



BEYOND ACCESS: FACTORS INFLUENCING STUDENTS' UTILIZATION OF EDUCATIONAL TECHNOLOGIES AT SELECTED HIGH SCHOOLS IN ADDIS ABABA – A SURVEY ANALYSIS

(Research article)

Anteneh Yimmam^a 1

^a, Ethioware Software Engineering Group, 22 St., Addis Ababa, Ethiopia

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Abstract

Relevant studies showed the positive influence educational technologies have on students' academic experience. This study examined how students in Addis Ababa's public, private, and international high schools use Educational Technologies to improve their academics. Thirty random schools were surveyed, and the collected data were analyzed using descriptive, regression, and inferential statistics to address the objectives of the study. The online survey had more than a thousand views per school, showing high accessibility of both the internet and devices. Most of the respondents used educational technologies. 18.4% of students who didn't use EdTech attributed it to a lack of guidance from their teachers. In Ethiopia and similar countries, many studies, including this one, found that teachers were not using educational technologies. This study confirmed that using EdTech increased academic motivation. Interestingly, educational technologies were used equally irrespective of whether students found their daily lessons “applicable” or not. This contradicted other studies, which found that the use of e-learning in developing countries was significantly affected by their perceived utility. Similarly, there were only a few significant advantages or disadvantages of enrolling in any of the three high school categories. For instance, students learning in public schools showed a significant increase in social media use while international high school students got significantly better guidance on using EdTech compared to their public counterpart.

Keywords: Educational technology; survey analysis; Addis Ababa; academic motivation

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¹Corresponding author Anteneh Yimmam. ORCID ID.: <https://orcid.org/0009-0004-6937-9319>
E-mail: anteneh.yimmam@ethioware.org

1. Introduction

The total Student-Teacher ratio for secondary level in the 2022 academic year was 44 and, in some regions, as high as 98.5. Despite these concerning stats, Ethiopia continues to look for innovative approaches to managing the educational sector, and technology seems to be one of these approaches. Educational technologies are any application of information and communication technologies in an educational context. This includes, but is not limited to, the distribution of existing technology, the provision of devices with tailored software, or the utilization of available technologies (Daniel Rodriguez-Segura, 2021). Indeed, Ethiopia has been showing rapid digitization in many sectors, especially education. For instance, the Ministry of Education has introduced the first-ever online university exit exams to manage cheating better and initiate the path to quality education. Digital Technology For Education Sector Transformation (D-TEST), as termed by the ministry, also aims to introduce technology as a means to improve the problems facing the educational sector. (Education Statistics Annual Abstract, 2022).

Consequently, educational technologies are expected to positively impact educational policies as the funding for education increases. As of 2019, 20.9% of Ethiopia's GDP, more than the 13.4% of the U.S.A.'s, was invested in the education sector (World Bank Data Catalog, 2023). Similarly, the evaluation of the MindSpark software and its success and cost-effectiveness has led to technological interventions enabling students to learn independently (Muralidharan et al., 2019). Furthermore, there have been several studies outlining access to electricity, the internet, digital literacy, and any other prerequisite to hindering the utilization of these technologies toward better education. However, having access to educational materials isn't the same as learning from them. For instance, students who already have access to these technologies showed significant correlations between low grades and reported time invested on social media and streaming platforms for other purposes than learning (Nina Bergdahl et al., 2018).

As a result, this study conducted a preliminary interview of the largest Ethiopian educational technology company, Kuraz Tech, to design surveys with a contextual basis. Upon integrating the insights of this industry, the students' survey validated the mentioned factors and quantified the extent of their influence. Although there are multidimensional factors, this study focused on the potential friction points influencing students, who already have access and digital literacy, in utilizing educational technologies at various types of Addis Ababa high schools.

1.1. Statement of the problem

Utilizing Educational technologies both by teachers and students has shown a positive outcome. According to results from 24 papers and over four thousand subjects, there is a significant overall impact of educational technology on student achievement, motivation, and attitudes. Specifically, Educational technology had a moderate to strong impact on achievement

both when compared with a control group and throughout an intervention program in the context of mathematics (Higgins et al., 2019).

Nevertheless, there has been a lack of accurate and sufficient data regarding the intrinsic side of educational technology utilization. Most studies are focused on accessibility figures. For instance, a study on the integration of ICT with education in Ethiopian secondary schools showed that 39.5% of the surveyed 10,000 students had a mobile, laptop, or tablet with access to the internet almost every day at schools. Additionally, 65.7% of the students had access to mobile and other equipment at home and outside of school. However, 61.9% of the 415 teachers didn't have access to desktop computers with Internet accessibility. This implies that, at least in the context of most high schools in Addis Ababa, accessibility has shown improvement. Still, of the teachers who did have these technologies, less than 10% used them to collect learning materials/resources, prepare lesson presentations, or create their digital learning materials for students (Tesfaye Bati et al., 2020). While investing in educational institutions, particularly high schools, the Ministry of Education invested around 27.9 Billion USD (World Bank Data Catalog, 2022). Although digitizing the educational sector would be a net positive in the future, the utilization of these infrastructures may not be as anticipated. This in turn may lead to inefficient spending due to improper utilization of the current available infrastructures. For instance, a recent study showed that 53.3% of students at a local government school had stated that the intensity of their courses affects their academic motivation. Although utilizing educational technologies would enhance their course comprehension, most students utilized this accessibility for social media. In the same study, half of the surveyed parents believed that social media use negatively influenced their child's motivation to learn (Anteneh Yimmam et al.). Similarly, another study in Tanzania also demonstrated that despite purposeful usage of the Internet, most students are using the Internet as a social media for chatting and socializing, watching movies, and listening to music (Almasi et al., 2017).

However, those studies still need to explore the underlying factors hindering students with access to proper technology and the internet in utilizing it for their academic tasks. This study, therefore, is significant in that it addresses this unique inquiry and provides valuable information in the context of high school students in Addis Ababa. Consequently, the study provided data that could be exploited in designing better policies, building more effective educational technologies, and improving the existing ones.

1.2. Literature Review

Educational Technology, like many other technological sectors, has shown rapid growth, impacting billions of people worldwide. This expansion was also noticed in Ethiopia as access to the internet increased from 220 thousand users in 2011 to 24.9 million users in 2021 ([Statista, 2023](#)). Although the accessibility of these technological products for pedagogy practice enabled more students to pursue a self-led learning approach, the majority of students and schools are

still not taking full advantage of the available infrastructure (Alemu, B.M., 2017). According to icog-ACC, a technology-focused educational company, limited access to technology and technology education is witnessed in public schools which further impedes the kids from having sufficient digital skills by the time they graduate from high school. As a remedy, they conducted free public workshops in public schools from 2-hour introductory classes up to training of trainees and 100 hours of coding programs (Icog-ACC, 2023).

According to Daniel Rodriguez-Segura et al., interventions that target “self-led learning” accounted for a third of the 24 core studies of Educational Technology research. This intervention enables students to explore any academic endeavor on their own without intensive supervision. Additionally, it is not necessarily intended to improve the overall classroom instruction, as it is implemented outside of school hours, but rather to deliver content directly to students. Educational Technology products can deliver customized instruction to each student’s level, or allow teachers to focus on specific groups of students while other students are engaging with appropriate practice exercises on technological platforms. More importantly, Educational Technology could be a very valuable tool to narrow learning and instructional inequalities.

A common obstacle to achieving this is student and teacher behavior in adopting Educational Technology. Shaping human behavior is a complex endeavor that requires deep knowledge about specific constraints, the availability of a channel for behavior-shaping incentives to flow, and a well-designed intervention based on a credible theory of change. Nevertheless, interventions that incentivize behavior are promising avenues to shape systemic issues, including the adoption of Educational Technology, cost-effectively and suitably (Daniel Rodriguez-Segura, 2021). Similarly, a study on 269 secondary and post-secondary students in Liberia indicated that students’ behavioral intention to accept and use e-learning in developing countries was significantly affected by their perceived usefulness and perceived ease of use (Vululleh P., 2018).

Another concern for the effective utilization of available infrastructure is reliability. Around 70% of the 800 Pakistani high school students agreed that they occasionally avoid visiting certain websites because their internet connection is too slow. This is particularly significant when most popular educational content utilizes various graphics, video, and other visuals, which requires a reliable internet. The same study analyzed the price and loading times of popular websites in 56 cities. The results showed that Addis Ababa was among the worst in cost (14.8 \$ per Gigabyte) and loading times (>27s) (Chaqfeh, M et al., 2023).

Nevertheless, teachers and school leaders recognized that ICT can be utilized for pedagogical practice and ease access to information. They also acknowledge the potential adverse effects that could happen if mitigation strategies fail to be implemented in place. There is a prominent attention to educational software, both in secondary education and higher learning, which is dominated by infrastructure development and the purchase of equipment. Despite the obvious requirement for hardware and infrastructure, integrated use of ICT in education depends on the

availability of appropriate educational software. “Given the diverse student groups that Ethiopia has and would have, in terms of linguistic and cultural pluralism; much work is needed for selection and adaptation of educational software and contents and/or development of local ones adhering to standards and quality measures to assure a right level of appropriateness” (Bati, Tesfaye et al., 2020).

Another finding suggests that educational technologies offer support for student engagement. The results showed a strong correlation of engagement with learning activities, where the teacher noticed the participation of all students. Similarly, technologies were organized to gain insight into students’ knowledge and learning processes. Mostly, it seemed that educational technologies were not organized to support student engagement, instead, there were plenty of instances in which the implemented educational technology was only fit for one user at a time. During most lessons, the teacher had no insight into the students’ learning processes (Nina Bergdahl et al., 2018).

1.3. Research Gap

Based on the discussed literature, this study aimed to explore the specific insights of learners in interacting with educational technologies that were lacking in Nina Bergdahl et al. study. Furthermore, the analyzed results contributed to the selection and adaptation of educational software and contents and/or development of local ones highlighted by Tesfaye Bati et al. and ensured future infrastructure is utilized properly. Finally, the intrinsic aspect of learners which was lacking in most of the literature, and the geographical context of Addis Ababa high schools have been included. The primary aim of this study is to examine the utilization of Educational Technologies among public, private, and international high school students in Addis Ababa and explore the factors influencing their usage patterns. The research aims to investigate the extent of current utilization of educational technologies among selected high school students and identify demographic-specific influences on their usage. Given the objective of this study and the discussed literature, this article seeks to answer the following research questions:

1. What is the current utilization of educational technologies by the selected high school students?
2. What factors influence the use of educational technologies?
 - a. Which demographic is influenced the most and to what extent?

2. Method

This study employed a mixed approach, with quantitative data obtained from an online survey and qualitative responses from an interview with a digital education company. The readability of the online survey was intentionally higher to ensure the respondents have adequate language skills to navigate other potential educational technologies. Additionally, the survey adopted the intrinsic components of the high school motivation scale (Vallerand et al., 1989). Furthermore,

the interview responses have been integrated with the students' survey for a holistic interpretation of the collected data points.

2.1. *Data collection*

The data collection had two phases. The first phase was an interview with Kuraz Technologies, the largest educational company in Ethiopia. Additionally, the responses contributed to the design of the 5-Likert student survey for phase two of the data collection. As a result, the questions on the students' survey reflected the observation of these stakeholders and additional factors in the literature review.

2.2. *Sampling*

Based on the Education Statistics Annual Abstract (2021/22), there are 78 government secondary schools and 132 non-government secondary schools in Addis Ababa. Similarly, there are 12 international schools in Addis Ababa ([international schools' database](#)). For the inclusivity of the results, 13% of the schools were selected while maintaining their distribution ratio. Therefore, 10 government secondary schools, 18 non-government/private secondary schools, and 2 international schools were selected randomly.

2.3. *Data Analysis*

The quantitative data collected through the surveys are analyzed using SPSS to maintain a reliable interpretation and representation of the data. Furthermore, the data used descriptive statistics (percentages, figures, and graphs) to understand the general characteristics of the participants, and inferential statistics to examine the relationships between different variables and the utilization of educational Technologies. Moreover, a regression analysis was done by using the Scikit Learn Python library to understand the abstract relation of various qualitative and quantitative variables. Finally, the analyzed results were integrated and presented in graphs, tables, and charts with proper format for the discussion section of the study.

2.4. *Ethical Considerations*

One of the most significant ethical considerations is the provision of informed consent. This study ensured obtaining permission from the high school administration to share the survey on their online platforms. Only volunteer high schools were given the surveys and made aware of the purpose and the content of the surveys. Additionally, the survey contained a summary of the research objectives to inform on how the students' input would be utilized. Only after the student clicked the "I consent" button did the survey start. The survey information was clear and easy to understand, and participants were allowed to communicate via email for further questions. Another vital ethical consideration in conducting this study would be confidentiality and privacy. Accordingly, the emails collected are for avoiding redundant responses and would not

be used aside from this study. Likewise, the researcher ensured that only their advisors had access to the data collected to ensure proper analysis. Furthermore, the collected data is elicited in a way that does not compromise the privacy of the participants, no name and personal information were asked.

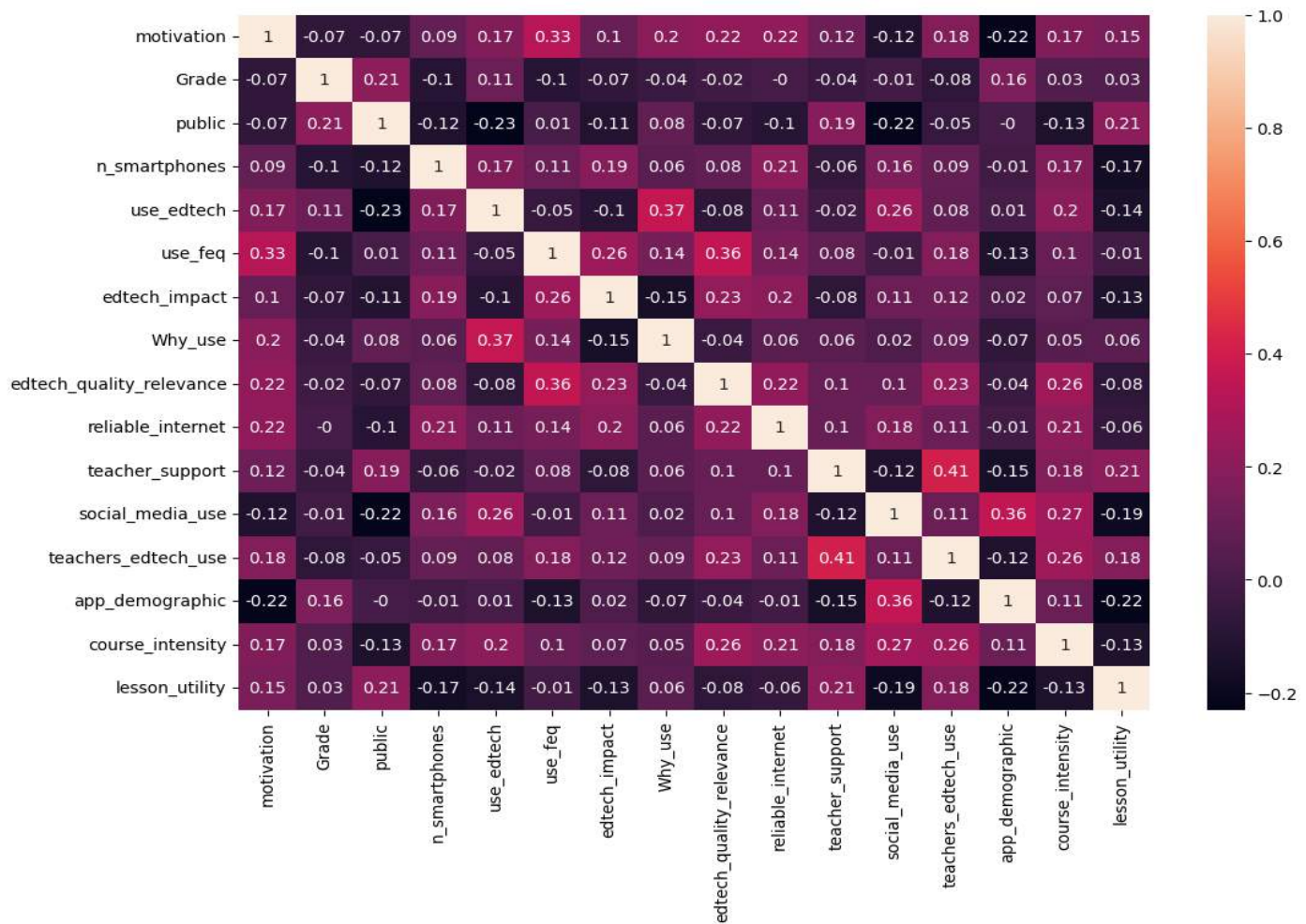


Figure 1. Annotated Regression Correlation Heatmap of Survey Variables

3. Results

Results of the study are presented in a tabulated format as follows:

3.1. Respondents' Demographic Information

Table 1. Grade Distribution

Grade	Frequency	Percent
9	1	.6%
10	11	6.7%
11	43	26.40%
12	108	66.3%
Mean	11.6	
Median	12	
Std. Dev	.65	
Total	163	100.0%

Table 2. School Type

High school Category	Frequency	Percent
International	11	6.7%
Private	66	40.5%
Public	86	52.8%
Total	163	100.0%

Tables 1 and 2 indicated that most of the respondents are upper high school (11-12 grade) students, mostly learning in either a private or public high school.

3.2. Educational Technology Availability

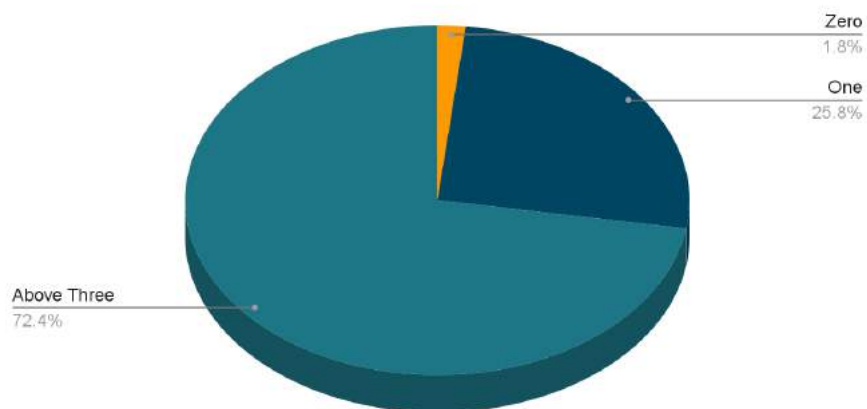


Figure 2. Number of Smartphones per Household

Table 3. Respondents' Educational Technology Utilization

Utilize Educational Technologies	Frequency	Percent
No	30	18.4%
Yes	133	81.6%
Total	163	100.0%

Table 4. Most Frequently Used Application

Application Category	Frequency	Percent
Camera	4	2.5%
Music/Video Player	16	9.8%
Search Engine	65	39.9%
Social Media	78	49.9%
Total	163	100.0%

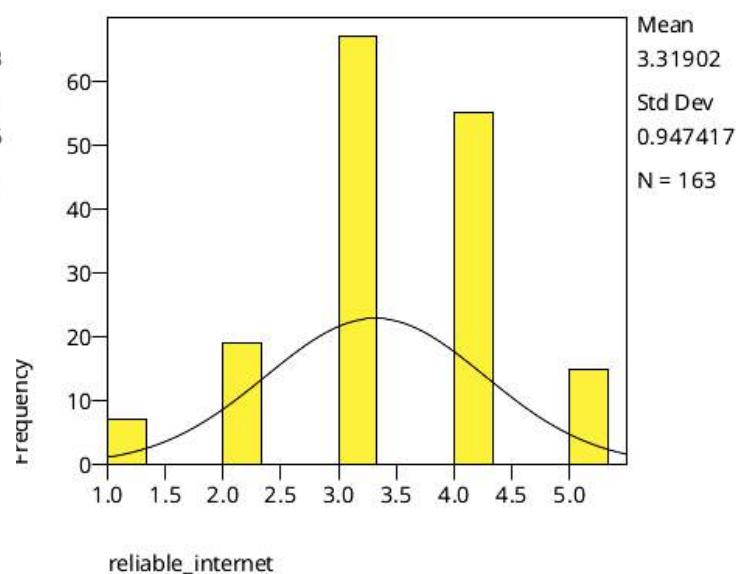
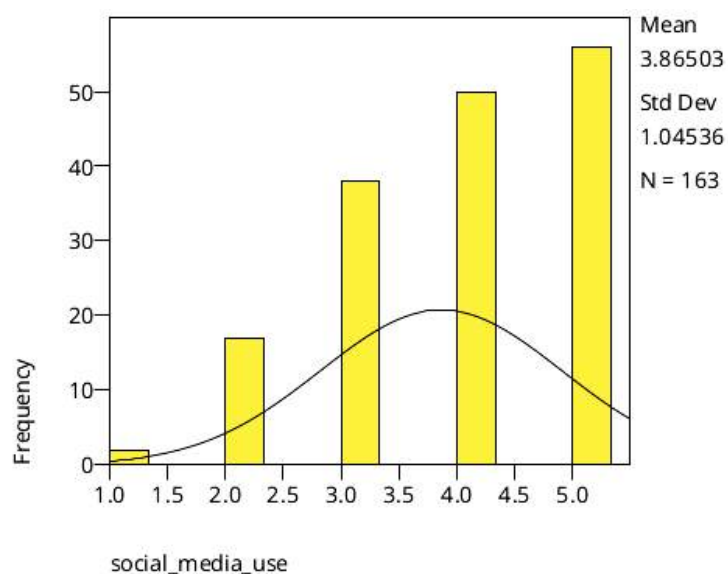


Figure 3. Social Media Usage Frequency Distribution Figure 4: Five Likert Internet Reliability Score

72.4% of respondents indicated having more than 3 smartphones in their household, with only 1.8% having no access (Fig 1). Although this shows clear availability of devices for utilizing educational technologies, 18.4% of respondents didn't use them (Table 3). Among the ones who utilize such technologies, almost half of the respondents indicated that they primarily use their access, internet, and device availability, to browse social media (Table 4). Additionally, as access to reliable internet increased, respondents did show an increased utilization of social media (Fig 3&4).

Table 5. Barriers to Educational Technology Utilization

Potential Barriers	Frequency	Percent
Distraction or temptation from other activities	7	23.4%
Lack of guidance or support	13	43.4%
Lack of quality or relevance of the content	5	16.6%
Lack of time	5	16.6%
Total	30	100.0%

Table 6. Use Educational Technology If the Above Barriers Are Solved

Frequency of Use	Frequency	Percent
Rarely	5	16.7%
Occasionally	8	26.65%
Frequently	8	26.65%
Very Frequently	9	30.0%
Total	30	100.0%

Table 7. Guidance from Peers and Teachers on Effective Utilization of Educational Technology

Frequency of the Guidance/Support	Frequency	Percent
Never	34	20.9%
Rarely	54	33.1%
Occasionally	42	25.8%
Frequently	23	14.1%
Very Frequently	10	6.1%
Total	163	100.0%

18.4% of respondents (Table 3) who indicated that they don't use educational technologies attributed it primarily to the lack of guidance or support (Table 5). The average guidance/support is 2.52 with the median being 2.0, demonstrating a clear lack of guidance from either their peers or teachers (Table 8). However, if the barriers were to be solved, most were willing to use it more often (Table 6).

Table 8. One-way ANOVA Test on Guidance from Peers and Teachers on Effective Utilization of Educational Technology Based on High School Category

Test			Mean Difference (I - J)	Std. Error	Sig.	95% Confidence Interval	
	(J) Family	(J) Family				Lower Bound	Upper Bound
Tukey HSD	International	Private	-.44	.37	.460	-1.31	.43
		Public (government)	-.81	.36	.068	-1.67	.05
	Private	International	.44	.37	.460	-.43	1.31
		Public (government)	-.37	.19	.113	-.81	.07
	Public (government)	International	.81	.36	.068	-.05	1.67
		Private	.37	.19	.113	-.07	.81

Table 9. One-way ANOVA Test on Social Media Use Based on High School Category

Test			Mean Difference (I - J)	Std. Error	Sig.	95% Confidence Interval	
	(J) Family	(J) Family				Lower Bound	Upper Bound
Tukey HSD	International	Private	-.12	.33	.930	-.91	.67
		Public (government)	.35	.33	.539	-.43	1.13
	Private	International	.12	.33	.930	-.67	.91
		Public (government)	.47	.17	.016	.07	.87
	Public (government)	International	-.35	.33	.539	-1.13	.43
		Private	-.47	.17	.016	-.87	-.07

According to the respondents' data, a significant effect of the high school category ($p < .05$) was noticed on the availability of support and social media use. Specifically, students enrolled in international high schools got significantly better guidance on using EdTech compared to their public counterparts (Table 8). However, students learning in public schools showed a significant increase in social media use (Table 9), public counterparts (Table 8). However, students learning

in public schools showed a significant increase in social media use (Table 9). The following figure shows the most frequently used applications.

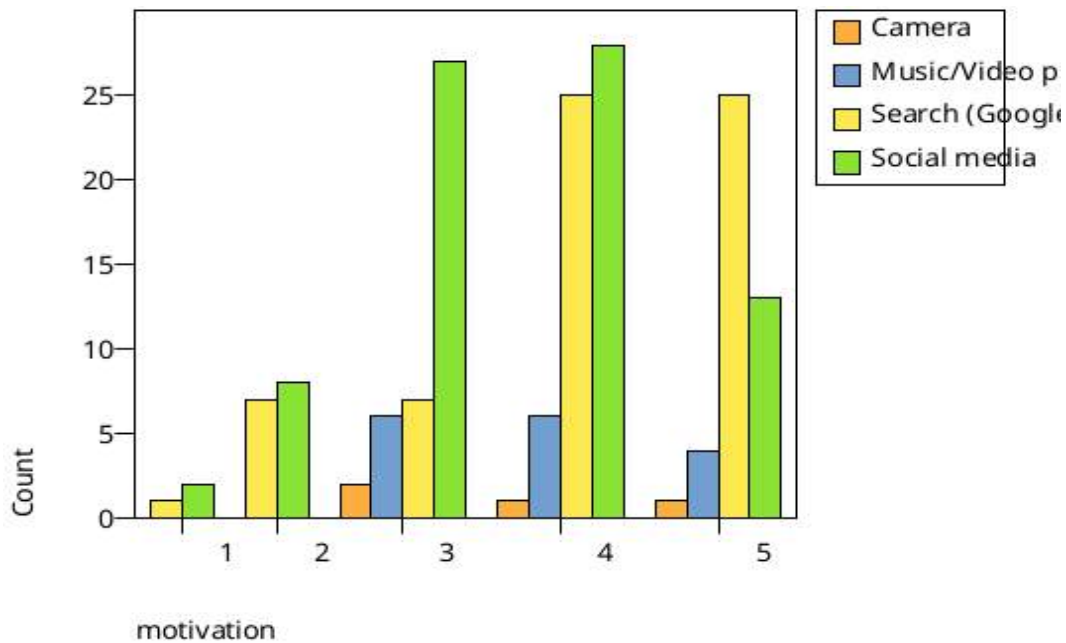


Fig 5. Most Frequently Used Application Category across Motivation Levels

Table 10. Guidance from Peers and Teachers on Effective Utilization of Educational

Frequency of the Guidance/Support	Frequency	Percent
Never	21	12.9%
Rarely	51	31.3%
Occasionally	45	27.6%
Frequently	33	20.2%
Very Frequently	13	8.0%
Total	163	100.0%

Technology

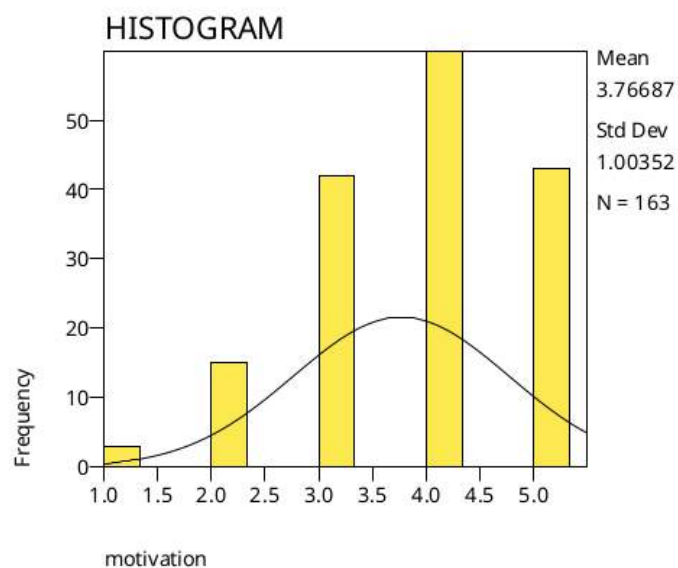


Fig 6: Motivation Distribution

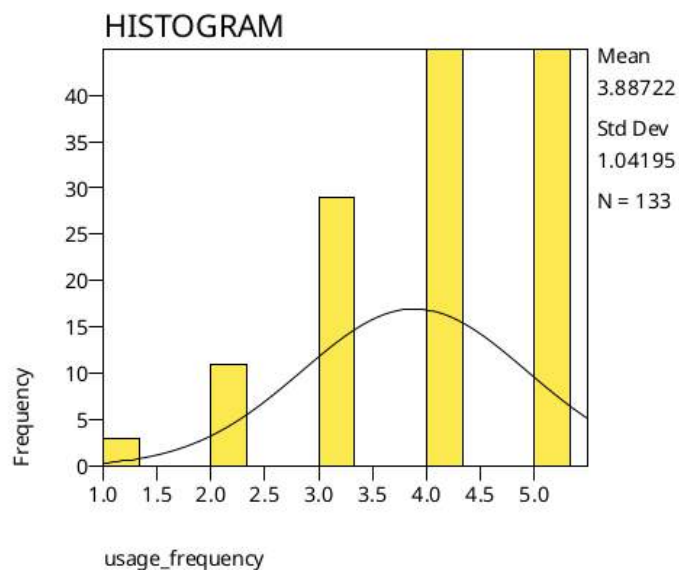
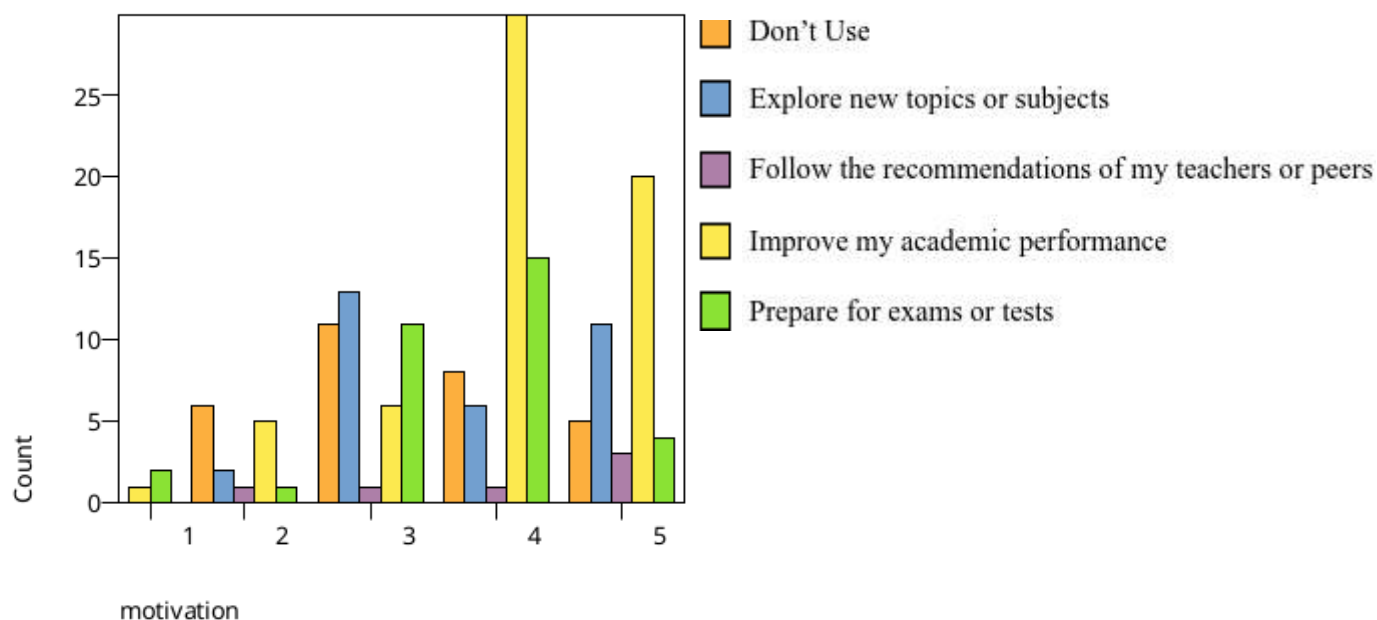


Fig 7: EdTech Usage Frequency Distribution

Figure 1 shows that motivation is most correlated (.33) with the frequency of using educational technologies (use_freq). When comparing the distribution of both variables on a histogram above, we find that respondents who reported more EdTech use also displayed an increased level of motivation (Fig 6 & 7). Regardless, most students either don't get guidance on the



proper utilization of educational technologies or get insufficient support, hindering the continuity of self-led learning (Table 10).

Fig 8. Purpose of Educational Technology Utilization across Motivational Levels

For the 81.6% of respondents who use educational technologies, their primary utility was to improve their academic performance, followed by exam preparation. However, the purpose of respondents' utilization varied based on their motivation levels (Fig 8). The utility of educational technologies, however, doesn't seem to influence their use. This is shown by a proportional use of educational technology irrespective of whether students think that high school lessons have practical utility or not (Fig 9). Additionally, there is a positive consensus among students who use EdTech in the quality and relevance of EdTech products (Table 11).

Table 11. Quality and Relevance of Educational Technologies

Quality and Relevance	Frequency	Percent
Neither relevant nor quality	4	3.0%
Somewhat irrelevant and low-quality	12	9.0%
Not sure	34	25.6%
Mostly relevant and decent - quality	40	30.1%
Very relevant and high-quality	43	32.3%
Total	133	100.0%

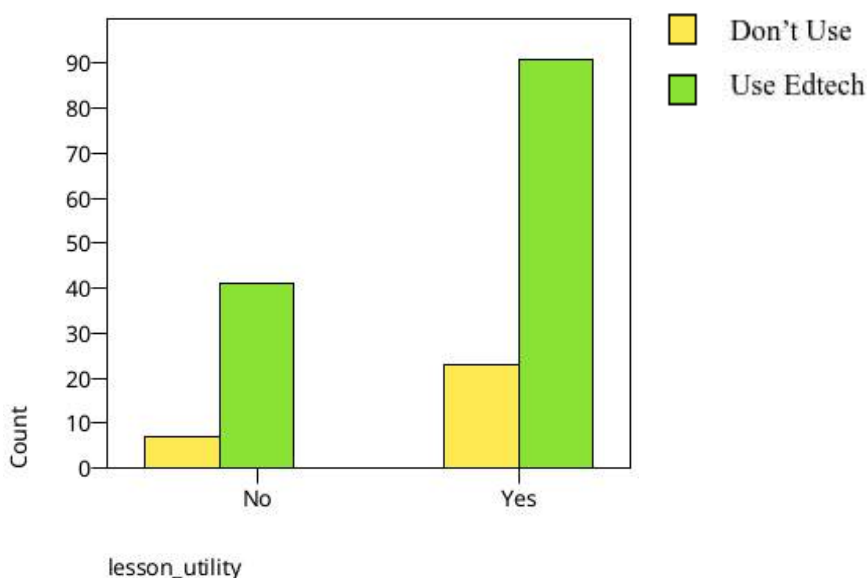


Fig 9. Frequency of Educational Technology Utilization Across Lesson Utility Score

3.3. Interview Data

The interview with the largest e-learning service provider, Kuraz Technologies, was conducted with the founder and CEO, Bisrategebriel Fisseha. Kuraz Technologies provides e-books and on-demand online video courses, and partners with the Ministry of Education, Ministry of Innovation, Ethio telecom, and Addis Ababa University to improve both the reach and quality of the lessons being delivered. The company serves various demographics from high school students to anyone who wants to upskill. The CEO followed by explaining how to apply a freemium model, where initial videos are free, and you pay if you want to progress, which has increased their adoption rates. Their prices, which are less than an average guidebook but offer more engaging content, retained their customers.

As with any new venture, the company had to manage several challenges during the initial stages. For instance, creating awareness of digital literacy, online payment adoption, copyright issues for the national exams, and lack of studies, like this one, for improvement. This made them rely on direct customer feedback and similar international company strategies for improvement and scaling.

Limiting our scope to high school students, the company saw a 200% enrollment increase upon the 3.3% national exam passing rate in 2022. The increased availability of devices, instant payment methods, and courses in 3 local languages have enabled wide utilization of educational technologies. Moreover, the company engaged existing customers via virtual coins when using their products which can be exchanged to purchase other courses, gift courses to others, cash out, invite customers as creators, and earn side-money.

4. Discussion

The online survey form had over 35,000 views, averaging 1,700 views per school channel. This showed how internet access wasn't an issue for the surveyed schools. However, only 5 in 1,000 or 163 respondents completed the survey. This low participation rate aligns with the results of Alemu, B.M., which showed that the majority of students and schools are still not taking full advantage of the available infrastructure. Thus, this study has identified the following factors to be influencing students' EdTech use that are beyond accessibility issues.

4.1. *Teachers' Utilization of Educational Technologies*

Since teachers have to be exemplary in the learning process, their actions highly influence that of their students. However, 18.4% of students who didn't use EdTech mostly attributed it to the lack of guidance and support from teachers (Table 3 & 5). When teachers use EdTech, they are more likely to guide their students to do the same (Fig 1). Regardless, we can't expect teachers to provide this guidance since most don't utilize them (Table 7). A related study, similarly, showed that this issue wasn't limited to Addis Ababa. Among 38.1% of the surveyed 415 teachers, the same study, illustrated that less than 10% of the teachers used educational technologies to collect learning materials/resources, prepare lesson presentations, or create their digital learning materials for students (Tesfaye Bati et al., 2020).

4.2. *Lack of Guidance on Effective Utilization of Educational Technologies*

The observed low utilization of modern platforms by teachers has made it difficult to provide effective guidance for students. This has led most students to use their access for chatting and socializing, watching movies, and listening to music (Almasi et al., 2017). Our data also supported this claim, since almost half of the respondents utilized their phones primarily to use social media (Table 3).

In a related study, students who already have access to these technologies showed significant correlations between low grades and reported time invested on social media and streaming platforms for other purposes than learning (Nina Bergdahl et al., 2018). Thus, reskilling teachers to integrate EdTech in the classroom would also influence students to do the same. Our interview with kuraz tech showed the availability of such classes at low cost and remote/offline access.

4.3. *Academic Motivation*

According to Jack & (2019) Higgins et al., EdTech use did increase motivation levels across 24 articles and 4,522 subjects. Similarly, students who reported higher academic motivation also used EdTech more frequently (Fig 6 & 7). Additionally, students scoring higher in academic motivation used EdTech to improve their academic performance (Fig 8). Thus, enabling students

to utilize educational technologies would lead to increased comprehension and a positive outlook toward their lessons.

However, it's necessary to make these technologies adhere to the local context for wider adoption. Given the diverse student groups that Ethiopia has and would have, in terms of linguistic and cultural pluralism; much work is needed for the selection and adaptation of educational software and contents and/or development of local ones adhering to standards and quality measures to ensure a right level of appropriateness" (Bati, Tesfaye et al., 2020). The largest EdTech company, Kuraz Technologies, has local language support and local instructors, making it easier to onboard new learners.

Similarly, there was a proportional use of social media across motivation levels (Fig 5). However, more academically motivated individuals might be engaging with educational social media channels, as shown by their frequent EdTech use (Fig 6 & 7).

4.3. *Lesson Utility*

A study on 269 secondary and post-secondary students in Liberia found that the use of e-learning in developing countries was significantly affected by their perceived usefulness (utility) and perceived ease of use (Vululleh P., 2018). However, our study found proportional use of educational technologies irrespective of whether they found their daily lessons "applicable" or not (Fig 9).

4.4. *High School Category*

Different high schools have varied resources and teaching staff. Although this may present widening inequalities, educational technology could be a very valuable tool to narrow learning and instructional inequalities (Daniel Rodriguez-Segura, 2021). The majority of the respondents were public school students, showing the equalizing potential of educational technology (Table 2). Similarly, there were not many significant advantages or disadvantages of enrolling in any of the three high school categories.

However, students learning in public schools showed a significant increase in social media use (Table 9) while international high school students got significantly better guidance on using EdTech compared to their public counterparts (Table 8). This might be due to better integration of technology in the curriculum.

5. **Conclusions**

Educational technologies are any application of information and communication technologies in an educational context. Relevant studies showed a positive influence on students' academic experience. This study aimed to investigate the influences on public, private, and international

high school students in Addis Ababa with access to Educational Technologies in utilizing them for bettering their academic experience. Specifically, identifying the current utilization of educational technologies, factors influencing that rate, and if a specific demographic was impacted significantly. The study employed an online survey abiding by ethical norms. Thirty random schools were surveyed, and the collected data were analyzed using descriptive, regression, and inferential statistics to address the objectives of the study. Several key insights were identified.

First, the online survey had several thousand views per school, showing high accessibility of both the internet and devices. This demonstrated the wide availability of infrastructure with a high potential to be used in educational technologies. Consistent with related literature, most students were utilizing this access primarily for social media. Social media had proportional use across students of various motivation levels, where more academically motivated individuals engaging with educational social media channels are shown by their frequent EdTech use.

Furthermore, most of the respondents used educational technologies. 18.4% of students who didn't use EdTech attributed it to a lack of guidance from their teachers. Numerous studies in Ethiopia, and similar countries, and also this study, showed that most teachers were not utilizing educational technologies. This is particularly hindering students from making the most out of their access. More importantly, this study validated the direct academic motivation increase that EdTech use brought. Interviews with the largest EdTech company CEO and another AI company showed ongoing efforts to provide such platforms as their positive effect is agreed upon.

Unexpectedly, our study found proportional use of educational technologies irrespective of whether they found their daily lessons “applicable” or not. This contradicted other studies, which found that the use of e-learning in developing countries was significantly affected by their perceived usefulness or utility. Similarly, there were not many significant advantages or disadvantages of enrolling in any of the three high school categories. For instance, students learning in public schools showed a significant increase in social media use while international high school students got significantly better guidance on using EdTech compared to their public counterparts.

6. Limitations of the Study

Due to the subjective nature of the intrinsic questions, this study wouldn't be able to fully control for circumstances that may create bias in respondents. Additionally, students who don't have digital tools and access to complete the online survey were not considered. Although this might make the results less inclusive, it ensured that all the responses were collected from students who have access to both technological infrastructures enabling them to access the survey. It also made sure that students had the digital literacy to complete and submit the questions. Finally, the study is limited to volunteer high schools in Addis Ababa, which did not allow generalization of the results to other high schools outside the city's context. Finally, the

request for interviews of EdTech companies and private and public stakeholders mostly went unanswered, which made kuraz technologies the only outside data source.

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Declaration of Conflicting Interests and Ethics

The author declares no conflict of interest.

References

- Alemu, B.M. (2017). *Transforming Educational Practices of Ethiopia into Development and the Knowledge Society through Information and Communication Technology*. African Educational Research Journal, 5, 1-17. <https://www.netjournals.org/pdf/AERJ/2017/1/16-050.pdf>
- Almasi, Mustapha & Machumu, Haruni & Zhu, Chang. (2017). *Internet use among secondary school students and its effects on their learning*. <https://doi.org/10.21125/inted.2017.0680>
- Anteneh F. Yimmam and Biniyam F. Yimmam (2023). *Academic Motivation of High School Students at Dr. Haddis Alemayehu Secondary School*. <https://doi.org/10.14293/PR2199.000248.v2>
- Bati, Tesfaye & Wasyhun, Anteneh. (2020). *Evaluating integrated use of information technologies in secondary schools of Ethiopia using design-reality gap analysis: A school-level study*. The Electronic Journal of Information Systems in Developing Countries. <http://dx.doi.org/10.1002/isd2.12148>
- Chaqfeh, M., Asim, R., AlShebli, B., Zaffar, M. F., Rahwan, T., & Zaki, Y. (2023). *Towards a World Wide Web without digital inequality*. Proceedings of the National Academy of Sciences, 120(3), e2212649120. <https://doi.org/10.1073/pnas.2212649120>
- Daniel Rodriguez-Segura (2021). *EdTech in developing countries: a review of the evidence*. <https://doi.org/10.1093/wbro/lkab011>
- Education Statistics Annual Abstract (2021/22). <https://moe.gov.et/Publication>
- Higgins, K., Huscroft-D'Angelo, J., & Crawford, L. (2019). *Effects of Technology in Mathematics on Achievement, Motivation, and Attitude: A Meta-Analysis*. Journal of Educational Computing Research, 57(2), 283–319. <https://doi.org/10.1177/0735633117748416>
- Icog-ACC (2023). *Schools Workshop*. [Icogacc.com. https://icogacc.com/impact/public+workshops](https://icogacc.com/impact/public+workshops)
- Jack, C. & Higgins, S. (2019). *Embedding educational technologies in early years education*. *Research in Learning Technology*, 27(2033), 1-17. <http://dx.doi.org/10.25304/rlt.v27.2033>
- Muralidharan, Karthik, Abhijeet Singh, and Alejandro J. Ganimian. (2019). *Disrupting Education? Experimental Evidence on Technology-Aided Instruction in India*. American Economic Review, 109 (4): 1426-60. <https://doi.org/10.1257/aer.20171112>
- Nina Bergdahl, Uno Fors, Patrik Hernwall, and Ola Knutsson (2018). *The Use of Learning and Student Engagement in Learning Activities*. <https://doi.org/10.18261/issn.1891-943x-2018-02-04>

- Vallerand, R.J., Blais, M.R., Brière, N.M., & Pelletier, L.G. (1989). *Construction et validation de l'échelle de Motivation en Éducation (EME)*. *Revue canadienne des sciences du comportement*, 21, 323-349. https://www.lrcs.uqam.ca/wp-content/uploads/2017/08/HS-emes_en.pdf
- Vululleh, P. (2018). *Determinants of students' e-learning acceptance in developing countries: An approach based on Structural Equation Modeling (SEM)*. *International Journal of Education and Development using ICT*, 14, 141-151. <https://files.eric.ed.gov/fulltext/EJ1178350.pdf>

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