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Problems and Challenges of Quality Education in Ethiopian Higher Education Entrance Exams: A Case Study in Dire Dawa

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Abstract:
This study aims to investigate the problems and challenges of quality education in the Ethiopian higher education entrance exam in Dire Dawa. The National Educational Entrance Examination results from the past six years were used in administrative secondary schools located in rural areas to illustrate the trend in academic achievement in science and mathematics. Data from student and teacher surveys and a trend analysis of academic performance on entrance exams between 2017 and 2022 are the foundation of this study. The study utilized structured questionnaires and a random sample method to gather basic information. The results revealed that science and mathematics performance in secondary schools under the Dire Dawa administration is primarily due to inadequate quality teaching, inadequate resources and methods for learning and teaching students, and their negative attitudes towards science and mathematics. The data indicated that the most common causes of insufficient performance were the science and mathematics teaching techniques employed by instructors, a scarcity of reference materials, and well-equipped laboratories. Instructors must receive frequent in-service training to become acquainted with the latest digital and contemporary pedagogical strategies for teaching science and math. Based on the slant investigation, there's anticipated to be an advancement in scholarly accomplishment between 2017 and 2022. The most significant impediments to students' academic admission to the institution were school attendance (71.4%), self-study hours per week (70.9%), and language (68.8%). Seventy-six percent of those polled stated that their ability to succeed on the admission exam was hampered by the educational setting. Cheating is widespread from elementary through high school, according to 92% of those polled. The teachers were not assigned according to their specialization. For example, you may have an engineering degree but teach math, physics, or chemistry. To improve the quality of education, we can build school communities in which all stakeholders come together to share ideas, challenges, and solutions within a cross-sectional learning framework.

Keywords: academic, achievement, entrance examination, school, science, mathematics, cheating.

INTRODUCTION

The aim of education is to prepare children for the talents, attitudes, and skills they will need throughout their lives. Teachers must be able to fully utilize students' intelligence, emotional attitudes, and abilities during the learning process in order for these traits to develop [1, 2]. Therefore, instilling values like honesty, integrity, respect for others, and hard effort is one of the objectives of education and training. In this respect, quality education contributes to quality labor production as opposed to all kinds of discipline, such as academic misconduct. According to [1,

3], unethical behavior can occur before, during, and after testing. It is made possible with the help of teachers and supervisors, the smuggling of illegal materials, and the cooperation of candidates through photocopying [1].

Exam design, preparation, security, and administration help promote social cohesion. These characteristics have been utilized to ensure fair talent selection, promote trust in government institutions, and improve the overall functioning of the school system. The Ministry of Education issued a curriculum overhaul in December 2010, emphasizing the change from objectives to competency-based education. Even if the national curriculum switches on a competency-based approach, the examination system will still measure cognitive skills exclusively. Consequently, it is problematic to connect national exams with the curriculum. However, in the Ethiopian education system, quality control is mainly concerned with reviewing, monitoring, and regulating schools. These indicators are valuable for gathering data on policy execution, strategic planning, and accountability. However**,** there are limits **to** adapting teaching and learning processes to meet specific goals. In 2022, the government altered its approach to grade 12 admission examinations. The Ministry assumed the burden of transporting and feeding all students to the nearest institution to take exams. The 2022 Ministry of Education's measures were insufficient to address these issues. It was merely a temporary treatment for a limited time. In partnership with higher education, the government should study the root cause of this problem. Every effort has been made to highlight this discrepancy in this study**.**

Statement of the Problem

Over the past two decades, performance in science and mathematics subjects in secondary schools in Ethiopia has worsened; this pattern implies a rapid decline in academic accomplishment in science and mathematics topics, particularly in secondary schools. The Ministry of Education is committed to adhering to the procedures in place to combat fraud in 2022. The first chief step was to relocate the examination centers. According to a report by the Ministry of Education, only 8.6%, or 22,936 students, scored 50% or above of the 340,00 students who took the exams in six subjects from the natural science stream. On the other hand, many studies on quality education in Ethiopia have found that poor student performance is due to a lack of enthusiasm, motivation, and support. Similarly, substandard education is observed at all school levels in the country [4, 5]. However, these studies do not show challenges beyond students' misconduct experiences. Failures in science subjects may result in a shortage of science experts such as doctors, engineers, and teachers. As a result, there is a need to investigate the root causes of poor performance in science and mathematics and possible solutions. This study explores the factors that influence students' science and mathematics performance**.** They addressed middle school cheating on national entrance exams under the Dire Dawa Administration.

Objectives of the Study

The present study has two main objectives. First, we investigated academic achievements from 2017 to 2022 in the Ethiopian National Higher Education Entrance Examination in the Dire Dawa administration. Secondly, to analyze the leading causes of students diverting to cheating and their failures in national higher education entrance exams.

The specific objectives of this study are:

- What is the trend in high school academic performance in science and mathematics under the Dire Dawa administration from 2017 to 2022?

- What factors contributed to poor science and mathematics performance in secondary school national entrance exams during 2017–2022 academic year?
- What are the proposed possible measures for improving students' science and mathematics performance in the Dire Dawa administration?

Research Questions

The research questions in this study are listed below:

- What has been the trend in high school academic performance in science and mathematics under the Dire Dawa administration from the 2017 - 2022?
- What factors contributed to poor science and mathematics performance in secondary school national entrance exams during 2017 - 2022 academic years?
- What are the proposed potential measures to improve students' science and mathematics performance in the Dire Dawa administration?

Significance of the Study

The findings of this study may benefit the Dire Dawa City Education Bureau and the Federal Ministry of Education in developing various strategies for teaching and learning science subjects in secondary schools. Moreover, these findings are helpful to the Education Bureau, managers, administrators, and teachers because they highlight the factors influencing poor performance in secondary school science and mathematics. Individuals, students, researchers, organizations, and institutions use the study's findings because they provide information on potential variables influencing low performance in the science and mathematics disciplines.

Operational Definition of Terms

- Academic achievements are the outcome of education on the extent to which a student, teacher, or institution has achieved their grades.
- Extraneous variables are those that can alter or change academic performance. When these variables come between the independent and dependent variables, they can be the dependent variables.
- Influencing factors: A lack of qualified teachers, a lack of teaching materials, inappropriate teaching methods, lack of motivation, tradition, and customs, and the difficulty of science subjects.
- School education is divided into four sections. There are two academic years in pre-primary, four academic years in primary (forms 1-6), two academic years in middle (forms 7-8), and four academic years in secondary school (from 9–12).
- Science subjects deal with the structure of the natural and physical worlds based on facts discovered through experimentation, observation, and theory development. Physics (Phy), chemistry (Che), biology (Bio), and mathematics for the natural science stream (NMa) are among the science subjects taught in Ethiopia.
- Performance: An academic certificate is always issued to show that the performer has attained the stated grades [6].
- Poor performance: It is an unsatisfactory examination result. The letter F, which ranges from 50 to 0, denotes poor performance.
- Qualifications: Teacher qualifications are a collection of requirements that employers look for when hiring for teaching publish, such as a diploma, BA/BSc, or MA/MSc

- School environment: It includes physical surroundings such as classrooms, class size, temperature, how dark or light it is, the arrangement of chairs, noise, and the school compound and its neatness.
- Teaching method refers to general ideas, pedagogy, and managerial tactics utilized in classroom instruction.

LITERATURE REVIEW

According to [7], students, teachers, government officials, testing bodies, and parents are all caught up in the network of corruption. Students who prepare for exams and want to get good grades at any cost are offenders. Some provide monetary incentives to invigilators in exchange for allowing them to enter the examination hall with programmed or web-based mobile tablets and phones.

Academic achievement or performance, according to [8], is a component of a student's entire conduct. It is the outcome of the student`s interactions with his surroundings, including his school, teachers, parents, and peers. Academic performance shapes a student's notions by informing him of how others view him and how he perceives himself in comparison to others [8]. Contextual, emotional, and motivational factors are among the theoretical factors that influence student achievement in national educational assessments and examinations [9-10, 11]. These factors include both external and internal factors of school. Internal school factors include socioeconomic status and parental involvement, while external factors include the availability of school resources and the quality of teachers. You can learn science and mathematics both inside and outside the classroom because they are human activities involving the study and interpretation of the natural world. The role of parents in providing tutoring and materials, encouraging students to study science and mathematics, and emphasizing the application of science and mathematics in everyday life helps students achieve higher levels of achievement. Parents significantly affect their children's science learning [11–13]

School is essential for all aspects of child development [14]. Many educational reformers believe that improving schools is vital to improving student achievement. Therefore, many school reform efforts focus on material resources, expanding access to textbooks, technology, and support materials, and establishing equitable funding methods.

According to education researchers and policymakers, teacher quality varies and is significant for student achievement [11, 15]. Education is a teacher-driven industry. Improving the quality of teachers is therefore an important tool for improving the academic performance of students. According to [16], improving teacher quality can be an imperative tool for improving student performance [11].

According to [17], trainer quality indicators fall into four categories. The qualifications, characteristics, practices, and effectiveness of teachers as evidenced by the academic success of their students. According to [18], teachers' professional qualifications influence the performance of secondary school students.

According to the definition of education, it is a never-ending process that aims to effectively bring desired changes in students [19]. [20-21] argue that in order to affect the desired change in students, a teacher's teaching strategy must be subject-appropriate.

Academic fraud is also known as cheating [22]. Furthermore, academic misconduct entails deceiving or harming others through trickery, fraud, deception, or deception [23]. Academic misconduct is defined as a student's behavior that deceive misleads, or causes a teacher to doubt the literary work presented by the student [24]. It characterizes a student's attempt to exist the academic work of others as his own. Examples include cheating on a test (asking a colleague for help), copying other students' work, collaborating with other students, and using unauthorized materials during an exam [25–26].

A leaked exam question can be copied numerous times in trustworthy copy shops and distributed to a wide range of organizations that are willing to provide answers. In our case, a few moderators immediately if copies of the tests. Several different actors are involved in this task. Candidates had to covertly bring their cell phones into the room and reproduce their answers while avoiding surveillance. When the students entered the exam room, they already had a scattered response in their hands. No one double-checked if the answers were correct. Teacher collaboration includes creating conditions for meetings and providing opportunities for communication, sharing ideas, joint planning, and peer support. These are necessary to reach a consensus on important educational and organizational issues [26–30]. Finally, school ethos refers to the norms, values, and beliefs that permeate schools and manifest in how teachers and students interact with and relate to each other [26, 31–32].

MATERIALS AND METHODOLOGY

Study Design

The study was conducted in the Dire-Dawa administration from March to May 2023. In the study, a cross-sectional survey was used. The dependent variable in this study was students' performance in science and mathematics, collected from national higher education entrance examination results from 2017–2022 and a questionnaire to supplement the required data, according to [33]. The questionnaire provides information such as student background such as gender, age, mother and father's education level, average score, and factors in science subjects (biology, chemistry, and physics) on the 2022 National Entrance Examination that affect their academic performance.

Sample Size

394 students from Dire Dawa's first year were chosen for the study using a targeted sample. The sample size was calculated using [34-36].

$$n = \frac{z^2 p(1-p)}{\sigma^2} \quad (1)$$

where n is the sample size, $z = 1.96$ is the 95% confidence interval critical value, 0.05 is the marginal error, and p is the sample proportion. Thus, data were collected from 200 first-year students and 194 remedial students from the 2023 batch. Data were collected from 88 secondary school science teachers from 12 high schools under the Dire Dawa administration.

Data Source and Instrument

The following data sources and data collection instruments were used to collect relevant information about students' science and mathematical performance:

- The Dire Dawa Education Bureau provided the results of students' National Educational Assessment and Examinations (N.E.A.E.R.) 2017-2022.

- Two sets of well-structured and self-administered questionnaires were used: one for students to assess their attitude toward science and mathematics. and
- The other teachers to learn about the difficulties they faced in their classrooms regarding to the student's achievement in these subjects [37].

Procedure for Data Collection

Participants who agreed to participate in the study were given a summary of the research objectives. The researchers collaborated with some subject teachers to plan 15-20 minutes of class time for students to complete the survey questionnaire.

Methods of Data Analysis

Tables, charts, scatter plots, and line graphs were used to arrange and display quantitative data. On the other hand, qualitative information gathered from open-ended questions was documented while taking into account the most pertinent and frequently forwarded inquiries. Students and teachers completed the questionnaires in separate sessions using S.P.S.S. Version 22. Trends in student academic performance are examined using Python 3.10.

RESULTS AND DISCUSSIONS

The research was aimed at examining the causes of poor performance in the National Higher Education Entrance Examination (NHEEE) results of secondary school students in the Dire Dawa administration. This chapter focuses on evaluating, presenting, and interpreting data collected from respondents through surveys, interviews, trends, and document analysis.

Results

Trend Analysis:

Males made up 58.0%, 55.64%, 50.69%, 57.32%, 50.56%, and 50.03% of natural science students who took the National Higher Education Entrance Examination in 2017, 2018, 2019, 2020, 2021, and 2022, according to Table 1. In 2017, 2018, 2019, 2020, 2021, and 2022, the proportion of female students was 42.0%, 49.63%, 49.31%, 42.68%, 49.44%, and 49.97%, respectively.

Table 1: The total number of students who sat the National Higher Education Entrance Examination in the natural science stream from 2017-2022 in terms of gender.

Years	Male	Female	Total
2017	790	372	1162
2018	528	471	999
2019	589	573	1162
2020	560	417	977
2021	636	622	1258
2022.	722	721	1443

Figure 1 depicts the total number of the students who took national education entrance examinations in the Dire Dawa administration between 2017 and 2022. These statistics show that 53.9% of students were male and 46.1% were female.

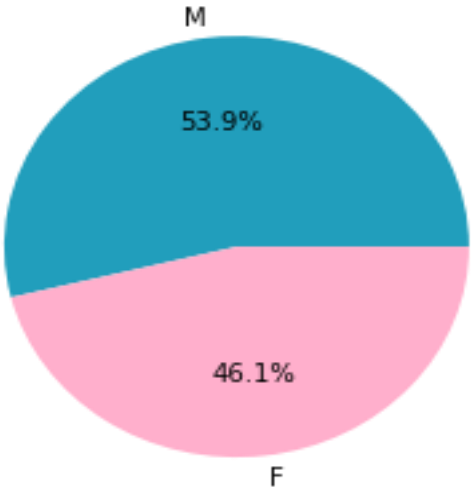

Figure 1: Gender distribution of students who sat the National Higher Education Entrance Examination in natural science from 2017 to 2022.

Table 2 shows the highest, lowest, average, and standard deviation of national college entrance exams from 2017 to 2022. It shows the overall results of 90 scores in biology, chemistry, mathematics, and physics from 2019 to 2022. The highest score in Physics in 2022 was 87. In 2017-2018, Biology received the highest marks and mathematics received the lowest marks in 2017-2022,

Table 2: displays the academic performance of students taking the National Higher Education Entrance Examination in the natural science stream from 2017 to 2022.

Items	Years	Mathematics	Biology	Chemistry	Physics
Max	2017	77	92	81	72
	2018	80	89	88	86
	2019	94	91	85	92
	2020	90	90	90	96
	2021	94	94	90	93
	2022	94	90	91	87
Min	2017	9	0	0	10
	2018	14	0	0	0
	2019	11	12	15	9
	2020	0	14	0	0
	2021	11	15	0	10
	2022	9	0	0	0
Mean	2017	37.74	59.04	48.21	36.98
	2018	41.33	52.69	48.36	43.55
	2019	36.34	35.96	45.2	51.72
	2020	50.39	52.7	52.84	47.36
	2021	44.91	60.14	62.45	51.54
	2022	33.35	31.49	35.94	28.96
Std	2017	13.56	16.80	13.50	10.89
	2018	14.23	14.92	13.76	15.17
	2019	12.64	15.88	11.6	11.42
	2020	16.99	16.95	16.67	15.55
	2021	17.32	18.2	18.13	17.68
	2022	13.43	10.94	14.00	9.63

In 2017 and 2018, the minimum score in biology and chemistry was zero, whereas it was higher in mathematics and physics. The average grade was less than 50 in mathematics, biology, and chemistry. On the other hand, the score in physics were greater than 50. The average in mathematics, biology, and chemistry was greater than 50 in 2020. It was less than 50 in physics. Biology, chemistry, and physics scored higher in 2021, whereas mathematics was lowest. In 2022, the average in mathematics, biology, chemistry, and physics was less than 40.

Table 3 shows the overall academic performance of science students in NHEEE from 2017 to 2022. Chemistry, Mathematics, and Physics averaged less than 50 points. However, Biology scored over 50 points. The passing grades in science and math were all zeros. Physics and Mathematics scored similar percentiles of 25%. Chemistry and Biology had the same 25th percentile as Math and physics. Additionally, the 75th percentile for mathematics and physics was lower than for chemistry and biology. The best score over six years was 91 or higher, with an overall average of 91.8% in science and mathematics.

Table 3: The overall academic performance of students in the NHEEE in science and mathematics subjects from 2017–2022

Items	NMa	Phy	Che	Bio	total score (%)
mean	40.13	40.17	48.36	50.77	44.86
Std	15.63	15.62	17.01	18.74	13.93
min	0	0	0	0	0
25%	28	28	34	34	33.5
50%	37	36	48	51	44.2
75%	51	50	61	66	54.5
max	95	94	91	96	91.8

Figure 2 illustrates the mathematics grades received by natural science students in the NHEEE from 2017 to 2022. It highlights each year's achievements in mathematics subject scores for pupils. The lowest score was recorded in 2022, according to the density curve illustrated in Figure 2. Furthermore, the pattern indicates that students fared better in math in 2021 than in 2022. The trend analysis of students' mathematics grades from the National Education Certificate test, presented in Figure 3, shows that most students scored below the passing mark line of 50 points.

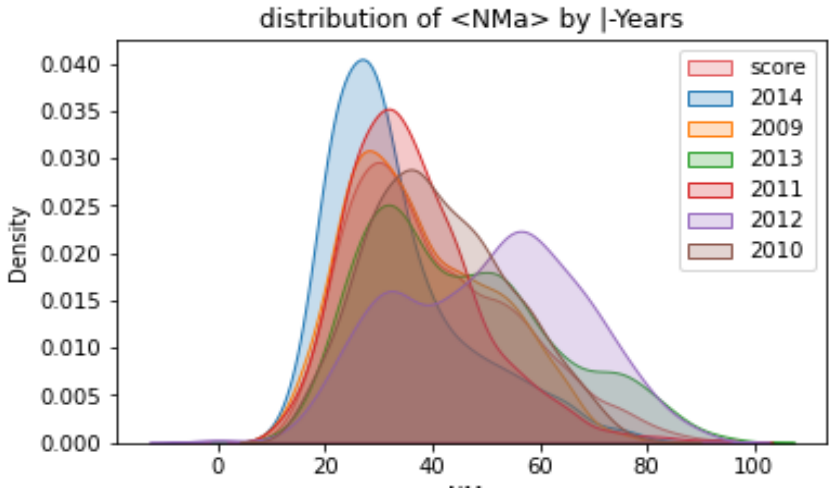

Figure 3: Natural science students achieved the density curve of mathematics grades from 2017 to 2022.

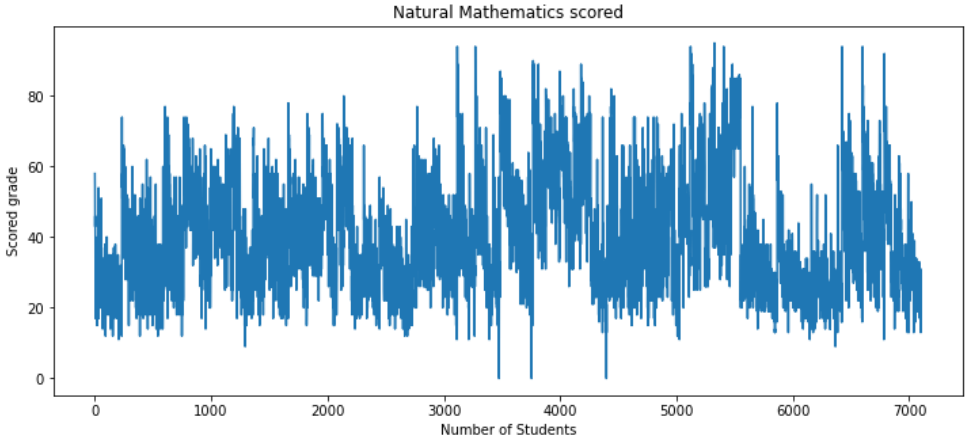

Figure 4: The trend analysis of mathematics grades achieved by Natural and science students from 2017-2022.

Figure 4 shows the density curve for biology scores obtained by students of natural sciences on national entrance exams for higher education from 2017 to 2022. It demonstrates that student performance between 2017 and 2021 had higher relative grades than in 2022. In comparison to the previous three years, the student's performance on the national education entrance exam in 2022 was at its lowest. It was a result of the new tactics used by the Ministry of Education.

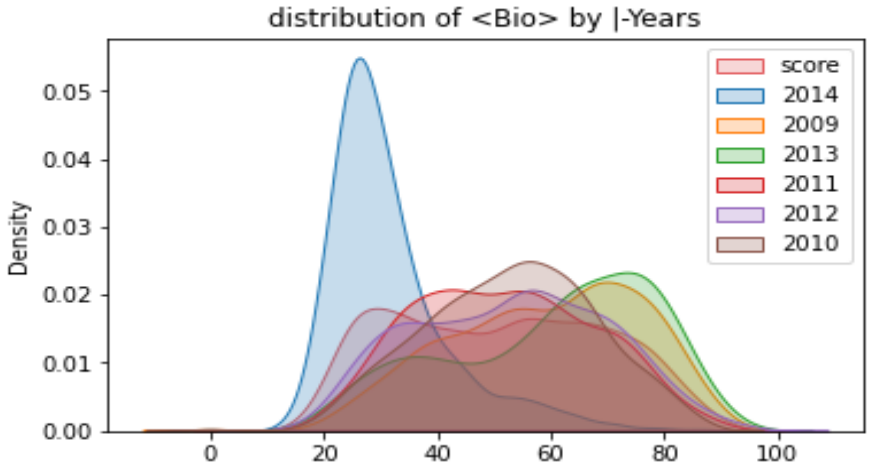

Figure 4: The density distribution curve of biology grades achieved by natural science students in the National Higher Education Entrance Examination from 2017 to 2022.

Similarly, Fig. 5 depicts the students' grades in biology. As shown in Fig. 4, the grade point average of most students in Fig. 5 was higher than the passing mark of 50. It was only valid between 2019 and 2021. However, the grade in the national education leaving examination in 2022 was the lowest.

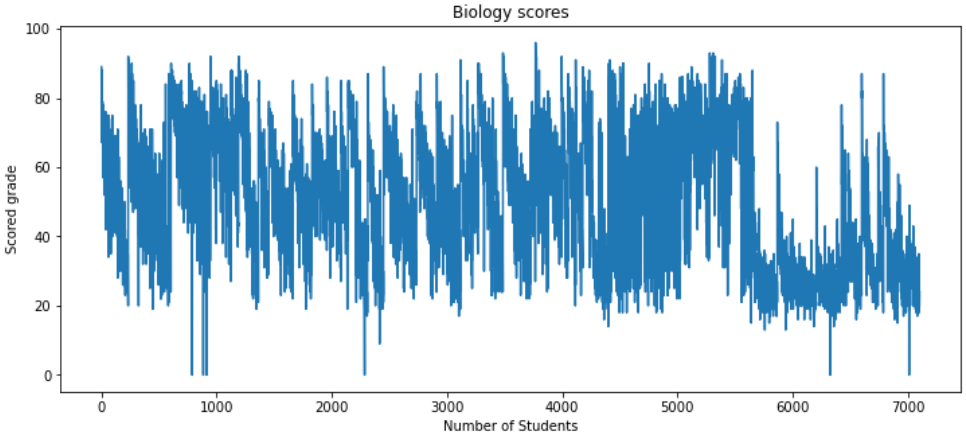

Figure 5: The National Education Leaving Examination results of biology subjects from 2017 to 2022

The results of the 2017–2022 National Education Leaving Test are shown in Figure 6, along with the grades received in chemistry. The results show that students' grades fluctuate dramatically over time. In comparison to the years 2019-2020 and 2022, students received the highest in 2021. It was due to cheating. Cheating, according to our observations, peaked in 2021 and subsequently declined in 2022, owing in part to the relocation of the exam center to the university campus.

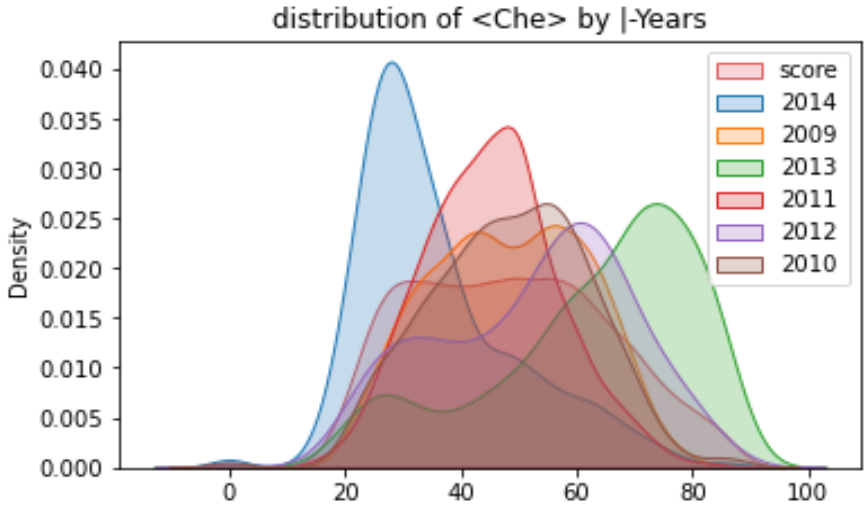

Figure 6: The density distribution curve of chemistry grades achieved by natural science students from 2017–2022.

Figure 7 depicts the trend analysis of chemistry for the national higher education entrance test for the 2017-2022 academic year. Similarly, the 2021 grade was higher than the previous two years and the 2022 academic year.

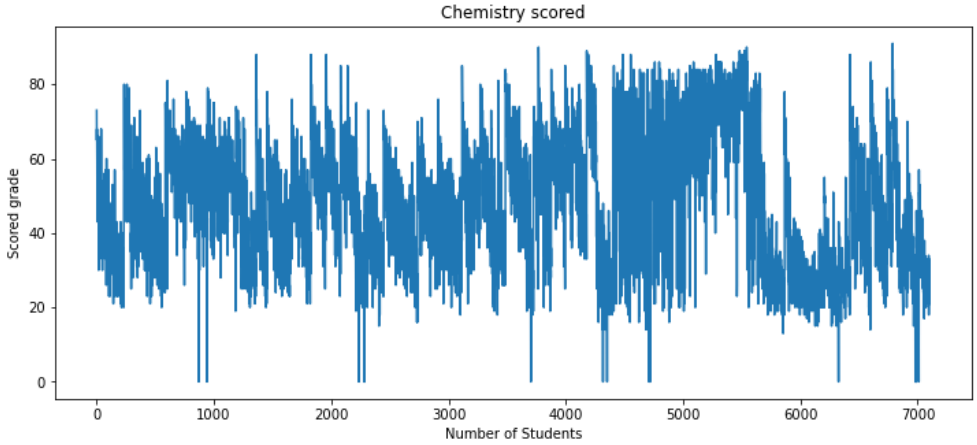

Figure 7: Trend analysis of chemistry scores in the natural higher education entrance examination by natural science students from 2019–2022.

Figure 8 illustrates the density distribution curve of natural science students' physics results in the national higher education entrance test from 2017–2022. This subject's results were lower than those of other scientific disciplines, as seen in Fig. 8.

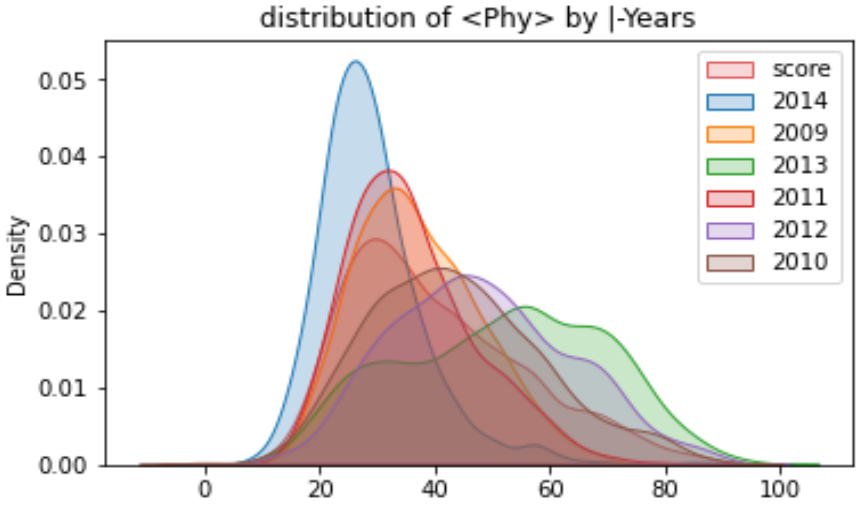

Figure 8: Physics density distribution acquired by natural science students between 2017 – 2022

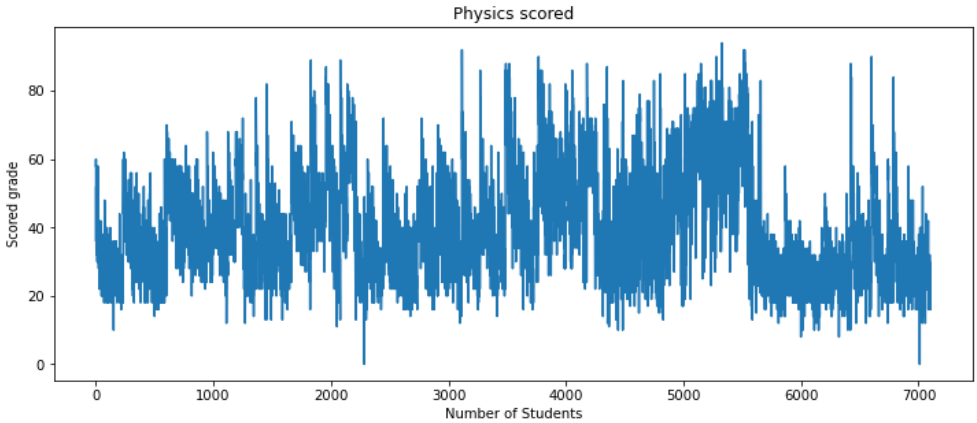

Figure 9: Trend analysis of physics achieved in the national higher education entrance examination by natural science students from 2017–2022.

Figures 2, 4, 6, and 8 depict the grade density curve's development. Students' grades from 2017 to 2021 were greatly exaggerated when compared to the 2022 academic year. It was due to the fact that all students took national examinations for higher education on campus, with university faculty serving as the examiners. The federal government developed a new strategy to deal with widespread cheating. Only 3.3% of the 888,116 students who took the entrance exam scored above 50%, and there was a total of 28,972 students who received a passing grade.

Social media has been a major factor in the past few years in students misbehaving and cheating. Social media users are inundated with information, whether it is accurate or not. Rarely is this pre-vetted. Individual social media platforms may consequently experience social and political divisions that affect students' academic success and lead to political unrest among neighboring states.

Figure 10 shows the overall grades received by pupils in the Dire Dawa administration in the National Education Entrance Examination from 2017 to 2022. It illustrates that a minimal result was earned in the 2022 academic year, whereas the maximum was earned in all sciences and mathematics fields in the 2021 academic year. Furthermore, Fig. 10 demonstrates that total student performance in 2019 was the lowest compared to the prior two years. The academic achievements of students in 2020 were higher than the previous year. Academic achievement in all science and mathematical fields is anticipated to diminish in 2022, according to the trend analysis illustrated in Figure 10.

Except for the language, the educational geography of the nation's regional states is the same. The results of the 2020 and 2021 school-leaving exams, presented in Figure 10, suggest that parents may feel justified in supporting cheating to some degree. Because of advantageous or corrupt circumstances, the family and their children seek success or advancement from one grade level to the next rather than mastering the knowledge, skills, and capabilities acquired via schooling. High entrance exam scores can lead to high-paying and prestigious positions in medicine or engineering. Low grades might lead to low-paying occupations in the local economy, such as teaching. Parents may assist their children in attempting to cheat on the exit exam. This may alleviate their burden. They actively participate by putting a small amount of money into exam questions to assist their students in receiving passing ratings. The data show that cheating is common and difficult.

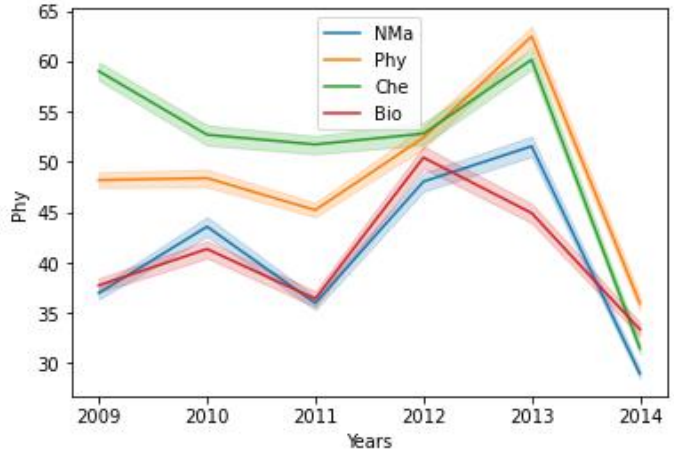

Figure 10: The overall trend analysis of student scores in science and mathematics subjects in the National Education Entrance Examination from 2017 – 2022

The association between natural sciences and national school entrance examination results is depicted in Figure 11. The grades attained by students who took the National Education Leaving Test were favorably related to the other subjects.

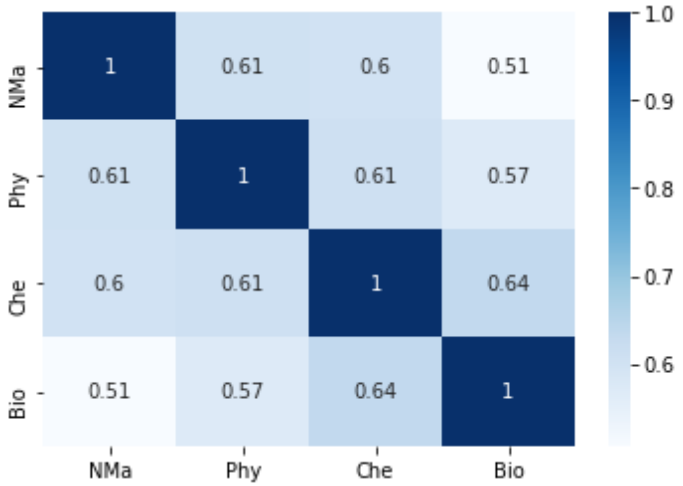

Figure 11: The Academic achievement correlation of science and mathematics subjects

Results Obtained from Student's Questionnaires

The Characteristics of The Respondents:

394 students participated in this initiative, of whom 200 (or 50.76%) were first-year students and 194 (or 49.24%) were in the 2015 remedial program. Table 4 shows the respondents' background characteristics and their families' educational backgrounds. According to the data, 85.3% were between 19 and 21 ages. Most respondents are mature enough to grasp what should be done about problems influencing students' academic performance in Dire Dawa City in grade 12 NHEEE. Moreover, 67.8% of the respondents were male and 32.2% were female. Although the survey sampled both genders, the majority of respondents were male. Primary education was the educational background of the respondents' mom and father, at 42.2% and 35.5%, respectively.

Table 4: The background of the respondents

Variables	Category	Count	percent
Age	19-21	337	85.3
	22-24	127	14.7
Gender	Female	127	32.2
	Male	267	67.8
Mothers' Education	Primary completed	167	42.2
	Secondary completed	102	25.9
	Diploma	83	21.1
	BA/BSc	41	10.4
	MA/MSc	1	3
Fathers' Education	Primary completed	140	35.5
	Secondary completed	57	14.5
	Diploma	87	22.1
	BA/BSc	75	19.0
	MA/MSc	35	8.9

Students' academic grades from the 2022 national higher education entrance examination in science and mathematics are shown in Fig. 12. The researchers devised the following system for assigning grades to students: 'A' indicates 85% or more, 'B' is between 75-84%, 'C' is 65-74%, 'D" is between 50-64%, and 'E' is less than 50%. Therefore, most of the student's grades were in the 'C' to 'E' category. A few of the students were labeled with 'A' and 'B' grades.

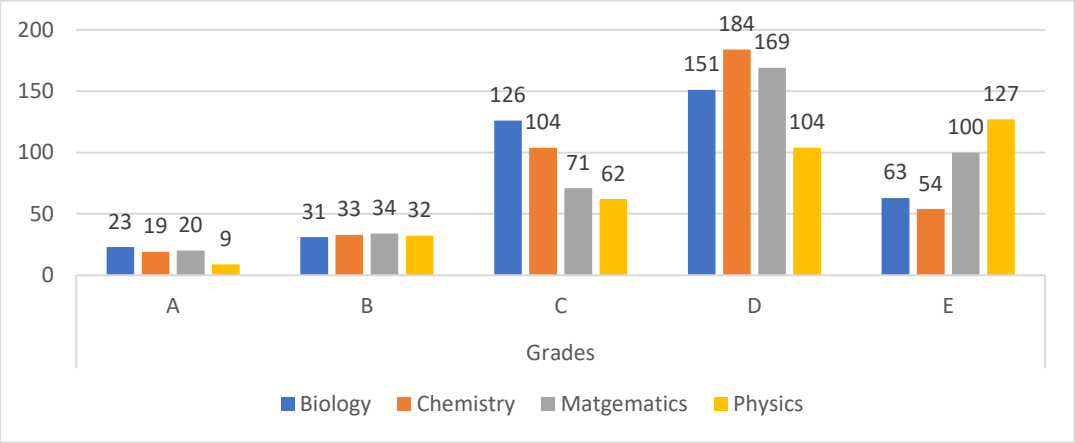

Figure 12: Students' ratings in university entrance examinations in sciences and mathematics begin in 2022.

According to the trend analysis indicated in the preceding part and the data given in Fig. 12, student academic performance in science and mathematics was a significant cause of problems. In this study, the researchers seek to identify those causes. The primary reasons include attitudes toward subjects, attitudes of teachers, teaching materials, school, student attitudes, and parental attitudes. As illustrated in Fig. 12, the researchers identified a lack of interest in the subjects as the most significant barrier to students' academic performance. The results suggest that 242 people (61.4%) are uninterested in the issue. It was one of the most significant obstacles to such triumphs. This finding could imply that during the examination, students formed a negative emotional attitude toward their courses. Cheating on the exam was one of the issues. However, the issues extended beyond cheating. The findings of this study indicate that teachers' qualifications, preparation before entering the classroom, methodology, perceptions of students, language, lack of interest, school environment, distance to school, lack of goals, substance use, study hours, and peer group all have an impact.

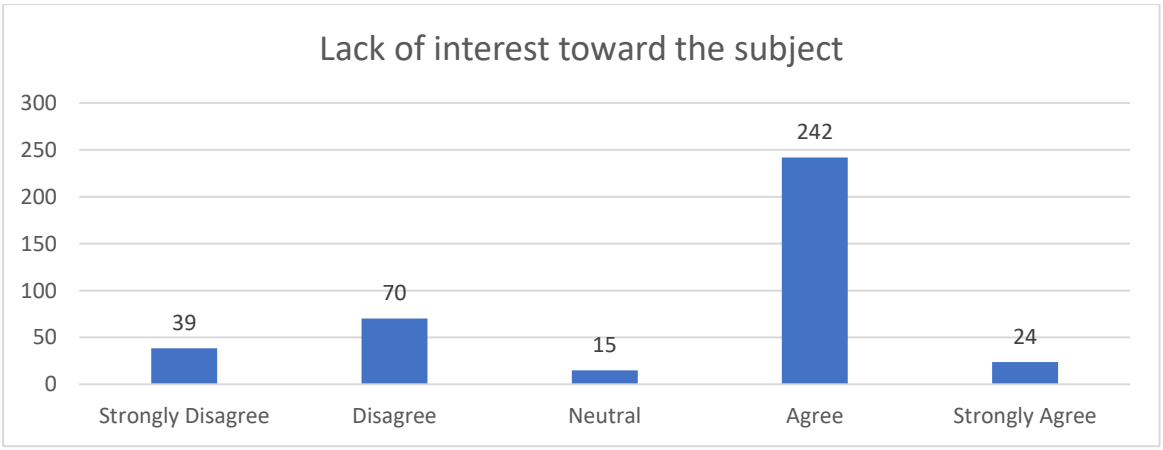

Figure 13: Students' attitudes toward science and mathematics.

Teacher Related Factors:

As demonstrated in Figure 14, students' challenges for academic performance from the perspective of teachers. According to the findings, the second most important element influencing students' academic achievement was the teachers' approach, pre class preparation, teachers' impressions of students, teachers' qualifications, and personalities. According to the findings, one of the most significant hurdles to students' performance in the admission exam was teacher methodology. The challenge, according to 62.2% of respondents, was the instructional methodology. Another difficulty for their success is the teacher's preparation before entering the classroom; 72.6% of respondents agreed to this challenge. Another barrier to student success was the teacher's opinion of the students. This challenge is supported by 71.1% of respondents. Another consideration is the teacher's qualifications.

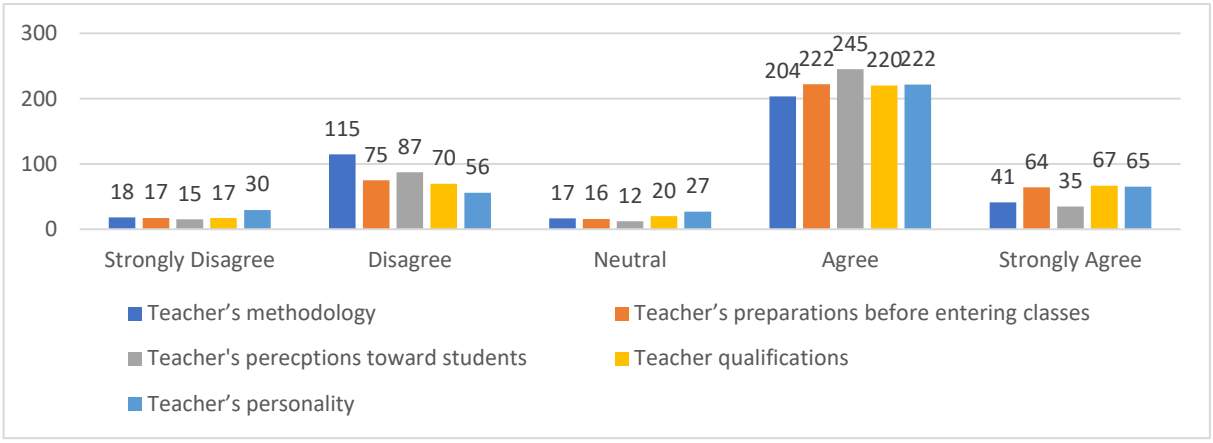

Figure 14: Challenges for students' success in academic performance in school leaving the entrance examination

Teaching-Related Material Factors:

Other elements influencing pupils' academic success were teaching materials. Reference materials, teaching aids, laboratories, topic matter, and coverage were among these components. According to the findings of this study, as shown in Table 5, respondents agree that reference materials, subject content, and coverage in the allotted time for each subject, and teaching aids or laboratories had an impact on the academic performance in the NHEEE examination.

Table 5: Teaching related material factors for academic success.

Types	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Reference materials	14(3.5%)	80(20.3%)	23(5.84%)	225(57.1%)	52(13.2%)
Content and coverage	18(4.6%)	104(26.4%)	26(6.6%)	201(51.0%)	45(11.4%)
Teaching aids/laboratory	16(4.0%)	78(19.8%)	31(7.9%)	229(58.1%)	40(10.2%)

School Related Factors:

According to the majority of research studies discovered in the literature, the school environment and distance to school are two factors that influence kids' academic achievement. School environmental elements such as student-staff ratio, school management, school personnel, classroom size, neatness, and school location, according to [38]. They have a significant impact on students' academic performance in the school leaving exams. According to Table 6, 70.6% of respondents stated that the educational environment was one of the obstacles to their

achievement in the entrance exams. Furthermore, 71.8% of respondents believed that school distance was the other factor influencing their academic success.

Table 6: Academic performance-related problems

Types	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
School environment	17(4.3%)	74(18.8%)	26(6.6%)	234(59.4%)	44(11.2%)
Distance school	15(3.8%)	70(17.8%)	25(6.3%)	236(59.9%)	47(11.9%)

Student Related Factors:

Exam cheating was one of the most significant difficulties affecting students' academic progress from 2017 to 2022, according to the trend analysis given in this study. As seen in Table 7, our research suggests that additional factors influence students' academic progress. It illustrates student-related features that promote academic success. Among these challenges are student conduct, language difficulty, exam cheating, attendance, self-study, the nature of exam types, peer groups, and substance use. According to the findings in Table 7, the respondents agreed that student conduct, language, exam cheating, school attendance, peer group, substance usage, nature of exam types, self-study hours per week, and exam center relocation all contributed to their achievement. Many students consider that the movement of exam centers and the variety of exam types are minor issues in contrast to the other criteria listed in Table 7. Furthermore, three of the most significant impediments to students' academic admission to the institution were school attendance (71.4%), self-study hours per week (70.9%), and language (68.8%), as the respondents indicated.

Table 7: Student-related factors for academic performance

Types	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Student Conduct	25(6.4%)	72(`18.3%)	27(6.9%)	229(58.1%)	43(10.9%)
Language problem	22(6.9%)	74(18.8%)	28(7.1%)	215(54.6%)	56(14.2%)
Exam cheating	26(6.6%)	70(17.8%)	28(7.1%)	229(58.1%)	43(10.9%)
School attendances	23(5.8%)	68(17.3%)	23(5.8%)	238(60.4%)	47(11.9%)
Self-study hours per week	16(4.1%)	74(18.8%)	24(6.1%)	238(60.4%)	43(10.9%)
Nature of exam types	184.6%)	130(33.0%)	25(6.4%)	189(48.0%)	33(8.4%)
Peer group	17(4.3%)	64(16.2%)	28(7.1%)	235(59.6%)	48(12.2%)
Substance use	22(5.6%)	62(15.7%)	28(7.1%)	235(59.6%)	48(12.2%)
Relocation of exam center	19(4.8%)	156(39.6%)	31(7.9%)	168(42.6%)	22(5.6%)

In focus group discussions, students had the chance to talk about how the learning environment at school affected them. Additionally, it was noted how the school's atmosphere affected students' performance in math and science. As a result, it was discovered that poor performance in science and mathematics on entrance exams is primarily caused by school management and its environment.

Results Obtained from The Teacher's Questionnaire

Demographic Profile of Teachers:

The background profiles of the instructor responses are shown in this section. It comprises school types, gender, educational attainment, teaching experiences, areas of specialization, student relationships, and teaching methods.

Table 8: Respondents background profile

Variable	Category	Frequency	percent
Types of school	Government	57	64
	Private	32	16
Gender	Female	78	87.8
	Male	11	12.4
Work experiences	1-5 years	23	25.8
	6-10 years	24	27.0
	11-15 years	41	46.1
	Above 15 years	1	1.1

According to the school classification in Table 8, 16% of the participants worked in private schools, and 64% worked in public schools. According to Table 8, most of the respondents in this study were male. 46.1% of respondents have 11-15 years of teaching experience.

Figure 15 depicts the teachers' preferences for various instructional styles. The findings revealed that participants favored a variety of educational tactics, as shown in the data above. The student-centered techniques approach was used by 47.2% of teachers. Another 34.8% of instructors preferred a collaborative method, while 18.0% chose a teacher-centered approach.

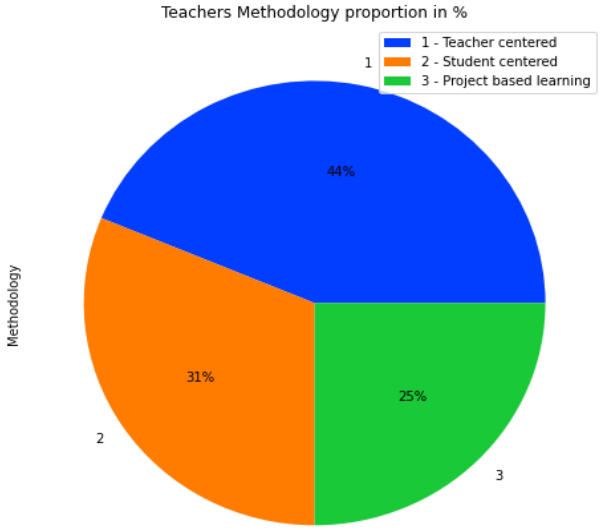

Figure 15: Applied Teacher's methodology (1 stands for Teacher-centered, 2 refers to student-centered, and 3 refers to project-based learning) (Source: Field Data (2023).

Figure 16 depicts the major areas of specialization for teachers. The results depict that biology, chemistry, mathematics, physics, chemical, electrical, and civil engineering were 24%, 24%, 16%, 16%, 10%, and 10%, respectively.

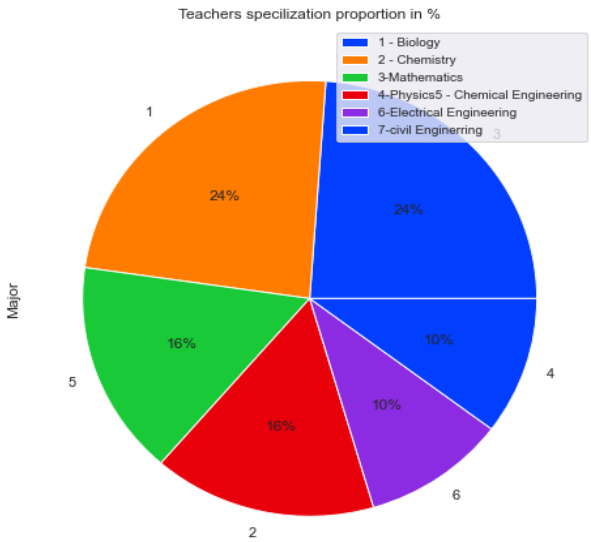

Figure 16: The respondents' the major field of specialization

How Would You Describe the Level of The Idea in Your School?

Knowledge of the curriculum and its purpose helps students improve their academic performance and the vision of the school. The results shown in Table 9 indicate that 55.1% of respondents agree that teachers understand the curriculum and its goals, and 37.1% of respondents rate the school's curriculum goals as moderate. 56.2% of the respondents felt that teachers were highly successful in implementing the curriculum. 37.6% of the respondents had some confidence in the likelihood of successful implementation of the curriculum. Additionally, Table 9 shows what teachers expect from their students for academic success. To achieve this goal, teachers work in groups to inspire and motivate students. However, the results revealed that 42.7% of parents played a role in attending school activities, and 40.3% participated in school activities. 43.8% of the respondents agreed that their parents did not force school administrators and teachers to maintain the quality of education. 38.2% of the respondents said that their students' ability to achieve their school's academic goals was low, but they respected their classmates for their efforts to excel in school. Moreover, Table 9 shows that the collaboration between teachers and school administrators in planning is high and that school administrators are enthusiastic about working with teachers on professional development.

Table 9: Teachers and parents' ideas on the academic performance of students

No	Items	Very low	Low	Medium	High	Very high
1	Teachers' understanding of the school's curricular goals	3(3.4%)	4(4.5%)	33(37.1%)	34(38.2%)	15(16.9%)
2	Teachers' degree of success in implementing the school's curriculum	2(2.2%)	5(5.6%)	32(36.0%)	37(41.6%)	13(14.6%)
3	Teachers' expectations for student achievement	3(5.4%)	10(11.2%)	13(14.6%)	49(55.1%)	14(15.7%)
4	Teachers working together to improve student achievement	4(4.5%)	13(14.6%)	34(38.2%)	25(28.1%)	13(14.6%)
5	Teachers' ability to inspire students	5(5.6%)	4(4.5%)	28(31.5%)	40(44.9%)	12(13.5%)
6	Parental involvement in school activities	16(18.0%)	22(24.7%)	30(33.7%)	16(18.0%)	5(5.6%)

7	Parental commitment to ensure that students are ready to learn	12(14.5%)	23(25.8%)	31(34.8%)	15(16.9%)	8(9.0%)
8	Parental pressure for the school to maintain high academic standards	14(15.7%)	25(28.1%)	23(25.8%)	18(20.2%)	9(10.1%)
9	Students' ability to reach the school's academic goals	7(7.9%)	27(30.3%)	30(33.7%)	22(24.7%)	3(3.4%)
10	Students' respect for classmates who excel in school	3(3.4%)	14(15.7%)	41(46.1%)	29(31.5%)	2(2.2%)
11	Collaboration between school leadership and teachers to plan instruction	7(7.9%)	15(16.9%)	30(33.7%)	33(37.1%)	4(4.5%)
12	School Leadership's support for teachers' professional development	10(11.2%)	21(23.6%)	16(18.0%)	38(42.7%)	4(4.5%)

Consider your current school and indicate how much you agree or disagree with each of the following statements.

Table 10 shows the school climate necessary to improve the academic ability of students and maintain the quality of education. 68.5% of the respondents agree that the school is in a safe place, while 22.5% disagree that the school is not in a safe place. 64% of respondents agreed that teachers were safe in school. 48.4% of the respondents agree that security, policies, and practices were in place, while 31.5% disagree. 51.7% of the respondents agreed that their students were behaving appropriately at school. 59.0% of respondents agreed that students respect their teachers. Finally, 59.5% of the respondents agree that schools have clear rules about student behavior and that those rules apply to students.

Table 10: Impact of school environment on quality of education

Items	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree
This school is located in a safe neighborhood	4(4.5%)	16(18.0%)	8(9.0%)	36(40.4%)	25(28.1%)
I feel safe when I was in the school	8(9.0%)	16(18.0%)	8(9.0%)	38(42.7%)	19(21.3%)
The school's security policies and practices are sufficient	0(0.0%)	28(31.5%)	9(10.1%)	30(23.7%)	22(24.7%)
The students behave in an orderly manner	6(6.7%)	18(20.2%)	19(21.3%)	24(38.2%)	12(13.5%)
The students are respectful of the teachers	10(11.2%)	15(16.9%)	15(16.9%)	25(39.3%)	14(15.7%)
The students respect school property	10(11.2%)	23(25.8%)	14(15.7%)	30(33.7%)	12(13.5%)
The school has clear rules about student conduct	2(2.2%)	19(21.3%)	15(16.9%)	34(38.2%)	19(21.3%)
The school's rules are enforced in a fair and consistent manner	4(4.5%)	16 (18.0%)	8(9%)	36(42.7%)	25(28.1%)

How serious is each problem at your current school? It shows the level of the problem found in the school. Table 11 shows the levels of school problems that affect student performance. 62.9%

of the respondents (with mild, moderate, and severe problems) feel that school maintenance is necessary. 42.7%, 25.8%, and 1.1% of her respondents said the level of the problem was mild, moderate, and severe, respectively. 40.4%, 12.4%, and 2.2% of respondents rated the lack of cleaning in classrooms as mild, moderate, and severe, respectively. 75.3% of respondents feel that their classrooms need maintenance and that there are not enough seats for teachers to support their students. Finally, 92.1% of respondents believe that cheating is a serious problem at school.

Table 11: The level of the current problem of the school.

Items	Not a problem	Minor problem	Moderate problem	Serious problem
The school building needs significant repair	33(37.1%0	33(37.1%)	14(15.7%)	9(10.1%)
Teachers do not have adequate workspace (e.g., for preparation, collaboration, or meeting with students)	27(30.3%)	38(42.7%)	23(25.8%)	1(1.1%)
Teachers do not have adequate instructional materials and supplies	26(19.2%)	42(47.2%)	16(18.0%)	5(5.2%)
The school classrooms are not cleaned often enough	40(44.9%)	36(40.4%)	11(12.4%)	2(2.2%)
The school classrooms need maintenance work	22(24.7%)	42(47.2%0	20(22.5%)	5(5.6%)
Teachers do not have adequate technological resources	7(7.9%)	38(42.7%)	29(32.6%)	15(16.9%)
Teachers do not have adequate support for using technology	10(11.2%)	28(31.5%)	33(37.5%)	18(20.2%)
Students cheating experiences	7(7.9%)	16(18.0%)	31(34.8%0	35(39.3%)

How Frequently Do You Have the Following Interaction with Other Teachers?

Table 12 shows that the nature of teaching resources and materials, like classrooms and technology, help to improve the quality of education. According to Figure 15, teachers were not assigned according to specialization. For example, you may have an engineering degree but teach math, physics, or chemistry. Not only does this contribute in some way to the quality of teaching, but it also encourages students to cheat on exams. Ninety-two percent of respondents said the level of cheating is high from elementary school through high school. 94.0% of those surveyed agreed to teach if they were given a specific topic. They volunteered to help design and create teaching materials and also volunteered to share their experiences with others. 34.8% of the respondents said they would not want to collaborate with others, while the rest were more positive about collaboration. 44.9% of respondents were reluctant to collaborate with other teachers to ensure continuity of learning.

Table 12: Interaction of teachers with other colleagues to sustain quality education

Items	Very often	Often	Sometimes	Never or rarely
Discuss how to teach a particular topic	9(10.1%)	24(27.0%)	51(57.3%)	5(5.6%)
Collaborate in planning and preparing instructional materials	12(15.5%0	23(24.7%)	43(48.3%0	12(15.5%)
Share teaching experiences	8(9.0%)	21(23.6%)	40(44.9%0	20(22.5%)

Visit another classroom to learn more about teaching	2(2.2%)	18(20.2%)	39(43.8%)	30(33.7%)
Work together to try out new ideas	8(9.0%0	12(13.5%)	38(42.7%)	31(34.8%)
Work as a group on implementing the curriculum	2(2.2%)	17(19.1%)	43(49.3%)	27(30.3%)
Work with teachers from other grades to ensure continuity in learning	2(2.2%)	12(13.5%)	35(39.3%)	40(44.9%)

How do you feel about being a teacher? Table 13 shows teachers' attitudes towards their profession. The results showed that most respondents were inspired and satisfied with their work. But some people don't inspire others with to work. 31.3% of those questioned have never influenced others with their work, and 37.1% of them do not want to continue in this profession for various reasons, including financial reasons. I think. A respected government agency pays no attention to occupation. Respondents believe that quality education can be achieved bottom-up rather than top-down.

Table 13: The teacher's feelings about their profession.

Items	Very often	Often	Sometimes	Never or rarely
I am content with my profession as a teacher	20(22.5%)	34(38.2%)	29(32.6%)	6(6.7%)
I am satisfied with being a teacher at this school	15(16.9%)	15(16.9%)	48(53.9%)	11(12.4%)
I find my work full of meaning and purpose	24(27.0%0	31(34.8%)	25(28.1%)	9(10.1%)
I am enthusiastic about my job	10(11.2%)	35(39.3%)	26(29.2%)	18(20.2%)
My work inspires me	18(20.2%0	18(20.2%)	34(38.2%0	19(31.3%)
I am proud of the work I do	15(16.9%)	34(38.2%)	20(22.5%0	20(22.5%)
I am going to continue teaching for as long as I can	17(19.1%)	15(16.9%)	24(27.0%)	33(37.1%)

In The Last 2-3 Years, Have You Participated in Services Training or Professional Development in Any of The Following Areas?

Table 14 shows the need for in-service training to maintain educational quality. While 50% of respondents agreed that they had completed on-the-job training in science or math, 39% of respondents said they had no on-the-job training in science or math. While 61.8% of respondents have received hands-on training in teaching methodology, 38.2% have not received such training to maintain student achievement. The majority of respondents did not know how to apply the science and math curriculum. As shown in Table 14, integrating science and technology information is essential aspect of maintaining student academic performance. Another key point for student achievement beyond the subject is that teachers need to teach students how to develop critical thinking and research skills. Additionally, 59.6% of those surveyed were unsure how to respond to individual student needs. They believed that this kind of education was important to the teaching and learning process.

Table 14: Professional development of teachers for the last two to three years.

Items	Yes	No
Science/mathematics content	50(56.2%)	39(43.8%)
Science/mathematics teaching methodology	55(61.8%)	34(38.2%)
Science/mathematics curriculum	44(49.4%0	45(50.6)
Integrating information technology into science and mathematics	48(53.9%0	41(46.1%)

Improving students' critical thinking or inquiry skills	40(44.9%)	49(55.1%)
Science/mathematics assessment	47(52.8%)	42(47.2%)
Addressing individual students' needs	36(40.4%)	53(59.6%)

How Many Total Hours Have You Spent in Formal In-Service or Professional Development (e.g., Workshops, Seminars) For Science or Mathematics Over the Last Two to Five Years?
The survey results found that 40.1% of respondents had no professional training in science and mathematics at all, and 28% had less than 6 hours of training in the last three years. 25% of respondents said they had completed 6-15 hours of training in the last 3 years. Only 7% of respondents said they exercised for more than 15 hours in the past three years.

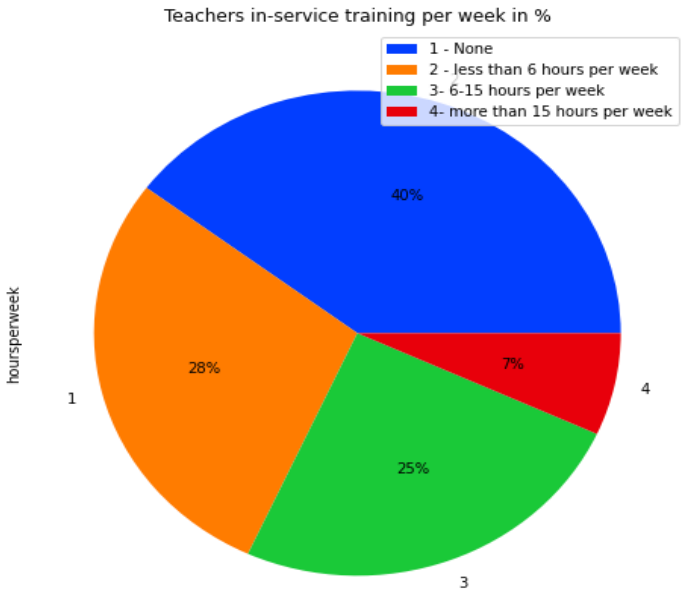

Figure 15: teachers' in-service training or professional development per week for the last three years.

DISCUSSIONS

According to Table 6, students who live a long distance from school will struggle to complete outside-of-school duties due to the time spent walking from school to home and vice versa [39-40]. Aside from exhaustion and hunger, kids who must walk long distances will get home or school late [41]. When kids are required to walk long distances, a significant amount of energy is expended, which can contribute to poor concentration on school duties and promote absenteeism and school dropouts [42-45].

According to [46-48], this was due to the unfavorable stereotype that had been established surrounding the subjects that had the lowest grades. Figures 8 and 9 show the lower grades earned over the 2017–2022 school year. The highest grades were obtained between 2021 and 2022. This was due to cheating rather than poor academic performance during the 2022 school year.

Figure 10 shows that the quality of examinations in Ethiopian schools has recently deteriorated. In 2021, this was due to insufficient examination preparation, administration, and scoring systems in all subjects. A growing number of stakeholders, both inside and outside the academic community, report rampant examination malpractice in the system, resulting in a rapid decline

in educational quality [49]. The significance of social media leaks on exam responses was greater than predicted. The importance of social media leaks in exam responses was greater than expected. Because of massive social media leaks of examination answers, Somali regional authorities canceled national examinations in 2019, requiring students to retake them, resulting in the student protests mentioned in [50].

According to [51-53], there is a worldwide developmental decline in student science motivation and attitudes. The results obtained in this work agree with [11, 54]. Factors related to academic success in school are critical to motivating students to succeed in learning science.

Science achievement at the secondary school level is critical because secondary school is the level at which general ideas become specific concepts in teaching science [55]. Students' performance at this level determines whether they continue their education in the science stream.

As the results revealed by [48] agree with this study, factors other than the teacher-student relationship had a significant impact on student performance. Students said they were not hostile to their teachers. However, it has been found that students are so afraid of science and mathematics that they do not practice, believing that if they do, they will fail. Some students said this. Moreover, some teachers who are not science or math teachers share their experiences of how difficult science or math was for them. This reduces students' morale towards science and mathematics.

The study of the factors influencing academic achievement demonstrates that the individual student has a more significant influence on their development than the school, teachers, teaching resources materials, and parent education background and that the school's environmental factors are usually more influential than the student's characteristics [56-59].

Cheating prevalence in school can be classified into two categories: dimensions and reasons, both of which incorporate components of equity and justice. The first dimension is the school's commitment to assessing each student's performance fairly [26, 60]. According to the findings, equity has a substantial impact on Ethiopia's education system. It provides a foundation for the school's credibility in promoting students' moral and ethical development. Furthermore, it is concerned with the societal ideal of equitable distribution of life possibilities, which means that someone who cheats may compete for higher education and a future job in place of someone else. This inequity is most pronounced in upper secondary schools, where students compete for entrance to further education based on their final results.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The study concentrated on the issues and challenges associated with Ethiopian higher education, admission exam results, and educational quality. Participants in this study included university students and teachers from the Dire Dawa Administration Education Bureau. The study used a trend analysis of student records from 2017 to 2022 and a survey to elicit respondents' perspectives on how they perceive factors affecting academic achievement. The sample was chosen randomly and included 464 students and teachers. As data collection approached, interviews, focus group talks, and documents were used.

The first research question inquired: What was the trend in high school academic performance in science and mathematics under the Dire Dawa administration from 2017 to 2022? The results showed that many students scored below 50% in four subjects in six years, such as biology, chemistry, mathematics, and physics. However, the results for 2021 and 2022 were not comparable. As was shown in the paper, the total number of students scoring above 50% was 8.6% of 340,00 in 2022. In addition, the first eight figures show the number of students every year. Altogether, the academic performance of students in sciences and mathematics subjects in the science stream was very poor.

The second study question is: What variables contributed to poor performance in science and mathematics in selected secondary school admission tests during the Dire Dawa administration's 2017-2022 term? The data demonstrated that students' lack of interest in the courses was the first and most significant impediment to their academic success. Other aspects, such as teacher's qualifications, dedication to their profession, school surroundings, instructional methods, reference materials, peer group impact, substance usage, study time, lack of goals, and cheating, are also dependent on other work. This impacted learners' ability to be properly prepared for their final exams.

According to the findings of this study, the Federal Ministry of Education system promises to sort citizens into distinct life paths based on national higher education admission examinations after 12 years of hard work. This is attributable to the country's national human resource development policy. However, young people aspire to attain their vision's big goals through these approaches. The government's testing processes lack a legitimate basis for sorting due to significant inequalities in teacher qualification, teacher preparation, teacher methodology, educational resources, class size, school compound environment, student languages, and the secondary school security system, among other factors. This might be one of the motivations behind students who choose to commit fraud or cheating with their exceptional accomplishments. To counteract this academic injustice as a social phobia, the government, school administration, teachers and their associations, parents, and students should collaborate.

Recommendations

The following suggestions were made in order to raise students' academic achievement in the Dire Dawa administration in light of the study's findings:

1. Governments must make sure that instructors are hired, trained, and then assigned to the most underprivileged areas. In rural and underprivileged locations, it is important to use suitable salary, bonuses, housing, professional development opportunities, and career possibilities to attract skilled teachers. Children in remote places will have qualified instructors and a high-quality education if teachers are chosen using a clear, rigorous procedure, local hiring, and quality incentive programs.
2. A cross-sectional learning framework can help create school communities where all stakeholders can come together to discuss ideas, concerns, and solutions.
3. Organize workshops and training sessions for teachers who teach a variety of disciplines to help them become better educators.
4. Teachers must be capable of reflecting on their own teaching, evaluating the methods they use critically, and seeking out new teaching strategies.
5. Encourage learning in children utilizing a variety of strategies and teacher-led activities.
6. Motivate students to learn using different techniques and teacher-taught activities

7. Professional freedom: Teachers are best equipped to decide how to set up the ideal learning environment.
8. Professional ethics Parents should be aware of their children's issues and collaborate with teachers and administrators to keep an eye on their children's academic progress (for instance, by incorporating the Convention on the Rights of the Child into the ethical and professional standards of education).
9. The education bureau and nearby higher education institutions collaborate closely to build teacher capacity.

Availability of Data and Materials

The findings of this study are derived from data collected and analyzed using the methods and materials specified. The data supporting this discovery will be made available upon request at any time.

Competing Interests

We declare that we have no competing interests.

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