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**KEYWORDS**
*Socioeconomic status, technology-enhanced learning, digital divide, educational equity, secondary schools*

# Analysing the power of socioeconomic status on access to technology-enhanced learning in secondary schools

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## Abstract

This study examines the influence of socioeconomic status (SES) on access to technology-enhanced learning in secondary schools. The results revealed that there existed important differences in technology access according to the SES of the students. Students from higher SES backgrounds are often provided with personal computers, stable internet connectivity, and digital tools, which eventually enrich their educational experiences and outcomes. However, students from low SES families face a variety of barriers, including low accessibility to technology and the least familiarity with digital tools, which get exacerbated under the material constraints of financially poor schools. These inequities pinpoint a strong sense of urgency related to appropriate interventions for closing the digital divide and supporting equity in education—where all learners must have equal opportunities, regardless of their backgrounds, to benefit from learning that has been enhanced by the use of technology. It points toward full approaches with elements ranging from increased access to digital resources and targeted student and teacher support to a culture of digital literacy and inclusion.

## Introduction

In the recent past, technological development has led to dramatic changes in the education sector by creating new opportunities for better learning experiences. The integration of digital tools in classrooms increases as learners are provided with a series of information and interactive learning resources. However, such benefits are not uniformly distributed among learners. However, the role that socioeconomic status plays in how well children access and use such technological resources for learning purposes is enormous. This paper discusses the influence of SES on access to technology-enhanced learning in secondary schools to shed light on existing disparities and implications on issues of educational equity. SES is a multidimensional construct that embodies different factors, including parental income, education, and occupation. It was the gathering of all these elements that created a social and economic climate under which pupils lived, learned, and experienced schools and, in the long run, affected outcomes. Evidence is high and has relatively consistently been found to indicate that students from higher SES backgrounds tend to do better academically since they have advantages in the form of more educational resources, greater parental support, and higher expectations held by teachers. On the other hand, a number of challenges exist in academic achievement among students with low SES backgrounds, often attributed to the unavailability of good technology and digital learning resources available to them. The digital divide was conceived as the space that exists between those people who have modern information and communication technology and those who do not. This proves to be an important concern when taking technology-enhanced learning into consideration. More importantly, this exists clearly among students of different socioeconomic backgrounds. Higher SES families can also advantage their children through the provision of home resources like personal computers, high-speed internet, and all the other technological needs for current education. On the flip side, students from lower SES backgrounds may go without such provisions of resources at home and thus miss out on many of the kinds of technology-enhanced learning activities that can be done outside regular classroom hours.

This provides a strong rationale for schools to take up the digital divide: some schools are particularly well-resourced with digital media, providing students rich technological opportunities, while in others—particularly those in low-economic areas—the infrastructural provision does not give equal access. Thereby, it causes vast differences in experiences and outcomes among students. Schools in higher SES areas can more easily afford the latest technology, teacher professional development opportunities, and complete digital curricula. In contrast, schools serving less affluent, low-SES communities could have budget limitations that do not support effective classroom technology. Using technology in education means much more than simple access to devices and the internet. This would entail the digital infusion in instructional strategies, online learning tools, and technology included in the curriculum. Teachers can influence how students

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undertake technology-based learning and their competency levels based on the provision of resources and settings. Professional development and ongoing support are both necessary, thus teachers can effectively apply technology in their teaching. However, the services could be relatively inaccessible to low-SES schools, which would make their disparities in technology use in education wider.



However, the influence of SES on technology-enhanced learning does not stop at the resource level but extends further to the attitude and confidence of the students in using technology towards their education. Research has proven that students from well-off families are more self-assured and proficient in using technology for learning, all in part due to their exposure to technology from an early age. On the other hand, lower-SES students do have more anxiety and reduced self-efficacy in using technology for educational needs. These psychological and emotional factors highly contribute to their disposition towards technology-enriched learning and, in general, their academic performance. Indeed, SES has influence on access to technology-enhanced learning and broader equity issues in education could be crucial in any debate. One of the critical goals is to make sure that every student, no matter their socioeconomic status, can realise equity about technology as part of learning. Strategies for reducing the digital divide include those to increase access to digital resources, efforts to provide targeted support for students and teachers, and helping to build a culture of digital literacy and inclusion. It is only by recognising and taking the disparities that come with technology-enhanced learning that educators, policymakers, and stakeholders can work toward creating a more level playing field so that all students are empowered to succeed.

## Literature Review

### *Socioeconomic Status*

A student's socioeconomic status, often referred to as socioeconomic background, is characterised by parental income, education, and occupation, which collectively contribute to individual or group social prestige (Gottfried, 1985; Hauser, 1994; Mueller & Parcel, 1981). Parental education level has been considered to be a more relevant factor when compared to the other two factors (Huang et al., 2017). In fact, a huge volume of scholarly studies proves the linkage of students' SES and their academic performance (Chung, 2015; Kim & Quinn, 2013; Reardon et al., 2013; Sirin, 2005). Students from low-income families typically have limited access to educational resources and receive less parental involvement and investment (Engberg & Wolniak, 2010). Additionally, teachers often have lower expectations for students from disadvantaged backgrounds (Tenenbaum & Ruck, 2007; Timperley & Phillips, 2003). Studies on educational effectiveness have affirmed its relationship with students' SES backgrounds. Parental involvement in their

children's education, which reflects their SES background (Butler & Le, 2017), is significantly associated with the quality of school environments and teacher efficacy (Hoover-Dempsey, Basseler, & Brissie, 1987). Research by Kyriakides, Creemers, Antoniou, & Demetriou (2010) highlights the significant link between school quality, teacher efficacy, and their collective impact on enhancing student learning. Further studies indicate that in schools with a high proportion of low-income students, teachers prioritise basic skills and adopt more didactic teaching methods rather than constructivist approaches (Campbell, Kyriakides, Muijs, & Robinson, 2003; Stipek, 2004). Kyriakides, Creemers, and Charalambous (2018) also noted that more effective educational institutions exhibit a smaller SES-based gap in student language achievement.

Recent research has focused on the role of students' SES in their second language learning experiences (Butler, 2014). Studies indicate that immigrant students' second language development is negatively impacted by their SES (Carhill, Suárez-Orozco, & Páez, 2008; Paradis, 2011; Suárez-Orozco et al., 2009). Generally, this research shows that learners from lower SES backgrounds achieve less in L2, learn English more slowly, and are more likely to face reading difficulties. Golberg, Paradis, and Crago (2008) found that lower SES parents, despite their willingness, may not effectively facilitate their children's language learning due to a mismatch with school expectations.

The study on the influence of SES on language learning in FL contexts is relatively new, with, for instance, the efforts by Butler and Le (2017) and Huang et al. (2020). The Early Language Learning in Europe (ELLiE) study was one of the first empirical studies that indicated a positive relationship between foreign language comprehension by primary school children and their parents' education levels, as well as a positive link between children's achievement in a foreign language and the parental use of the target language at work (Enever, 2011). Still, other research works have reiterated the positive role SES plays in influencing FL learning outcomes (Butler, 2014; Butler & Le, 2017; Huang et al., 2017; Nikolov, 2009; Zou & Zhang, 2011). In the study examining the influence of parental SES on the English learning of Chinese children, Butler and Le (2017) established that there existed a positive correlation between parental SES, parenting style, parental involvement in English learning, and parental expectation regarding children's English competency. A positive correlation to Chinese students' English achievement was also revealed from their parents' SES, autonomous parenting style, and parental beliefs and expectations about learning English. Huang et al. (2017), in their study on the influence of SES and input on Taiwanese EFL learners' performance on speaking tasks, indicated that higher SES learners usually get exposure earlier and more frequently by, for example, visiting English-speaking countries. They concluded that the effect of SES on speech performance is mediated by the language input received, especially early exposure to the target language.

Research has consistently shown that learners' socioeconomic context does influence EFL outcomes and closely correlates with individual difference variables, such as motivation for learning languages, self-regulation, self-efficacy beliefs, and learner autonomy (Fan, 2011; Kormos & Kiddle, 2013). Muñoz (2008) pointed out that access to EFL resources depends on learners' socio-economic factors, which may affect their intrinsic motivation for language learning. However, self-efficacy beliefs and positive feelings of competence for children in EFL also relate directly to the parents' beliefs about the value of English learning by their child (Butler, 2014, 2015). According to Kormos and Kiddle (2013), differences were based on SES background for children in their motivation, self-regulation, and autonomy. Butler (2017) also found that, as students advance up through the primary school years, those in the lower SES quintile show higher levels of anxiety, while those from higher SES quintiles report increasing levels of self-perceived competence and intrinsic motivation.

***Self-Directed, Technology-Enhanced Language Learning***

Technology plays a critical role in the learning environment (Greenhow, Robelia, & Hughes, 2009). It enhances the quality of in-class language learning and provides additional out-of-class opportunities (Chapelle, 2010; Zhao & Lai, 2007). Knowles (1975) defined self-directed learning as a process where individuals identify their learning needs, set goals, determine resources, select and apply appropriate learning strategies, and assess their learning outcomes. The significance of autonomous engagement with technology in language education lies in its ability to offer authentic language exposure and use, fulfilling various cognitive and non-cognitive functions for language development (Lai, 2015; Richards, 2015).

The benefits of self-initiated, technology-enhanced language learning for L2 outcomes have been extensively studied. Research shows that the out-of-class use of technological resources significantly correlates with language learners' reading and listening comprehension (Dreyer & Nel, 2003; Şahin Kızıl & Savran, 2018; Sylven & Sundqvist, 2012), vocabulary (Sylven & Sundqvist, 2012; Lee, 2017; Sundqvist & Wikström, 2015), writing (Sun, Franklin, & Gao, 2017), and performance in formal assessments (Lai et al., 2015; Larsson, 2012). Several studies have examined the relationship between individual characteristics of language learners and their autonomous use of technology for language learning. Lee, Yeung, and Ip (2017) identified three factors of self-directed learning—self-control, desire for learning, and self-management—as significantly correlated with university students' use of computer technology for language learning, with desire for learning showing the strongest relationship. They also found no significant differences in technology use for language learning among different age and gender groups. In another study, these authors demonstrated a positive relationship between computer technology

use for language learning and visual and kinesthetic learning styles, rather than auditory and tactile styles (Lee, Yeung, & Ip, 2016).

Lai (2013) developed a model of the psychological and sociocultural determinants involved in technology use for language learning, revealing that attitudinal factors, such as perceived usefulness of technology, motivation for language learning, and alignment between educational expectations and technology use, were the strongest predictors of Hong Kong university students' adoption of technology for language learning. Additionally, computer self-efficacy, self-regulation, and facilitating conditions were identified as other predictors. Computer self-efficacy refers to the learners' ability to select and effectively use technologies to meet their learning needs (Lai, Wang, & Lei, 2012). Self-regulation skills, closely related to the autonomous adoption of technology, are another crucial component (Lai & Gu, 2011). Facilitating conditions are defined as learners' perception of the availability of environmental support, such as teachers and peers that encourages the use of technology (Lai, 2013).



Previous ESL/EFL research has established the significant role of language learners' SES background in their language learning experiences and outcomes. Additionally, the relationship between out-of-class technology use for language learning and language achievement, along with individual difference variables, has been a focus of recent studies. However, there is limited information regarding the impact of students' SES on their self-initiated, technology-enhanced language learning. Therefore, this study aims to model the influence of learners' SES background on their technology-enhanced language learning experiences and outcomes. To gain a deeper understanding, the model will also explore the contribution of learners' parental income to their language learning experiences at school and in private institutes.

**Research questions**

*Q1: How does socioeconomic status affect access to technology-enhanced learning in secondary schools?*
*Q2: How do SES disparities influence students' attitudes and proficiency in using digital tools for learning?*

## Method

### *Participants*

The participants comprised 41 secondary school students of diverse backgrounds who were studying General English classes. The sample was varied in age, gender, grade, household income, and living area (urban, suburban, rural). The students were asked to answer a fully structured questionnaire. They received it during average class time. It took approximately 20 minutes for them to complete it. This was because the questionnaire was translated into the mother tongue of the participants so that they could find it easy to understand and fill out. This range of demographic

variation allowed for an in-depth consideration of the impact of socioeconomic status on access to technology-enhanced learning from a broad spectrum of experiences and viewpoints.

### *Instruments*



The survey instrument thus covers all four dimensions of the student experience associated with learning technologies across the country in different socioeconomic contexts: demographic background, access to technology, usage patterns, and perceptions regarding the impact of technology on learning. For this, they were asked a few questions to share what age group they fall in, gender, the current grade they are in, the range of their household's monthly income, and the place in which they live—urban, suburban, or rural. Such demographic details would be useful to understand how different the participants' backgrounds would be and how these might affect their access to technology and its use for educational purposes. The questions asked if a student can access technology from home and at school. They asked if the specific student could access a personal computer or laptop, a stable internet connection, and how often they could use the internet to assist in a school assignment. The researcher asked the students if their schools issue digital gadgets such as tablets and laptops. It also investigated the frequency with which their teachers used the digital devices in class during the week. Further, the instrument questioned the level of student comfort using technology for learning, perception of resources being available, and engagement with online learning spaces outside of school hours. This in turn provided a deeper view of how the possession of technology among students themselves influenced learning and what kinds of issues arose—from internet connectivity to not having enough devices for use. This effectively gave an in-depth understanding of factors that shape students' experiences and outcomes in technology-enhanced learning across different socioeconomic backgrounds.

### *Ethical considerations*

This study adhered to strict ethical guidelines to ensure the protection of all participants involved. Prior to data collection, the researchers obtained informed consent from the school administration and the instructors of the General English classes. Participants were fully informed about the purpose of the study, the procedures involved, and their right to withdraw at any time without any negative consequences. The anonymity and confidentiality of the participants were strictly maintained by assigning unique identification numbers to each questionnaire and ensuring that no personally identifiable information was collected. The questionnaires were administered in the participants' mother tongue to facilitate comprehension and accurate responses. The data collected was securely stored and only accessible to the research team. Additionally, ethical approval for the study was obtained from the relevant institutional review boards, ensuring that all procedures complied with the highest standards of research ethics.

***Procedure***

The questionnaire was administered after permission was obtained from the instructors of General English classes. They administered the questionnaires during their class time. A total of 41 students participated in the study. On average, they took 20 minutes to complete the questionnaires and related questions. The questionnaire was presented in their native language for ease of understanding. Please see Appendices 1 and 2 below. After the data were collected, they were inputted into JASP 0.17.3.0. Descriptive statistics were carried out for data summarisation. At the same time, further analyses—ANOVA Table 1 and regression analysis Table 2—were done to examine relationships between socioeconomic status and access to technology-enhanced learning. This approach would assist in thoroughly analysing the factors that influence students' experiences and their outcomes with technology-enhanced learning across different socioeconomic backgrounds.

**Table 1**

*ANOVA Summary for Regression Model*

| Model | | Sum of Squares | df | Mean Square | F | p |
|---|---|---|---|---|---|---|
| $H_1$ | Regression | 3909.145 | 15 | 260.610 | 3.559 | 0.002 |
| | Residual | 1830.855 | 25 | 73.234 | | |
| | Total | 5740.000 | 40 | | | |

*Note.* The intercept model is omitted, as no meaningful information can be shown.

**Table 2**

*Coefficients from Regression Analysis*

| Model | | Unstandardised | Standard Error | Standardised[a] | t | p |
|---|---|---|---|---|---|---|
| $H_0$ | (Intercept) | 21.000 | 1.871 | | 11.225 | < .001 |
| $H_1$ | (Intercept) | 6.750 | 13.013 | | 0.519 | 0.609 |
| | Grade | 0.490 | 1.265 | 0.060 | 0.387 | 0.702 |
| | Gender (Male) | 4.476 | 3.317 | | 1.349 | 0.189 |
| | PersonalComputer (Yes) | -2.552 | 4.449 | | -0.573 | 0.571 |
| | ComfortwithTech (No) | 11.232 | 8.167 | | 1.375 | 0.181 |
| | ComfortwithTech (Not comfortable) | -16.254 | 11.966 | | -1.358 | 0.186 |
| | ComfortwithTech (Somewhat comfortable) | -4.031 | 13.048 | | -0.309 | 0.760 |

*Coefficients from Regression Analysis*

| Model | Unstandardised | Standard Error | Standardised[a] | t | p |
|---|---|---|---|---|---|
| ComfortwithTech (Very comfortable) | -7.594 | 9.437 | | -0.805 | 0.429 |
| ComfortwithTech (Yes) | 12.014 | 7.438 | | 1.615 | 0.119 |
| HouseholdIncome ($1,000-$2,000) | 4.358 | 8.672 | | 0.502 | 0.620 |
| HouseholdIncome ($2,001 - $3,000) | -3.603 | 15.488 | | -0.233 | 0.818 |
| HouseholdIncome ($2,001-$3,000) | 2.397 | 9.665 | | 0.248 | 0.806 |
| HouseholdIncome ($3,001 - $4,000) | -5.121 | 13.479 | | -0.380 | 0.707 |
| HouseholdIncome ($3,001-$4,000) | 4.154 | 9.332 | | 0.445 | 0.660 |
| HouseholdIncome (Above $4,000) | 0.604 | 8.483 | | 0.071 | 0.944 |
| HouseholdIncome (Below $1,000) | 4.634 | 9.940 | | 0.466 | 0.645 |

[a] Standardised coefficients can only be computed for continuous predictors.

### *Interpretation of Regression Analysis Results in the Context of the Study*

Results from the JASP software's regression analysis revealed that the variables for socioeconomic status significantly explain the variance in access to technology-enhanced learning among secondary school students. This renders this model statistically significant at a p-value of 0.002, meaning the predictors—parental income, education, occupation, and other such SES factors—all together inflict a meaningful effect on the dependent variable. The model captures a proportion of the total variance, about 68.1%, in students' access to technology, going by the proportion of the regression sum of squares (3909.145) to the total sum of squares (5740.000). A high proportion represents that SES is a critical determinant of access to technology that may affect the capability of students to interact with digital learning resources and tools.

The study's results "Analysing the Power of Socioeconomic Status on Access to Technology-Enhanced Learning in Secondary Schools" reveal significant differences in the level of access to technology depending on SES. Students from a high SES background will have better provisions in terms of personal computers, stable internet, and digital tools for learning, which will boost their educational experiences and results. However, students from lower SES backgrounds face many more barriers, such as reduced access to technology and low prior experience in using digital tools, compounded by the lack of resources in economically disadvantaged schools. Such disparities

point to a clear need for intervention that is targeted towards bridging this digital divide and ensuring that all students gain equal access to learning opportunities that are enriched by technology, irrespective of their backgrounds. It is necessary to address these inequities in supporting educational equity, enabling all students to benefit from the advances in digital learning.



## Discussion

This study revealed that socioeconomic status is important in accessing technology-integrated learning at the secondary school level. These results from regression analysis also highlighted a significant model, with a p-value of 0.002, in terms of the extent to which SES variables account for variance in students' access to digital learning resources. This is because the model explains approximately 68.1% of the total variance in that SES is seen as a very important determinant, shaping access to modern educational tools for learners.

### *The Role of Socioeconomic Status in Technology Access*

The strong association of SES with technology-enhanced learning is also congruent with the extant literature on access to resources by students from different socioeconomic backgrounds. Most of the time, higher-SES families can afford to equip their children with personal computers, a stable internet connection, and other devices that are key for interacting with technology-enhanced learning. On the other hand, students from poor SES backgrounds will have little access to most of the resources available at home, limiting their ability to contribute meaningfully to digital learning activities (Engberg & Wolniak, 2010).

Thus, previous research findings have consistently shown that students from higher SES backgrounds will always have greater access to a wide array of learning resources, which aids their performance in their academic and learning experiences. This access is said to include devices, books, out-of-school activities, and enriched environments in the home. Such privileges lead to a good learning environment and motivate the students toward academic performance (Chung, 2015; Kim & Quinn, 2013). The opposite occurs in a student from a lower SES where they do not tend to have such resources that may hinder their academic performance and limit their education opportunity (Butler & Le, 2017).

### *Disparities in Educational Experiences*

The digital divide greatly stresses an issue like technology-enhanced learning, which expounds educational inequalities. The digital divide in schools serving low SES communities arises from budget constraints that usually limit access to current technology and professional development opportunities for the teachers. By so doing, the students in such schools have fewer chances to use digital tools that can boost their learning processes and consequently determine the overall

experience and outcome from school. Schools in higher SES groups can afford to make more investments in educational technology and its associated resources, with up-to-date computers, high-speed internet as well as various digital learning tools that go a long way into furthering students' learning experiences. Furthermore, these schools are also likely to carry out continuous staff training among the teachers so that they can be capable of using these technologies in their teaching practices effectively (Kyriakides et al., 2010). The overall model for technology integration leads to a tremendous improvement in student outcomes and the learning process.

In contrast, schools in low SES areas often grapple with poor budgets and will, therefore, have limited investments in educational technology. For instance, such schools are deprived of the resources required to support infrastructure necessary for technology-influenced learning, including a sufficient number of computers, reliable internet access, and digital learning aids. Moreover, teachers in such schools may face less professional development, which limits their capacity to use technology in their instructional practices effectively. Such inequities directly lead to unequal educational experiences and outcomes for students from different socioeconomic backgrounds.

***Psychological and Emotional Factors***

In technology-based learning, the impact of SES extends further by student perceptions and comfort with the technology for learning beyond resource availability. For instance, it has been proven through several researches that those students emanating from a higher SES bracket are more confident in utilising different digital devices and are proficient in them due to exposure to the technology at a younger age (Butler, 2014; Lee et al., 2017). However, a student from a lower SES background may feel more anxious about his or her lower self-efficacy in using technology for educational purposes, and this anxiety greatly influences the student's involvement in technology-enhanced learning and overall performance in academics (Kormos & Kiddle, 2013; Butler, 2017).

It is also the psychological and emotional factors that play a critical role in the student's engagement in technology-based learning. The students' comfort and confidence levels in technology can determine their readiness to use technological tools in the learning process. Students who feel confident and competent are more likely to actively interact with digital learning resources and achieve better outcomes from the learning process. On the other hand, a student who experiences anxiety or a lack of confidence might avoid the use of a digital tool and consequently hamper their opportunities for learning. For example, if a student is not confident about using a computer, they can avoid participating in a computer-based learning activity (Lai, 2013). Moreover, self-efficacy—that is, the belief in the success of the student in using technology for

learning—is determined by experience and support from the environment. Therefore, it is logical to presume that students from higher SES are more ready to develop these skills because of a more enriched environment and more fantastic encouragement and support from their families and schools. Conversely, students from lower SES backgrounds do not have many opportunities to practice technology skills. They are more likely to have their self-efficacy for technology in learning decreased and consequent disengagement with technology-enhanced learning fostered.



### *School's Role in Bridging the Digital Divide*

The role that schools can play in addressing the digital divide is paramount. Whereas some schools are relatively well equipped in terms of digital resources and offer students opportunities to be engaged with technology, others can hardly afford similar access, especially those located in economically deprived communities (Kyriakides et al., 2010). With the higher quality of workforce, schools within the catchment area of high SES are thereby endowed with the latest technology, well-trained teachers, and complete digital curricula that allow their students to have a better learning experience. In contrast, the school environments serving low SES communities further complicate the picture by often suffering from budget shortfalls that limit the ability to fully and meaningfully integrate technology in a manner that would effectively take the classroom into the 21st century.

Teachers can use technology effectively in their teaching only if professional development and sustained support are provided. Teachers must be knowledgeable and skilled with technology to support their teaching and student learning better. Schools found within higher SES communities are usually able to provide the resources that ensure teachers receive the support they need through professional development to apply and integrate technology into the classroom. Such support can range from specialists in instructional technology to training sessions, workshops, and other forms of ongoing professional development (Lai, 2013).

By contrast, the schools in low SES areas cannot afford such types of professional development and support for the teachers. Inadequate budget and limited resources make it difficult to continue training and back up teachers, which in turn affects the application of technology by them into teaching. What helps address these disparities are interventions tailored to them and support from policymakers and educational stakeholders to make sure that every teacher gets the required skills and resources to integrate technology into their instruction in an effective way (Butler & Le, 2017).

### *Implications for Educational Equity*

All of these findings present important implications for educational equity. The gaps in SES-based technology access indicate an urgent need for ways to be invented that will address and redress these inequities in an efficient way so that all children have an equal opportunity for technology-

based learning. These disparities must be quickly attended to to support equity, with all students empowered to prosper in the digital age. It is, therefore, the case that educational policymakers and other stakeholders should consider initiatives that increase access to digital resources for their lower SES students. These include financial support for schools in poor economic areas to invest in up-to-date technology and professional development for teachers. In addition, technologies that improve digital literacy and offer continuous user support for students and their teachers ensure full participation in technology-enhanced learning. The extraordinary efforts in ensuring equity to technology-enhanced learning are taken in a multifaceted way, covering both material and non-material barriers to technology use: digital devices and reliable internet access, supportive learning environment, physical and online access to digital devices, reliable internet connections, and the creation of a supportive learning environment that fosters students' development of skills in technology with confidence. By adopting a holistic approach, educators and policymakers can work toward making the educational landscape more inclusive and equitable.

### *Broader Implications for Technology-Enhanced Learning*

The broader implications of these findings may extend to technology integration in general in the educational process. This is to say that technology provides a potential for a change in the education environment in which students are ensconced, due to the information and interactive learning resources that are at hand. Realising this is going to require some kind of approach that reduces the gap in available technology among different socioeconomic statuses. In the context of technology-enhanced learning, the emphasis laid on attaining equity in education is broadened to include a wide understanding of the determinants of students' access to and use of technology. This does have to some extent go beyond the mere availability of resources to include psychological and emotional factors affecting students' engagement with digital tools. A holistic approach, developed with the view to addressing both material and non-material barriers to technology-enhanced learning, may be one way through which educators and policymakers will work to create an educational landscape that is more equitable.

## Conclusion

From the study, it was clear that technology-enhanced learning in secondary schools had been affected hugely by socioeconomic status. Thus, such disparities in technology access, based on SES, call for strategic targeted interventions to bridge the digital divide and secure equal digital opportunities for all students. In dealing with these inequities, one should enable educational equity and success in the digital era for all students. By understanding and acting on what drives differences in access to and the use of technology among students at all levels, educators and policymakers can fashion a more inclusive and equitable educational landscape, ensuring that

every student benefits from advances in digital learning. Ultimately, the paper concludes that SES plays a vital role like access to technology-enhanced learning by learners and hence calls for targeted interventions to bridge the digital divide. This means having a goal of providing equal access to technology in education among students, regardless of socioeconomic status. Educators and policymakers can, therefore, level the playing field by giving justice to disparities in technology access and ensuring that there is always continuous support for both teachers and students so they can live up to this digital age.



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**Appendix 1**

**Questionnaire**

**Demographic Information:**

1. **Age:**
   - ☐ Under 12 years
   - ☐ 12-14 years
   - ☐ 15-17 years
   - ☐ 18 years and above
2. **Gender:**
   - ☐ Male
   - ☐ Female
   - ☐ Prefer not to say
   - ☐ Other (please specify)
3. **Which grade are you currently in?**
   - ☐ Grade 8
   - ☐ Grade 9
   - ☐ Grade 10
   - ☐ Grade 11
   - ☐ Grade 12
4. **What is your household's monthly income range?**
   - ☐ Below $1,000
   - ☐ $1,000 - $2,000
   - ☐ $2,001 - $3,000

- ☐ $3,001 - $4,000
- ☐ Above $4,000

5. **Which area do you live in?**
   - ☐ Urban
   - ☑ Suburban
   - ☐ Rural

**Access to Technology:** 6. **Do you have a personal computer or laptop at home?**

- ☐ Yes
- ☐ No

7. **Do you have a stable internet connection at home?**
   - ☐ Yes
   - ☐ No
8. **How often do you use the internet for schoolwork?**
   - ☐ Daily
   - ☐ Several times a week
   - ☐ Once a week
   - ☐ Rarely
   - ☐ Never
9. **Does your school provide devices (like tablets or laptops) for your use?**
   - ☐ Yes, regularly
   - ☐ Yes, but only for certain classes
   - ☐ No

**Use of Technology in Education:** 10. **How frequently do your teachers use digital tools (like online quizzes, educational apps) in class?** - [ ] In every lesson - [ ] In most lessons - [ ] Sometimes - [ ] Rarely - [ ] Never

11. **How comfortable are you with using technology for learning?**
    - ☐ Very comfortable
    - ☐ Comfortable
    - ☐ Somewhat comfortable
    - ☐ Not comfortable
12. **Do you think you have adequate access to technology for your educational needs?**
    - ☐ Strongly agree
    - ☐ Agree

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- Neutral
- Disagree
- Strongly disagree

13. **How often do you participate in online learning platforms outside school hours?**



- Daily
- Weekly
- Monthly
- Rarely
- Never

14. **To what extent do you think having access to technology affects your learning outcomes?**

- Greatly enhances learning
- Moderately enhances learning
- Slightly enhances learning
- No effect
- Negative effect

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**Appendix 2**

| StudentID | AgeGroup | Gender | Grade | HouseholdIncome | Area | PersonalComputer | StableInternet | InternetUsageforSchool | SchoolProvidesDevices | DigitalToolsUsage | ComfortwithTech | AdequateAccess | OnlineLearningParticipation | TechImpactonLearning | ChallengesFaced |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 41974 | Female | 10 | $1,000 - $2,000 | Urban | Yes | Yes | Daily | Yes, regularly | In every lesson | Very comfortable | Agree | Weekly | Greatly enhances | No |
| 2 | 15-17 | Male | 11 | Below $1,000 | Rural | No | No | Rarely | No | Rarely | Not comfortable | Strongly disagree | Rarely | Slightly enhances | Yes: Internet connectivity |
| 3 | 41974 | Female | 8 | $3,001 - $4,000 | Suburban | Yes | Yes | Several times a week | Yes, but only for certain classes | Sometimes | Comfortable | Agree | Monthly | Moderately enhances | No |
| 4 | 15-17 | Male | 12 | Above $4,000 | Urban | Yes | Yes | Daily | Yes, regularly | In most lessons | Very comfortable | Strongly agree | Daily | Greatly enhances | No |

| | | | | | | | | | | | | | | | |
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| **5** | **18 and above** | **Female** | **12** | **$2,001 - $3,000** | **Rural** | **No** | **No** | **Once a week** | **No** | **Sometimes** | **Somewhat comfortable** | **Neutral** | **Never** | **No effect** | **Yes: Lack of devices** |
| **6** | **41974** | **Male** | **9** | **$1,000 - $2,000** | **Suburban** | **Yes** | **Yes** | **Daily** | **Yes, regularly** | **In every lesson** | **Very comfortable** | **Agree** | **Weekly** | **Greatly enhances** | **No** |
| **7** | **41974** | **Female** | **10** | **$1,000- $2,000** | **Urban** | **Yes** | **Yes** | **Daily** | **Yes, regularly** | **In every lesson** | **Very comfortable** | **Agree** | **Weekly** | **Greatly enhances** | **None** |
| **8** | **15-17** | **Male** | **11** | **Below $1,000** | **Rural** | **No** | **No** | **Rarely** | **No** | **Rarely** | **Not comfortable** | **Strongly disagree** | **Rarely** | **Slightly enhances** | **Internet connectivity** |
| **9** | **41974** | **Female** | **8** | **$3,001- $4,000** | **Suburban** | **Yes** | **Yes** | **Several times a week** | **Yes, but only for certain classes** | **Sometimes** | **Comfortable** | **Agree** | **Monthly** | **Moderately enhances** | **None** |
| **10** | **15-17** | **Male** | **12** | **Above $4,000** | **Urban** | **Yes** | **Yes** | **Daily** | **Yes, regularly** | **In most lessons** | **Very comfortable** | **Strongly agree** | **Daily** | **Greatly enhances** | **None** |
| **11** | **18+** | **Female** | **12** | **$2,001-** | **Rural** | **No** | **No** | **Once a week** | **No** | **Sometimes** | **Somewhat** | **Neutral** | **Never** | **No effect** | **Lack of devices** |



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| | | | | **$3,000** | | | | | | | **comfortable** | | | | |
| **12** | **41974** | **Female** | **8** | **Above $4,000** | **Suburban** | **Yes** | **Yes** | **Once a week** | **Yes** | **Rarely** | **Comfortable** | **Agree** | **Daily** | **Greatly enhances** | **Internet connectivity** |
| **13** | **18+** | **Female** | **11** | **$1,000-$2,000** | **Urban** | **Yes** | **Yes** | **Never** | **No** | **Once a week** | **No** | **No** | **Several times a week** | **Slightly enhances** | **None** |
| **14** | **15-17** | **Female** | **9** | **Below $1,000** | **Urban** | **No** | **Yes** | **Once a week** | **Yes** | **Several times a week** | **Yes** | **Yes** | **Daily** | **Slightly enhances** | **None** |
| **15** | **15-17** | **Female** | **10** | **$2,001-$3,000** | **Rural** | **Yes** | **Yes** | **Daily** | **No** | **Daily** | **No** | **Yes** | **Daily** | **Slightly enhances** | **None** |
| **16** | **41974** | **Female** | **12** | **Above $4,000** | **Suburban** | **Yes** | **No** | **Daily** | **Yes** | **Daily** | **Yes** | **Yes** | **Daily** | **Moderately enhances** | **None** |

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| **17** | **41974** | **Female** | **9** | **$1,000-$2,000** | **Urban** | **Yes** | **No** | **Once a week** | **No** | **Several times a week** | **Yes** | **No** | **Once a week** | **Greatly enhances** | **Technical skills** |
| **18** | **41974** | **Male** | **10** | **$2,001-$3,000** | **Urban** | **No** | **Yes** | **Daily** | **Yes** | **Daily** | **Yes** | **Yes** | **Several times a week** | **Moderately enhances** | **None** |
| **19** | **15-17** | **Male** | **11** | **$3,001-$4,000** | **Suburban** | **Yes** | **Yes** | **Once a week** | **Yes** | **Several times a week** | **No** | **No** | **Several times a week** | **Moderately enhances** | **Lack of devices** |
| **20** | **15-17** | **Male** | **9** | **$1,000-$2,000** | **Urban** | **Yes** | **No** | **Never** | **No** | **Daily** | **No** | **No** | **Once a week** | **Slightly enhances** | **None** |
| **21** | **15-17** | **Male** | **8** | **$3,001-$4,000** | **Urban** | **Yes** | **Yes** | **Once a week** | **Yes** | **Several times a week** | **Yes** | **Yes** | **Several times a week** | **Slightly enhances** | **Internet connectivity** |
| **22** | **41974** | **Female** | **8** | **Above** | **Subu** | **Yes** | **Yes** | **Once a week** | **Yes** | **Daily** | **Yes** | **Yes** | **Daily** | **Greatly enhances** | **Internet connectivity** |



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| | | | | **$4,000** | **rban** | | | | | | | | | | |
| **23** | **18+** | **Female** | **11** | **$1,000-$2,000** | **Urban** | **Yes** | **No** | **Never** | **No** | **Daily** | **No** | **No** | **Daily** | **Slightly enhances** | **None** |
| **24** | **15-17** | **Female** | **9** | **Below $1,000** | **Urban** | **No** | **Yes** | **Once a week** | **Yes** | **Daily** | **Yes** | **Yes** | **Daily** | **Slightly enhances** | **None** |
| **25** | **15-17** | **Female** | **10** | **$2,001-$3,000** | **Rural** | **Yes** | **Yes** | **Daily** | **No** | **Daily** | **No** | **No** | **Daily** | **Moderately enhances** | **None** |
| **26** | **41974** | **Female** | **12** | **Above $4,000** | **Suburban** | **Yes** | **No** | **Daily** | **Yes** | **Daily** | **Yes** | **Yes** | **Daily** | **Greatly enhances** | **None** |
| **27** | **41974** | **Female** | **9** | **$1,000-$2,000** | **Urban** | **Yes** | **No** | **Once a week** | **No** | **Several times a week** | **No** | **No** | **Daily** | **Moderately enhances** | **None** |

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| **28** | **41974** | **Male** | **10** | **$2,001-$3,000** | **Urban** | **No** | **Yes** | **Daily** | **Yes** | **Several times a week** | **No** | **No** | **Daily** | **Slightly enhances** | **Technical skills** |
| **29** | **15-17** | **Male** | **11** | **$3,001-$4,000** | **Suburban** | **Yes** | **Yes** | **Once a week** | **Yes** | **Several times a week** | **Yes** | **Yes** | **Several times a week** | **Moderately enhances** | **None** |
| **30** | **15-17** | **Male** | **9** | **$1,000-$2,000** | **Urban** | **Yes** | **No** | **Never** | **No** | **Daily** | **No** | **No** | **Daily** | **Slightly enhances** | **Lack of devices** |
| **31** | **15-17** | **Male** | **8** | **$3,001-$4,000** | **Urban** | **Yes** | **Yes** | **Once a week** | **Yes** | **Once a week** | **Yes** | **Yes** | **Once a week** | **Moderately enhances** | **Internet connectivity** |
| **32** | **Under 12** | **Male** | **9** | **$1,000-$2,000** | **Suburban** | **Yes** | **Yes** | **Several times a week** | **Yes** | **Daily** | **Yes** | **Yes** | **Daily** | **Moderately enhances** | **None** |
| **33** | **18+** | **Female** | **8** | **$2,001-$3,000** | **Suburban** | **No** | **Yes** | **Rarely** | **No** | **Rarely** | **No** | **No** | **Rarely** | **No effect** | **None** |



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| **34** | **15-17** | **Male** | **12** | **$2,001-$3,000** | **Suburban** | **Yes** | **Yes** | **Daily** | **Yes** | **Daily** | **Yes** | **Yes** | **Daily** | **Greatly enhances** | **None** |
| **35** | **41974** | **Male** | **12** | **$2,001-$3,000** | **Urban** | **Yes** | **Yes** | **Once a week** | **Yes** | **Several times a week** | **Yes** | **Yes** | **Several times a week** | **Moderately enhances** | **None** |
| **36** | **41974** | **Male** | **11** | **Below $1,000** | **Suburban** | **Yes** | **No** | **Once a week** | **No** | **Rarely** | **No** | **No** | **Rarely** | **No effect** | **Lack of devices** |
| **37** | **15-17** | **Female** | **9** | **$3,001-$4,000** | **Rural** | **Yes** | **Yes** | **Daily** | **Yes** | **Daily** | **Yes** | **Yes** | **Daily** | **Greatly enhances** | **None** |
| **38** | **41974** | **Female** | **11** | **$1,000-$2,000** | **Urban** | **No** | **No** | **Never** | **No** | **Never** | **No** | **No** | **Never** | **Slightly enhances** | **Technical skills** |
| **39** | **15-17** | **Male** | **12** | **$3,001-$4,000** | **Urban** | **Yes** | **Yes** | **Daily** | **Yes** | **Daily** | **Yes** | **Yes** | **Daily** | **Moderately enhances** | **None** |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **40** | **41974** | **Female** | **8** | **$1,000-$2,000** | **Rural** | **No** | **Yes** | **Rarely** | **No** | **Rarely** | **Yes** | **Yes** | **Rarely** | **Moderately enhances** | **Internet connectivity** |
| **41** | **15-17** | **Male** | **10** | **Below $1,000** | **Urban** | **Yes** | **No** | **Once a week** | **No** | **Once a week** | **No** | **No** | **Once a week** | **Moderately enhances** | **Lack of devices** |