want to teach their children everything about their lives. Moreover, their teachers use teaching aids more frequently, which increases their level of understanding, and the more the students understand, the more they enjoy and accept the subject.

The results showed high level of acceptance of science among students from the schools under the authority of the Palestinian government. The arithmetic mean was high, and the students were doing some interesting activities in science classes. The researcher attributed this to the fact that the schools under the authority of the Palestinian government, and schools in general, take great care with elementary education, as it is the beginning of learning for students. Therefore, teachers make great efforts to teach students the science curriculum using different methods that make the students want to study science. Also, as elementary education is the stage where students get to know the basics of science, it is easy for the teacher to do various activities with students to help them understand the curriculum, such as agriculture, how plants grow and other topics.

The results also showed a high level of acceptance of science in grades 7-9 among Israeli system students as well as students from the schools under the authority of the Palestinian government. The researcher attributed this to the fact that students in these grades have a curiosity for learning, and their ability to understand increases as the curriculum is not difficult to understand. Also, the teacher can use different teaching aids at this stage as well, as it is considered an extension of the elementary education stage. Thus, the information is cumulative, which make it easy for the student to understand the curriculum, and this leads to the students loving and accepting the science curriculum.

As for the students in grades 10-12, the acceptance of Israeli system students was higher than that of students from the schools under the authority of the Palestinian government. The researcher attribute this to the fact that in secondary school, the curriculum becomes difficult, and students learn chemistry, physics and biology with a specific textbook and curriculum in each case. These subjects require great effort and different teaching aids. There is a lack of use of teaching aids in the schools under the authority of the Palestinian government due to the increasing number of students in the classes. Also, the educational system in Israeli schools requires students to specialize from the beginning of the 10th grade, making it easy for them to learn the curriculum. This is not the case of schools under the authority of the Palestinian government.

However, regarding students’ acceptance of science curriculum according to the gender variable, the results showed differences in the Israeli system. The differences were in favor of females at all grades, which means that female acceptance of science curriculum is higher than that of males. This is due to the fact that female students prefer to constantly study and read. Also. they might have the ability to provide the tools to make it easier for them to understand things. In addition, female students’ desire to study and assimilate knowledge in Jerusalem schools is higher than that of male students, as the political conditions and the overcrowding of male students also play a role in weakening the male students’ desire to study.

As for the grade variable, there were statistically significant differences in Israeli system students’ acceptance of science curriculum. Differences were in favor of students in grades 7-9. This is due fact that students at this stage begin to study science through experiments, so it becomes more enjoyable than in the previous stage. Also, in the next stage, science will be studied according the specialization in the undergraduate stage which focus more on studying science. Therefore, it is an intermediate stage and neither difficult nor easy.

Meanwhile, in the schools under the Palestinian National Authority, elementary school students learn about science through various activities. Therefore, the level of acceptance of science among students in grades 3-6 is high, as they start learning science from the third grade; thus, the students have a passion for studying science.

According to the researcher, the students prefer chemistry followed by biology, as both subjects are easier than physics and the students can be more creative in them. Also, chemistry is more fun and exciting due to chemical experiments and interactions, and as job opportunities are more available for those who study chemistry than physics.

## 2.5 Recommendations

The researcher can recommend the following:

- Efforts by the teachers in the schools under the Palestinian Authority to use the various teaching methods and strategies to encourage and motivate students to accept the science curriculum in secondary school.

- Incorporate extracurricular activities into the science curriculum to increase students’ acceptance of the science curriculum, as it is an interactive and important curriculum for the student.

- Conduct further studies and research on students’ acceptance of different curricula.

- Empower teachers through training to explain and teach science curriculum in a way that contributes to students’ acceptance of it.

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## Questionnaire

|  |  |
| --- | --- |
| Variable | Level |
| Grade | 3-6 |
| 7-9 |
| 10-12 |
| Age | 8-11 |
| 12-14 |
| 15-17 |
| Gender | Male |
| Female |
| Father’s educational attainment | Less than secondary school |
| Secondary school degree |
| Vocational diploma |
| University degree |
| I do not know |
| Mother’s educational attainment | Less than secondary school |
| Secondary school degree |
| Vocational diploma |
| University degree |
| I do not know |
| Computer usage | Yes |
| No |
| Number of books in the household | Few books |
| Have a bookshelf |
| Have a bookcase |
| Have many bookcases |
| Grades in scientific subjects | Pass |
| Average |
| Good |
| Very good |
| Excellent |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **No** | **Item** | **disagree strongly** | **disagree** | **neutral** | **agree** | **agree strongly** |
| 1 | I enjoy science | 1 | 2 | 3 | 4 | 5 |
| 2 | Learning science is not important for my future success |  |  |  |  |  |
| 3 | We have many interesting activities in science lessons |  |  |  |  |  |
| 4 | All people should understand science because it affects their lives |  |  |  |  |  |
| 5 | I will study science if I go to the university |  |  |  |  |  |
| 6 | I am sure I can achieve good grades on scientific subject exams |  |  |  |  |  |
| 7 | Scientific discoveries are more harmful than useful |  |  |  |  |  |
| 8 | When I can’t understand a subject in science, I usually don’t try to understand it again |  |  |  |  |  |
| 9 | Science subjects are among the most interesting subjects in school |  |  |  |  |  |
| 10 | My teachers encourage me to understand the subjects of science in science lessons |  |  |  |  |  |
| 11 | Science lessons will help me to go to university |  |  |  |  |  |
| 12 | Science is easy for me |  |  |  |  |  |
| 13 | The science teachers in my school are very good |  |  |  |  |  |
| 14 | I will not work in a career related to science in the future |  |  |  |  |  |
| 15 | I like watching scientific programs |  |  |  |  |  |
| 16 | I couldn’t understand science even if I studied harder |  |  |  |  |  |
| 17 | Science is important in solving our daily issues and problems |  |  |  |  |  |
| 18 | I want to be a scientist in the future |  |  |  |  |  |
| 19 | Working in a scientific field would be boring |  |  |  |  |  |
| 20 | I want to learn more about science |  |  |  |  |  |
| 21 | I really enjoy science lessons |  |  |  |  |  |
| 22 | I will continue studying a field of science after I graduate from school |  |  |  |  |  |
| 23 | My family encourages me to study science |  |  |  |  |  |
| 24 | I am sure I can understand scientific subjects |  |  |  |  |  |
| 25 | We live in a better word because of science |  |  |  |  |  |
| 26 | I will enjoy a career that relates to science |  |  |  |  |  |
| 27 | I will miss studying science after graduating from school |  |  |  |  |  |
| 28 | My friends like science |  |  |  |  |  |
| 29 | Knowledge of science helps me to make better choices about my health |  |  |  |  |  |
| 30 | My family encourages me to have a career related to science |  |  |  |  |  |
| 31 | I really like science |  |  |  |  |  |
| 32 | If I could choose, I wouldn’t study any science subjects |  |  |  |  |  |
| 33 | Scientific knowledge helps me to protect the environment |  |  |  |  |  |
| 34 | Studying science in my mother tongue is easier than studying it in any other language |  |  |  |  |  |
| 35 | Work related to science is only important to scientists |  |  |  |  |  |
| 36 | Science helps me understand the world around me |  |  |  |  |  |
| 37 | My friends do well in science |  |  |  |  |  |
| 38 | If I studied harder, I could understand difficult scientific concepts |  |  |  |  |  |
| 39 | I will study additional science subjects in the future |  |  |  |  |  |
| 40 | Science lessons are a waste of time |  |  |  |  |  |
| 41 | People who work in scientific fields do not have time for fun |  |  |  |  |  |
| 42 | People who work in scientific fields live a normal life |  |  |  |  |  |
| 43 | I don’t like science |  |  |  |  |  |

**الاستبيان**

**عزيزي الطالب\عزيزتي الطالبة :**

لا توجد في هذا الاستبيان أجوبة " صحيحة " أو " خاطئة " لما يلي من أسئلة . نحن فقط مهتمون بمعرفة رأيك حول عدد من الأمور المتعلقة بالعلوم ودراستها في المدرسة .

* وضح\ي الى أي مدى تتفق أو لا تتفق مع كل عبارة من عبارات الاستبيان
* ضعي علامة √ على الإجابة التي تمثل رأيك
* اعط\ي إجابة واحدة فقط أمام كل عبارة

|  |  |  |
| --- | --- | --- |
| 1. التاريخ : | | |
| 1. اسم المدرسة : | | |
| 3.الصف | 10  11  12 | 4.الشعبة ( إن وجدت ) : |

|  |
| --- |
| 5. المواد (اختر تلك التي تدرسها حاليا):  علم الأحياء (بيولوجيا ) كيمياء فيزياء علوم عامة |
| 6. العمر : ( ) |
| 7. الجنس : ذكر أنثى |
| 8.مكان السكن : القدس بيت لحم أخرى ( حدد) ............ |

|  |  |
| --- | --- |
| 9.التحصيل العلمي للوالد :  أقل من الشهادة الثانوية  الشهادة الثانوية  دبلوم مهني  شهادة جامعية  لا أعرف | 10. التحصيل العلمي للوالدة :  أقل من الشهادة الثانوية  الشهادة الثانوية  دبلوم مهني  شهادة جامعية  لا أعرف |

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| --- |
| 11. هل تستخدم الكمبيوتر في البيت :  نعم لا |

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| --- |
| 12. كم عدد الكتب الموجودة في بيت العائلة ؟  قليل من الكتب ( 0-10 ) رف من الكتب ( 11-25 )  خزانة من الكتب (26- 100 ) عدة خزانات من الكتب ( أكثر من 100) |

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| --- |
| 13. كم مرة تتحدث مع أحد أفرادعائلتك عن دراستك في المدرسة ؟  لا أتحدث مطلقا مرة كل عدة أسابيع مرتين أو ثلاث مرات في الأسبوع كل يوم |

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| 14. أنا أدرس المواد العلمية في المدرسة باللغة :  العربية الانجليزية أخرى ( حدد ): ............... |
| 15. أنا **أفضل** دراسة المواد العلمية في المدرسة باللغة:  العربية الإنجليزية أخرى ( حدد): ................ |

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| 16. علاماتي في المواد العلمية :  غير جيدة متوسطة جيدة جيدة جدا ممتازة |

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| --- | --- | --- | --- | --- | --- |
| العبارات | لا أوافق بشدة | لا أوافق | غير متأكد | أوافق | أوافق بشدة |
| 1. أنا أستمتع بالعلوم |  |  |  |  |  |
| 1. تعلم العلوم ليس مهما لنجاحي مستقبلا |  |  |  |  |  |
| 1. نقوم بكثير من النشاطات الممتعة في دروس العلوم |  |  |  |  |  |
| 1. يجل أن يفهم معظم الناس العلوم لأنها تؤثر في حياتهم |  |  |  |  |  |
| 1. سأدرس العلوم إذا التحقت بالجامعة |  |  |  |  |  |
| 1. أنا متأكد بأنني أستطيع أن أحقق درجة جيدة في امتحانات المواد العلمية |  |  |  |  |  |
| 1. الاكتشافات العلمية ضارة أكثر مما هي نافعة |  |  |  |  |  |
| 1. عندما لا أستطيع استيعاب موضوع بمادة العلوم فإنني عادة لا أحاول مرة أخرى |  |  |  |  |  |
| 1. مادة العلوم هي من أكثر المواد الدراسية ممتعة |  |  |  |  |  |
| 10.المدرسون يشجعونني على فهم المواضيع العلمية في دروس العلوم |  |  |  |  |  |
| 11.دروس العلوم ستساعدني على الالتحاق بالجامعة |  |  |  |  |  |
| 1. العلوم سهلة بالنسبة لي |  |  |  |  |  |
| 1. مدرسي العلوم في مدرستي جيدون جدا |  |  |  |  |  |
| 1. سوف لن أعمل في مهنة مرتبطة بالعلوم مستقبلا |  |  |  |  |  |
| 1. أرغب بمشاهدة البرامج التلفزيونية حول العلوم |  |  |  |  |  |
| 1. لا أستطيع فهم العلوم حتى لو بذلت مجهودا كبيرا |  |  |  |  |  |
| 1. العلوم مفيدة في حل مشاكل الحياة اليومية |  |  |  |  |  |
| 1. أريد أن أصبح عالما في المستقبل |  |  |  |  |  |
| 1. أتطلع بشوق الى جزء الأنشطة العلمية من دروس العلوم |  |  |  |  |  |
| 1. العمل في مجال العلوم سيكون مملا |  |  |  |  |  |
| 1. أرغب بتعلم المزيد حول العلوم |  |  |  |  |  |
| 1. أنا فعلا أستمتع بدروس العلوم |  |  |  |  |  |
| 1. سوف أستمر بدراسة العلوم بعد تخرجي من المدرسة |  |  |  |  |  |
| 1. تشجع عائلتي اهتمامي في دراسة العلوم |  |  |  |  |  |
| 1. أنا واثق بأنني أستطيع فهم المواد العلمية |  |  |  |  |  |
| 1. نعيش في عالم أفضل بسبب العلوم |  |  |  |  |  |
| 1. سأستمتع بالعمل في مهنة مرتبطة بالعلوم |  |  |  |  |  |
| 1. سوف أفتقد دراسة المواد العلمية بعد تخرجي من المدرسة |  |  |  |  |  |

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| العبارات | لا أوافق بشدة | لا أوافق | غير متأكد | أوافق | أوافق بشدة |
| 1. أصدقائي يحبون العلوم |  |  |  |  |  |
| 1. معرفة العلوم تساعدني في اتباع خيارات جيدة حول صحتي |  |  |  |  |  |
| 1. عائلتي تشجعني على أن أعمل بمهنة مرتبطة بالعلوم |  |  |  |  |  |
| 1. أنا فعلا أحب العلوم |  |  |  |  |  |
| 1. لو أستطيع الاختيار فلن أدرس أي مادة علمية في المدرسة |  |  |  |  |  |
| 1. معرفة العلوم تساعدني على حماية البيئة |  |  |  |  |  |
| 1. دراستي للعلوم باللغة التي أتحدث بها في البيت يكون أسهل من تعلمها بلغة أخرى |  |  |  |  |  |
| 1. العمل العلمي مفيد فقط للعلماء |  |  |  |  |  |
| 1. العلوم تساعدني على فهم العالم من حولي |  |  |  |  |  |
| 1. أداء أصدقائي جيد في مواد العلوم |  |  |  |  |  |
| 1. إذا درست بجهد أكبر فإنني أستطيع استيعاب المفاهيم العلمية الصعبة |  |  |  |  |  |
| 1. سوف أدرس مواد علمية إضافية في المستقبل |  |  |  |  |  |
| 1. دروس العلوم مضيعة للوقت |  |  |  |  |  |
| 1. العاملون في مجال العلوم ليس لديهم وقت للمتعة |  |  |  |  |  |
| 1. العاملون في مجال العلوم يعيشون حياة طبيعية |  |  |  |  |  |
| 1. لا أحب العلوم |  |  |  |  |  |
| 1. مدرسو المواد العلمية يحفزونني على تعلم العلوم |  |  |  |  |  |
| 1. أشارك في المسابقات المدرسية ( الأولمبياد ومعارض البحوث ) |  |  |  |  |  |
| 1. أحب المشاركة في النوادي العلمية |  |  |  |  |  |
| 1. مادتي العلمية المفضلة هي ( أجب عن كل الخيارات: أ، ب، ج، د) |  |  |  |  |  |
| 1. علم الأحياء ( البولوجيا ) |  |  |  |  |  |
| 1. الكيمياء |  |  |  |  |  |
| 1. الفيزياء |  |  |  |  |  |
| 1. أخرى ( حدد ) |  |  |  |  |  |

شكرا على مشاركتكم في الاستبيان مع تمنياتنا لكم بدوام النجاح