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Challenges in Utilizing Technology to Enhance Academic Performance among University Students from Diverse Socioeconomic Backgrounds

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Abstract

Technology is important in higher education, it facilitates skill development, virtual collaboration, and resource access. The digital divide is still a significant obstacle, though, especially for low-income students who frequently face challenges with antiquated technology. The purpose of this study is to examine the technological challenges among college students from various socioeconomic backgrounds and to find out how the problems affect academic performance from the viewpoints of students, parents, educators, and administrators. This study applied a qualitative case study design. Eighteen participants from a range of socioeconomic backgrounds participated in semi-structured interviews at Shandong University. This comprised six parents from the same income brackets and six students, two from each of the low, middle, and high-income groups. Three educators and three school officials also took part, offering expert perspectives on how student learning is affected by access to technology. Three main themes emerged from the interview analysis. First, common technology problems faced by university students. Second, unequal access to technology based on financial background. Third, strategies students use to overcome technology challenges. According to the findings, in order to guarantee equal access and opportunity for all students, universities must improve their digital infrastructure, offer financial and technical assistance, and encourage digital literacy. This study demonstrates how low-income university students' academic performance is still hampered by the digital divide. Despite coping mechanisms, low-income students encounter significant technological obstacles that hinder their ability to succeed academically. It is crucial that everyone has equal access to technology. In order to establish an inclusive learning environment, universities must address digital inequality through device loans, internet assistance, free software, and digital literacy initiatives.

Keywords: University Students, Diverse Socioeconomic Backgrounds, Academic Performance

Introduction

Due to disparities in access to devices, the internet, and digital skills, Chinese university students from a variety of socioeconomic backgrounds encounter difficulties when utilising ICT for academic success. These disparities exacerbate the educational divide and prevent full participation in online learning (Zhou, 2025). Positive results require a supportive learning environment and equal opportunities (Chang Su, 2024). The digital divide in Chinese higher education is a reflection of more serious problems, as socioeconomic status and technological access are frequently linked to students' academic performance (Manar & Ouhammou, 2024). Procrastination and discontent are more common among underprivileged students (Tian et al., 2024). These obstacles continue to restrict opportunities for underprivileged students in the absence of focused assistance for skills, access, and an inclusive institutional culture. The aim of this study is to determine the challenges in using technology to enhance academic performance of college students from various socioeconomic backgrounds. It also tries to present the opinions of parents, educators, and university administrators on the matter.

Literature Review

Low digital literacy, poor internet, and restricted device access are some of the main obstacles that Chinese university students from lower socioeconomic backgrounds face when utilising technology for learning (Zhou, 2025). When compared to more affluent peers who receive better support, these difficulties increase the achievement gap (Manar & Ouhammou, 2024). Inequality is reinforced by the fact that elite universities frequently enrol students from wealthier families (Xie et al., 2023). Disadvantaged students are also impacted by low self-efficacy and high stress by Tian et al. (2024), although fair institutional support, such as residential colleges, can be beneficial (Gui et al., 2023). Targeted digital inclusion and support policies are necessary to address these problems.

In China, low-income students frequently struggle to get their hands on personal devices, dependable internet, and training in digital skills all of which are necessary for academic success in technologically advanced classrooms. Although studies show that self-regulation and technological literacy are important indicators of academic achievement in online learning environments, students from underprivileged backgrounds tend to perform worse in these domains (Zhou, 2025). Furthermore, there is a positive correlation between GPA and the use of technology in the classroom; however, equal participation is still impacted by regional and economic disparities (Manar & Ouhammou, 2024). The over representation of middle and upper class backgrounds among students at elite universities also points to a structural imbalance in access to and preparedness for higher education (Xie et al., 2023).

Students' academic success is positively correlated with parental involvement and educational spending, but primarily for families with higher socioeconomic status. Families with lower incomes frequently are unable to offer the same degree of educational involvement or technological support at home (Yu, 2024). Due to their lack of knowledge, time, or technical skills to support online learning environments, these families are also more impacted by the digital divide.

Due to limited access and low levels of digital literacy, teachers say that students from low-SES backgrounds are more likely to have difficulty participating in online activities and finishing assignments (Chang Su, 2024). Furthermore, it has been discovered that, when properly applied, the integration of fruitful pedagogies like differentiated and technology-enhanced instruction helps to reduce academic gaps based on socioeconomic status (Sun & Abidin, 2024).

Administrators must strike a balance between the need to provide equitable digital infrastructure and their constrained budgets. This is even more urgent now that virtual learning has grown. According to research, administrative attention to digital infrastructure and focused support initiatives can lessen inequalities and enhance the overall effectiveness of the institution (Gui et al., 2023). Low-SES students' results are improved and the digital divide is closed by institutions that adopt inclusive policies and supportive learning environments (Zhao et al., 2022).

The ability of Chinese university students to use technology for academic success is consistently correlated with their socioeconomic status (SES), according to recent research. Limited devices, bad internet, and low digital literacy are common problems for low-income students, which lowers their academic engagement and results (Zhou, 2025; Manar & Ouhammou, 2024). Educators see disparities in digital readiness and advocate for inclusive teaching methods (Chang Su, 2024; Sun & Abidin, 2024), while parents point to gaps in digital knowledge and financial resources as obstacles to helping their kids (Yu, 2024). Although they acknowledge structural obstacles, administrators point out that specific assistance, such as residential colleges, can be beneficial (Gui et al., 2023; Zhao et al., 2022). Inequality in digital access and the critical role that institutional responsibility plays in guaranteeing equitable learning are the two main issues that are highlighted in the literature.

Research Design

This research using a qualitative case study design to examines the challenge university students from various socioeconomic backgrounds encounter when utilising technology to succeed academically. Case studies are perfect for thoroughly and contextually analysing real-life problems (Yin, 2018). While concentrating on important themes, semi-structured interviews provide flexibility (Creswell & Creswell, 2018).

Semi-structured interviews are used in this case study research to collect flexible and in-depth insights from 18 participants, including three university administrators, three educators, and two students and two parents from each of the three income groups (low, middle, and high). A comparative study of educational experiences and access to technology across socioeconomic backgrounds is made possible by this stratified approach.

Locations, Sampling and Participants of Study

Choosing an appropriate research location is essential for producing significant qualitative data (Creswell, 2018). One of the oldest and most prominent universities in China, Shandong University, located in Jinan, Shandong Province, is where this study was carried out. It was founded in 1901 and offers a rich setting for investigating the ways in which socioeconomic status affects academic achievement and access to technology in higher education.

For qualitative case studies to capture rich, context-specific experiences, sampling and participants are essential (Haute, 2021). Purposive sampling was used in this study to choose 18 participants, enabling comparisons across socioeconomic groups. Educators and administrator are included in the sample, as are parents and students from low, middle, and high income families. This varied mix provides a thorough understanding of how socioeconomic status affects educational experiences, academic challenges, and access to technology. The sampling strategy employed in this investigation is shown in Table 1.

Table 1
Sampling

Category	Low-Income	Middle-Income	High-Income	Total
Students	2	2	2	6
Parents	2	2	2	6
Educators	-	-	-	3
University Administrators	-	-	-	3
Total Participants	4	4	4	18

The sampling strategy, which guarantees balanced representation across socioeconomic groups and educational roles, is shown in Table 1. Eighteen participants are involved in the study: three educators and three administrators who provide institutional insights without classifying income, and six parents and six students who are equally split by income level.

Data Collection, Data Analysis, and Validity Of Study

Data collection, including focus groups and semi-structured interviews, to investigate the ways in which socioeconomic status (SES) and technology access affect academic performance among Shandong University students. Focus groups offer common insights within each group, while in-depth interviews with students, parents, teachers, and administrators offer a variety of viewpoints (Yin, 2018; Creswell & Poth, 2018). By contrasting viewpoints from various roles, methodological triangulation increases credibility (Daruhadi & Sopiati, 2024; Rademaker & Polush, 2022).

Braun and Clarke's (2006) six-phase thematic analysis framework which includes coding, theme development, and interpretation was used to analyse the data. arranging answers according to themes like academic results, digital tool accessibility, and SES (Malik et al., 2022). To guarantee that both individual and group level insights were meaningfully interpreted, patterns were examined and improved to ensure alignment with research objectives (Chowdhury & Shil, 2021; Yin, 2018). A thorough grasp of how SES affects academic performance through technology access is supported by this systematic analysis.

The study uses member checking and triangulation, where participants confirm the accuracy of interpretations, in accordance with Yin's (2018) construct validity principles to assure validity (Creswell, 2018; Arslan, 2022). Upholding thorough research protocols and making sure procedures can be reliably replicated are two ways to achieve reliability (Burnard, 2023; Nha, 2021). While member checking verifies that the results are reliable, triangulating various sources and viewpoints increases credibility. When combined, these techniques guarantee that the research is reliable and credible.

Research Results

To analyse the results, interviews are used and data triangulation integrates these viewpoints to offer a comprehensive picture of how technological differences impact academic achievement and the necessity of institutional interventions to assist students who are struggling with technology. Figure 1 shows the challenges faced by university students from diverse socioeconomic backgrounds in utilizing technology to improve their academic performance.

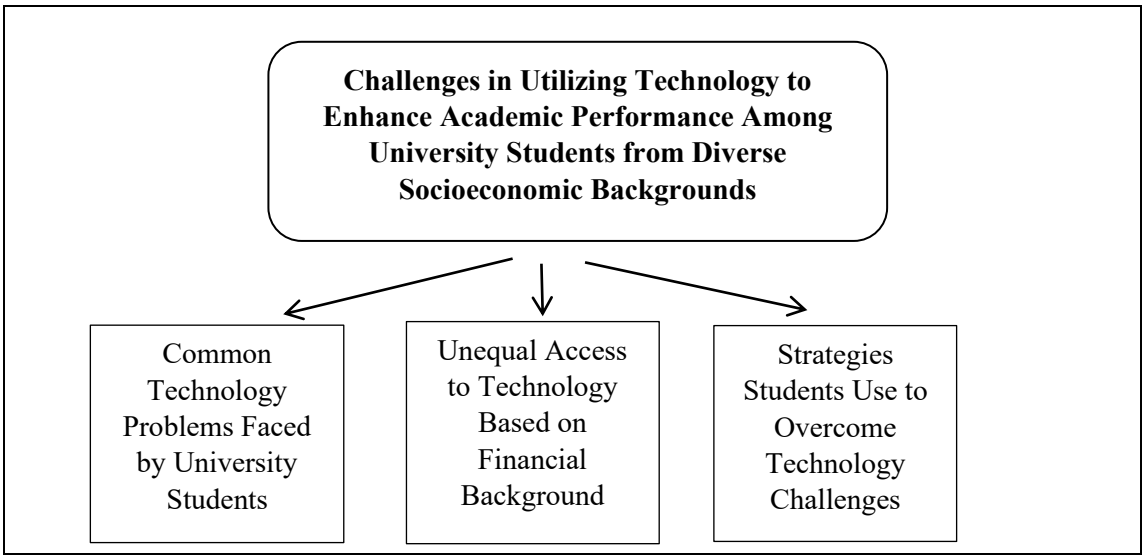

Figure 1

The Challenges Faced by University Students from Diverse Socioeconomic Backgrounds in Utilizing Technology to Improve Their Academic Performance

The difficulties university students encounter with technology use are depicted in Figure 1 according to their socioeconomic status. Three main themes are presented: (i) common technology problems faced by university students, (ii) unequal access to technology based on financial background, (iii) strategies students use to overcome technology challenges. Students' coping mechanisms include sharing tools and campus resources. In order to close the digital divide and advance equitable learning opportunities, institutions must provide support, as the figure highlights the relationship between financial status and academic results and tech access.

Finding Data Analysis for Interview

University students from a range of socioeconomic backgrounds encounter when utilising technology to succeed academically are revealed by the interview data. Table 2 shows students' perspectives on the challenges faced by university students from diverse socioeconomic backgrounds in utilizing technology.

Table 2
Students View on the Challenges Faced by University Students from Diverse Socioeconomic Backgrounds in Utilizing Technology to Improve Their Academic Performance

Theme	Sub-Themes	Description
Common Technology Problems Faced by University Students	(i) Outdated or Incompatible Devices (ii) Unstable or Limited Internet Access (iii) Expensive Software and Learning Platforms	Outdated equipment, poor internet access, especially in rural or low-income areas, and the high cost of required software are some of the technology-related problems that affect university students' academic performance.
Unequal Access to Technology Based on Financial Background	(i) Financial Limitations Affecting Learning Opportunities (ii) Differences in Academic Resource Availability	The digital divide, which creates unequal access to academic resources, low-income students often lack reliable devices, internet, and software, limiting their educational options.
Strategies Students Use to Overcome Technology Challenges	(i) Using University-Provided Resources (ii) Seeking Alternative Software and Study Methods (iii) Sharing Devices and Learning Materials	Students employ creative strategies to overcome technological challenges, such as using free or low-cost software, sharing devices and study materials with classmates to improve learning, and making use of university resources (labs, Wi-Fi, loaner laptops).

Table 2 presents university students face various **technology-related challenges** that impact their academic success, particularly those from **lower-income backgrounds** who struggle with access to necessary digital tools. These challenges fall into three key themes (i) Standard technology problems faced by university students **, (ii) Unequal Access to Technology Based on Financial Background, and (iii) Strategies Students Use to Overcome Technology Challenges**.

(i) First theme: Standard technology problems faced by university students
The first theme, common technological issues faced by university students, emphasises the challenges that students face as a result of out-of-date or incompatible technology, erratic internet access, and costly software needs. Many students, particularly those from low-income families, rely on outdated or sluggish laptops that are unable to effectively run the necessary academic programs.

"I just have to make due with my laptop's frequent crashes because I can't afford a new one." (Student 1)
Another major problem is internet access; some students cannot afford high-speed internet at home, so they must use campus Wi-Fi or pay expensive mobile data fees.

"I have to use costly mobile data if I can't make it to campus for an important online lecture." (Student 2)

"I have to look for alternatives if the university does not offer free access to the costly software that some programs require." (Student 3)

Furthermore, some courses call for paid software licenses, which students from low-income families may not be able to afford.

(ii) Second theme: Unequal access to technology based on financial background
Students from various economic backgrounds have unequal access to necessary digital tools, as highlighted by the second theme, unequal access to technology based on financial background. Students with lower incomes frequently put tuition, rent, and food expenses ahead of purchasing new technology, which restricts their capacity to participate fully in online education.

"Have to make due with what you have if your family cannot afford a new laptop or high-speed internet." (Student 1)

Richer students, on the other hand, have a major academic edge because they can afford online certification programs, private tutoring, and expensive software.

"I never have to consider my access to technology. If I need a faster laptop or better internet, I recently upgraded." (Student 5)

Due to these disparities, students who are financially stable are able to fully utilise digital learning resources, while those who are not have continuous limitations.

(iii) Thrid theme: Strategies students use to overcome technology challenges
The third theme focuses on how students are using their own resources to help, and it may be that student strategies for overcoming technology issues can be an effective one. Coping strategies range from the use of several different coping strategies in order to access technology. A great number of students are users of university facilities which are computing centers, places where users can take out laptops for short periods and the school's Wi-Fi free of charge.

"I have to use university computer labs a lot since my laptop is not capable of running complex software." (Student 1)

Seek out the software option and also the study pattern change which has free trial versions, student discounts, and open-source alternatives to expensive software.

"I am for example first of all looking if the university provides software with a discount or even free. If there is not, I search for trial versions." (Student 3)

The process of taking the device on loan, or using the account of friends, or making a joint purchase with the group becomes one of the known strategies used by the learners toward their access to technology as needed.

"When my laptop is not strong enough, I think about collaborating with my schoolmates who have very strong devices." (Student 4)

One of the determinants of whether a student has access to and can use a technology device is a relative family financial position, besides such factors as the influence on learning, skill development, or the concepts of future career opportunities. From the side of the universities, they must be in charge of this gap closure which refers to money aid, the onset of the latest technology, and education projects.

The Table 3 below summarizes parents' views on the tech challenges faced by university students from different socioeconomic backgrounds, highlighting concerns about unequal access to devices, internet, and software.

Table 3
Parents' View on The Challenges Faced by University Students from Diverse Socioeconomic Backgrounds in Utilizing Technology to Improve Their Academic Performance

Theme	Sub-Themes	Description
Common Technology Problems Faced by University Students	(i) Outdated or Unreliable Devices (ii) Unstable or Limited Internet Access (iii) Limited Access to University Computers and Software	University students frequently deal with technological problems that hinder their academic progress, such as out-of-date devices, slow internet, particularly in rural or low-income areas, and restricted access to campus computers or licensed software.
Unequal Access to Technology Based on Financial Background	(i) Financial Barriers to Purchasing Essential Technology (ii) Disparities in Learning Tools and Software (iii) Long-Term Impact on Academic and Career Opportunities	Low-income students' access to devices and the internet is restricted by financial constraints, which results in unequal learning and skill-development opportunities. This disparity exacerbates educational inequality by negatively affecting academic achievement and future employment opportunities.
Strategies Students Use to Overcome Technology Challenges	(i) Utilizing University Resources and Support Systems (ii) Finding Free or Discounted Software Alternatives (iii) Advocating for Institutional and Government Support	Students use university resources like computer labs, loan programs, and campus Wi-Fi to deal with technology issues. Additionally, they actively push for greater assistance through device access, internet subsidies, and inclusive digital policies, and they use free or heavily discounted software alternatives.

Table 3 presents university students from **different socioeconomic backgrounds** face **varying levels of access to technology**, which directly impacts their academic performance. The interview findings highlight three key theme (i) **Common Technology Problems Faced by University Students, (ii) Unequal Access to Technology Based on Financial Background, and**

(iii) Strategies Students Use to Overcome Technology Challenges.
(i) First theme: Common technology problems faced by university students
University students' most common technology issues, clearly defines that the three main problems that students face are old, unreliable equipment, unreliable internet connections, and the lack of university computer and software resources. Some low-income students are forced to use a slow, outdated laptop that frequently crashes and thus hinders productive and efficient assignment work.

"My child's laptop is very old and very slow and the situation is that we cannot afford a new one. It's so if the crash is caused by it. It is really a struggle to be able to study and to do assignments." (Parent 1)

Making a computer to stay connected to the internet is a major issue with the students, where there are members from the students that they do not have internet connections at home which are stable, hence they tend to public Wi-Fi or be at the school campus late at night to undertake their tasks.

"I am not able to pay for a fast internet service, so my child has to go onto the public or stay in school until late at night." (Parent 2)

"Near the deadlines, students may face difficulties in finding out the vacant places in university laboratories." (Parent 3)

Moreover, the majority of students depend on the computer rooms of the university, access to which is limited to a certain period of time during the peak hours, in order to finish the assignments.

(ii) Second theme: Unequal access to technology based on financial background
The second theme, demonstrates that those who belong to lower social classes are usually facing economic barriers that inhibit their ability to use school resources, hence, they cannot enjoy equal chance for learning. Typically, the poor spend most of their budget on utilities and food, then not much is left for Laptops, software, or broadband internet which makes them lose the capacity to be the part of the electronic education industry.

"*If you are in a position to buy and use the latest technology, you benefit from the learning process more compared to peers who are toiling with the old versions."* (Parent 1)

To add more, wealthier kids indulge in buying the best-sellers, taking online courses, and getting the latest software products, while those with insufficient funds are expected to be content with cheaper or free of charge, but slower software versions.

"The wealthy ones access personal licenses of the imperative software, yet the others have to be content with the compromise licenses or share them." (Parent 4)

"Suppose there are students who have been continuously struggling with technology which at the same time has become outdated through the years till they are getting to the job market, this will restrict their abilities and confidence when it comes to comparing with students who had access to the best tech tools during the learning process." (Parent 6)

The differences between students have a significant impact on their academic performance at school and in their future careers because those with better technology access are more skilful and confident.

(iii) Third theme: Strategies students use to overcome technology challenges
The third theme, strategies to cope with technology-related challenges, shows how the learners are flexible with the constraints of technology. Students rely on their school's computer facility, library network and the laptop borrowing service provided by the campus to compensate for their personal technology inadequacies.

"Universities should also try out laptop loan programs as many students are abundant, but they cannot have the will to get the resources." (Parent 1)

There are those who manage to enjoy free or discounted versions of software by using trial versions, open-source software, and by getting software at a reduced rate through student discount.

"Some students never find out they can be assisted with discounted or even free software, technical support or technology aid." (Parent 3)

On the other hand, a few parents and students take a positive stand on such issues as better university policies, more technology-oriented grants, and better IT infrastructure that will form the framework for equal opportunities for all.

"The institutions need to put money in IT infrastructural improvements like additional computer labs, cloud software availability, and increased campus internet speed to eliminate the factors causing the students' economic conditions to have hold on them." (Parent 6)

These findings reveal a growing tech gap between students of different financial backgrounds, affecting their academic success and future readiness. Bridging this divide needs stronger university support, targeted aid, and digital equity policies. Table 4 shows educators' views on these issues.

Table 4
Educators' Views on The Challenges Faced by University Students from Diverse Socioeconomic Backgrounds in Utilizing Technology to Improve Their Academic Performance

Theme	Sub-Themes	Description
Common Technology Problems Faced by University Students	(i) Limited Access to Personal Devices and Software (ii) Unstable or Limited Internet Access	It can be challenging for university students to finish assignments or participate in online courses when they lack access to devices, software, and dependable internet, particularly in low-income or rural areas.
Unequal Access to Technology Based on Financial Background	(i) Financial Barriers to Purchasing Essential Technology (ii) Differences in Learning Tools and Resources (iii) Impact on Academic and Career Preparedness	Low-income students frequently do not have access to gadgets, the internet, or digital tools, which hinders their ability to succeed academically and prepare for the workforce.
Strategies Students Use to Overcome Technology Challenges	(i) Utilizing University and Free Digital Resources (ii) Adjusting Study Schedules to Optimize Technology Use (iii) Advocating for Institutional Support and Policy Changes	Students utilise free software, campus resources, and modified study schedules to access shared tools in order to overcome technological obstacles. In order to advance equity, they also support enhanced digital infrastructure, tech loan programs, and better institutional support.

Table 4 presents educators' views on the challenges faced by university students from different **socioeconomic backgrounds** facing significant disparities in access to technology, which affect their academic success and long-term career opportunities. The key challenges they experience fall into three main themes (i) **common technology problems faced by university students, (ii) unequal access to technology based on financial background, and (iii) strategies students use to overcome technology challenges.**

(i) First theme: Common technology problems faced by university students
The first issue, namely the universal technology issues university students face, highlight the difficulties of the students due to the out of date equipment and the irregular internet. A vast number of people, who also happen to be from a low-income stratum, are working on computers with outdated running systems; thus, they are not able to install the software required for their academic tasks.

"Many low-income students struggle with old or public computers, which they cannot adequately complete their advanced software using." (Educator 1)

Furthermore, students' internet connections are changing, with most of them lacking a stable thought that is also reflected in the sentence's original content, having no home Wi-Fi, and resorting to campus networks, public internet, or even expensive mobile data.

"Some students, for example, do not use home Wi-Fi or have a weird slow connection that disrupts not only their presence in online discussions and the prompt submission of their work but also the zoom session." (Educator 2)

Not only such challenges with productivity of the students, but also their achievements in the web-supported education environment, are going to be hindered, and they will feel stressful as well.

(ii) Second theme: Unequal access to technology based on financial background
The second form of technology reduction between rich and poor indicates the influence of the economy on the possibility of a student buying technology and its optimal use. In practical terms, we are dealing with a situation in which the richer students are able to buy a laptop, better software, and have access to high-speed internet and the lower-income students spend most of their limited means not in technology but in tuition fees and living expense.

“The main problem is the price of the products. Most of my students said that it is impossible for them to buy the most recent computer models, so they are sharing the family ones, the ones in the university, or going to the public library.” (Educator 1)

At the same time, a majority of these learners are involved in the cost of both, software subscriptions, and, unnecessary usually, course-related tools. The presence of the latter two is mostly not negotiable as one cannot fulfill the requirements of the course without them.

"In the technical field of Education, those students who are unable to get their own software licenses let alone the special computers get fewer hands-on experiences. Also, individuals will be at a disadvantage in the job market in terms of skills and confidence." (Educator 3)

These disparities will have a significant impact in the future as students who are not exposed to technology will have minimal technical skills which will then reduce their chances of getting internships and jobs and this will be the biggest problem for them.

(iii) Thrid theme: Strategies students use to overcome technology challenges
The third theme, the strategies used by students to deal with technology restrictions, is about how the students manage the limitations in technology accessibility through the use of resources of the university, time revisions in study, and getting more support through negotiation. Many of the students are pooling campus IT labs, university internet, and open-source software to be able to do assignments and not to spend money on technology expenses as well.

“Laptops borrowing programs are suggested to be started by universities and to offer cloud computing software so that the students can work on their assignments even on their phones.” (Educator 1)

The method of the students who base their coursework on lab hours, use free internet places, or collaborate with classmates with better technology resources is also in practice.

"One way is that every student has to decide on the specific time during which the university laboratories are available that, however, leads to less flexibility of theirs." (Educator 2)

Further, the faculty and a portion of the students have no objection to the changes in policies and extra funding for technology-related costs, thus, calling upon the universities to allocate more money for the development of IT infrastructure, as well as for the provision of equal access to online teaching tools. The students were urged explicitly to be future leaders of society by none other than faculty. This warm-hearted speech moved many students.

"Public schools usually do not have enough funding to keep laboratories open for the time that is needed. There is also not enough support for students to improve their knowledge of technology." (Educator 3)

These findings illustrate a substantial link between the wealth of the students' ability to take part in online learning with a computer. The students in high-income families are provided with a better learning experience through education while the students of low-income families are unable to access the same because of outdated hardware, poor connection, and limited software, which ultimately hinders their performance. Entities can conceivably escalate technology inequalities and can be minimized through targeted relief funded by the institutions such as technology grants, device loan schemes, and discounted internet together with the partnering with tech companies for the acquisition of affordable software and staff training. The table 5 contains the perceptions of the administrative officers about these challenges.

Table 5
School Administrators' View on The Challenges Faced by University Students from Diverse Socioeconomic Backgrounds in Utilizing Technology to Improve Their Academic Performanc

Theme	Sub-Themes	Description
Common Technology Problems Faced by University Students	(i) Lack of Access to Personal Devices and Software (ii) Unstable or Limited Internet Connectivity	Learners resort to no-cost materials, university facilities, and modified learning programs in order to deal with technological issues. They also demand the driving of education's efficiency to a higher level through more accessible means.
Unequal Access to Technology Based on Financial Background	(i) Financial Barriers to High-Performance Technology (ii) Limited Digital Literacy and Technical Training	Those members of the student population who consistently lack the necessary economic resources to keep them updated with the latest computer technology and the required skills in the related subject, due to financial difficulties.
Strategies Students Use to Overcome Technology Challenges	(i) Utilizing University Technology Resources	Students always typically have the university's help, whenever they are

	(ii) Financial Aid and Subsidized Technology Support	required to deal with problems related to technology, using equipment like lab computers, campus Wi-Fi, and loaner laptops. They also visit dorms, shared houses, and apartments to save on accommodation costs, and since it is impossible to do research or write assignments without the right software, they look for places that require minimal expense, use school PCs, or go to the library.

Table 5 presents school administrators' view on university students from **different socioeconomic backgrounds** face significant disparities in **technology access,** which directly impacts their academic performance. The interview findings highlight three key themes (i) **common technology problems faced by university students, (ii) unequal access to technology based on financial background, and (iii) strategies students use to overcome technology challenges**.

(i) First theme: Common technology problems faced by university students
The first theme that is typical technology issues for university students reveals the difficulties that block the students from using technology for effective study. It is frequently seen that many students, especially those who have got low income, either do not have a laptop that could be used for studying or they are too old, constantly breaking off and not able to run software necessary for studying.

"The most challenging factor is the lack of personal devices. Lower-income students are generally unable to afford a laptop, and many of their old computers are not reliable and/or are very slow." (Administrator 1)

"Additionally, the issue of the instability or unavailability of the internet that students are facing also contributes to the expansion of these problems. Students not having access to the internet, thus, not managing to attend online classes, efficiently finish their homework or communicate,] with them as needed, are some examples of what can go wrong here." (Administrator 2)

At the same time, students from poor families cannot afford a good internet connection and they usually rely on schools, libraries, or mobile networks, all of which are not only slow but also expensive. Such students are, therefore, left with no option but to embark on a journey to find the available resources at university, thus, incurring additional mental strain which undoubtedly, may at times be a hindrance to their ability to be able to cope.

(ii) Second theme: Unequal access to technology based on financial background
The second theme, that of technology being unequally accessible on the economic basis, focuses on the unequal technology tools available for learners from different economic levels. Students in the lowest income group are unable to afford such powerful laptops, software packages, and at the same time to be provided with regular internet connection which is important for their online education.

"On the other end of the spectrum, students with more financial resources have personal laptops, speedy internet, and the latest in technology, while on the other hand, students from low-income families have to use old computers or the family computer." (Administrator 1)

Besides limited funding sources, not a few students especially the first-generation college students do not also have the digital literacies required for their successful transition through online course platforms, educational software, and cloud tools.

"One is that not many can recognize the absence of digital literary skills as an equally important yet less-than-obvious matter. It is about students when the trouble with the Internet happens, carry problems in online platforms, educational software, and cloud tools." (Administrator 3)

These gaps, therefore, put underprivileged students at a further disadvantage by not having technology skills developed for their future careers.

(iii) Third theme: Strategies students use to overcome technology challenges
The third theme - student strategies to overcome technology challenges, discloses how the student body re-adjusts to the limitations of technology accessibility through the use of institutional facilities and financial initiatives. Campus computer labs, university broadband connectivity, and laptop loan schemes.

"Universities can develop the schemes to be carried on throughout the semester, so students can also take the equipment home." (Administrator 1)

At this point, it is also fair to say that some students resort to university-provided technology assistance plans to obtain the essential devices and software they need in their studies.

"Financial help should also cover technology-related expenses such as laptops, software, and internet fees. Universities should partner with technology companies to secure discounts on devices and software licenses to benefit students." (Administrator 2)

The strategies close the gap between low-income students and the technological world, and they are made possible, first, by the revised policies that the institution adopts and second, by the coordinated promotion of said policies and resources.

Triangulation of Interview Data
Figure 2 shows the intersection of various informant view interviews on college students from various socioeconomic backgrounds who use technology as a vital tool for their studies. The picture visualizes the views from the student, parents, administrators, and educators that cover the technology issues like common themes and disparities in the accessibility of technology that are economically based, and also students' coping strategies. The data illustrated in the diagram gives a complete picture of how lack of monetary resources not only has a major effect on the digital education accessibility but also supports the idea of school intervention and policy formulation as the ways of bridging the digital divide among college students.

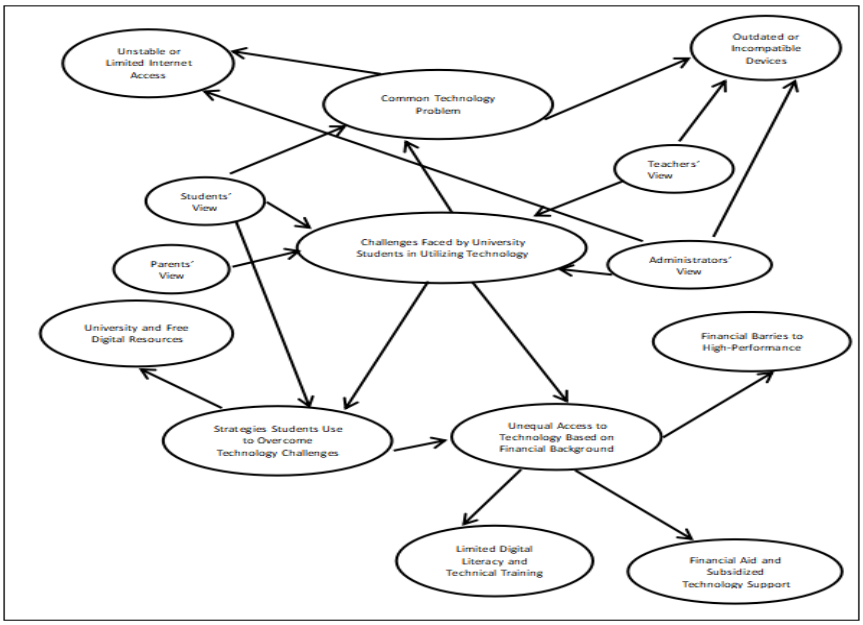

Figure 2

Triangulation of Interview Data on The Challenges Faced by University Students from Diverse Socioeconomic Backgrounds in Utilizing Technology to Improve Their Academic Performance

Figure 2 presents interview data in a trimmed down version of a Venn diagram, revealing students', parents', teachers', and the principal's attitudes toward the problems that undergraduate learners face when it comes to employing technological advancements for their academic progress. The challenges are further clustered into three main themes (i) Common technology problems, (Ii) Unequal access to technology based on financial background, and (Iii) Strategies students use to overcome technology challenges.

(i) First theme: Common technology problems

The first theme, Common technology challenges that university students encounter, delves into the technological challenges that the students go through because of old devices and poor internet connectivity. Among the technology hurdles that students commonly experience is the situation where one cannot use unreliable computers, that can just break down in the middle of a task. Furthermore, the students' unstable internet is a further impediment to joining online classes and gathering group works.

"One of my most important online lectures and the one I missed campus for that day I had to use mobile data which is an expensive alternative." (Student 2)

"Students in low-income families find it difficult to get access to old, shared computers which is one of the main reasons they cannot finish their work by using software, which is advanced." (Educators 1)

Students with limited technology access were identified as students who were found to be falling behind in their classwork and also they did have fewer opportunities to practice.

(ii) Second theme: Unequal access to technology based on financial background
The second problematic issue, unequal technology accessibility in relation to the financial situation, demonstrates how economic inequality affects student access to technology. It was pointed out by several parents that one of the most widespread forms of non-accessibility to technology for students is the tendency of their children to use tuition fees and living expenses as a priority and not engage in the digital learning course.

"My child's computer is slow and outdated, and we can't afford a new one. It's hard to study and do assignments with it after it crashes." (Parent 1)

It was also reported by administrators that there are some technical expenses that have no provision in financial aid, hence students have to depend on the general or outdated facilities.
"Many students cannot afford to have fast speed internet at home, so they are not able to watch online lectures, meet assignments deadlines, or even conduct online interviews." (Administrator 2)

Additionally, the budgets of underrepresented communities in education impede their path to achieving career goals, especially since richer students are in a tendency to buy high-end study materials and enroll in certification programs, whereas the less privileged are not given similar chances.

(iii) Third theme: Strategies students use to overcome technology challenges
The third theme, student strategies to overcome technology issues, is about the ways students get around the lack of economic and technological capabilities by getting help from the educational institution and solving them with new techniques. Students use the academic resources and technology grants provided by the schools, as well as the economic support, to obtain success in their studies.

"The first thing I do is to find out whether my university has the software at a discount or does it have the software available for free. In case it is not there, I go for trial versions." (Student 3)

Students plan their studies around the resources that the university makes accessible to them, including computer rooms and areas with free internet access.
“Most of the time I am at university labs as my laptop is not capable of running the software I am using.” (Student 4)

University policymakers suggested upgrading the IT infrastructure, launching cloud computing solutions, and providing additional money to cover the technology expenditures to bridge the digital gap.

"Colleges must direct their budget towards cloud computing so that students can use any machine to run the software even if the student has an underpowered computer." (Administrator 3)

The way in which different views are interrelated and shows that financial restrictions have an effect on the digital accessibility of the learners in the university, their engagement in education and their job opportunities.

Discussion

The study's conclusions provide a thorough grasp of the technological difficulties encountered by Chinese university students from various socioeconomic backgrounds. Triangulated perspectives from educators, parents, administrators, and students support previous findings, demonstrating that socioeconomic status (SES) significantly influences academic performance and digital access (Zhou, 2025; Manar & Ouhammou, 2024; Xie et al., 2023).

The persistent technological difficulties that students, particularly those from low-income families, face was a recurring theme in all participant groups. Problems like antiquated technology, slow internet access, and pricey software were commonly mentioned as significant barriers to academic performance and engagement. These results corroborate previous studies on disadvantaged college students' digital challenges (Zhou, 2025).

The second major theme emphasises how access to technology varies depending on one's financial situation. Low-income students often find it difficult to afford personal devices, sophisticated software, and reliable internet, which hinders their engagement, digital skills, and preparedness for the future (Yu, 2024; Zhao et al., 2022). In contrast, higher-income students enjoy the advantages of these resources. These differences also impact students' self-esteem and readiness for the workforce, according to educators and parents.

The third theme, which focusses on how students overcome technological obstacles, emphasises how resilient underprivileged students can be. They share devices with peers, use open-source tools, modify study schedules, and utilise university resources. Although these initiatives show a great deal of resolve, they also highlight the pressing need for more organised institutional support (Chang Su, 2024; Gui et al., 2023).

In general, socioeconomic status still influences how students learn in the digital age. To guarantee equal learning opportunities for all, systemic tech access gaps must be addressed through focused support and inclusive infrastructure, even though many underprivileged students exhibit resilience.

Conclusion

According to this study, Chinese university students' access to technology is greatly influenced by their socioeconomic status, which has an impact on their academic achievement. While wealthier peers enjoy better resources, students from low-income backgrounds face obstacles like outdated devices, poor internet, and limited software access. Structural disparities still exist even though many underprivileged students demonstrate resilience by turning to alternative resources and university support. Universities must provide focused assistance, upgrade digital infrastructure, and advance inclusive policies to guarantee equal learning opportunities for all students in order to close the digital divide.

Implication and Suggestion

According to the study's findings, digital inequality in Chinese higher education is a structural problem that is strongly related to socioeconomic status. In the absence of focused interventions, the achievement gap will continue to widen as low-income students encounter obstacles to developing their digital skills and succeeding academically. Institutions must acknowledge that it is their duty to establish fair learning environments by addressing digital literacy and technology access.

By offering free academic software, subsidised internet, and laptop lending programs, universities can increase access to digital tools. Additionally, they ought to incorporate instruction in digital literacy into orientation and support programs. In order to bridge the digital divide, partnerships with tech companies can provide resources at a reduced cost, and continuous evaluations of students' needs can guide the creation of inclusive, responsive policies.

Theoretical significance for this research confirms the current body of literature by demonstrating a relationship between educational technology usage and socioeconomic equity in academic achievement. It develops a more integrative framework that includes the consideration of the effects of factors such as digital access, technological confidence, and institutional support on student performance across various SES backgrounds.

Contextual significance for this research is still relevant with the increasing influence of technological tools in higher education. It points out how students from the different strata of the society see technology in different ways and, thus, offers practical activities for universities that want to establish a more just and efficient learning climate.

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