



Parental Socioeconomic Status and Digital Academic Engagement of University Students in AJK, Pakistan

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Abstract

The research question is the ways in which socioeconomic status of parents affects access of and utilization of digital academic services by the university students and their satisfaction with the services and challenges they face in the institutions of higher learning in Azar Jammu and Kashmir (AJK), Pakistan. This work is the result of increased importance of the digital tools in the academic use as well as the overall trend of the digital divide which seems to be correlated with socioeconomic differences. A sample size of 124 university students was picked and the structured questionnaire was carried to them, chosen of various backgrounds. It gathered socio-demographic variables, SES variables (parents education level, occupation, and household income), and digitization access variables (ownership of devices, availability of internet, frequency of use, and number of hours of use per day) and variables of satisfaction (perceived effectiveness, effects of performance, and availability).

The initial descriptive statistics was that students who belonged to higher SES families possessed their own personal devices, had good access to internet, and used the digital resources more often than those belonging to lower SES-groups. Chi-square test and ANOVA tests revealed that the digital satisfaction and internet access were dependent on income and education. Lastly, the level of SES groups experienced a higher number of barriers such as financial and lack of connectivity, as well as institutional support that added to the structural discrimination of digital access. The results indicate that this should be done through policy formulation, the institutional investments in infrastructures and developing insights in digital literacy so that the accrued benefits of the entire population can be equally obtained by all and inclusive in accessing to digital educational materials.

Keywords: Socioeconomic Status (SES), Digital Resource Access, Student Satisfaction, Higher Education, AJK, Pakistan, Digital Divide.

Introduction

The advent of the digital technologies has shaken the higher education world. It is amazing that online and offline libraries, online textbooks, learning management systems (LMS), online classrooms, and many other academic applications have enabled learning and education more than ever before, making use of technology. That change apparently bears the title of digitalization, and it is currently opening up new avenues of more openness, enhanced accessibility, and scalability in learning (Al Emran et al., 2023). Ideally, they should democratize learning and break down divisions, particularly among those in remote or underserved locations

however in practice, they leave a lot to be desired in terms of provision and utilization. Here socioeconomic status (SES) appears to be one of the most dominant determinants of students' access to, engagement with, and benefit from these resources (Saifi & Arif, 2024; Kim & Song, 2022).

Digital academic resources denote all the tech-based tools and platforms that support learning, such as online libraries, academic databases, e-books, digital lectures, and virtual learning environments. Access to these resources is a reflection of how much the students can obtain and utilize these tools in a proper way, which is dependent on their devices, internet connection, and institutional support (Chen, 2022). Usage patterns indicate the extent and duration of student engagement with such digital resources for academic purposes while satisfaction denotes the students' evaluation of these tools in terms of a learning goal being supporting adequately, relevantly, and effectively (Kayani et al., 2023). The parental socioeconomic status, especially, indicates the overall impact of the parents' income, education, and occupation, which together decide a family's access to economic and social capital. Consequently, this determines the way of interaction of the students with the digital learning resources both in terms of opportunity and skill.

Students belonging to high SES families are privileged to several advantages, such as having personal computers or laptops, undisrupted high-speed internet, availability on paid academic platforms, conducive learning environments at home, and parents who are digitally literate and helpful in their children's academic life. However, students belonging to lower SESs face several obstacles in having limited or entirely shared access to outdated devices, poor or no internet connectivity, inadequate study spaces, and a complete lack of technical support (Kayani et al., 2023). Such differences affect their performance as students and attitudes toward the quality of digital resources made impact assessment usability possible by universities (Chen, 2022).

The context of these issues can be very clearly explained with regards to the semi-autonomous region of Pakistan, Azad Jammu and Kashmir (AJK). The area has moved to a new stage in terms of the development of higher education availability and Internet connectivity; but the socioeconomic martyrs are still a significant characteristic of the area. The uneven distribution of both financial and social capital is that there are many experiences about education that have much difference based on the background. AJK has a number of public sector universities, which include the University of Kotli and the Mirpur University of Science and Technology: these are responding to an increased interest in online and blended learning by offering a range of digital learning solutions. Nevertheless, these efforts also are conditional upon the extent to which students can practically use these tools, and this aspect is also closely interconnected with SES (Ahmed et al., 2023). These inequalities have been complicated by the COVID-19 pandemic. To switch to the online schedule of classes favored the students of wealthy status in relative easy-going in comparison to that of the unfortunate, who got no chance of experiencing classes literally, downloaded educational materials, or took on-line exams. Not only did this pose a threat to the educational outcome during the pandemic, it also raised serious questions concerning the inclusivity of such initiatives and their success in the future (Xu et al, 2025).

Thus, it becomes very important for understanding the specific extent to which parental SES affects students' access to, usage of, and satisfaction with digital academic resources in higher education in AJK. Such information would serve as a basis for framing any policy interventions aimed at diminishing educational inequalities and developing digital inclusiveness (Halim et al, 2025).

Literature Review

The world has experienced significant and extensive changes in the higher education systems within the past twenty years or so. The majority of them were led by the digital technology advancements. The transformation of the institution as a physical space into a digitized, portable and usually borderless place of learning has been swift and expansive. Several digital resources and systems have financed this alteration; they may be Learning Management Systems (LMS), online classrooms, and online libraries, e-textbooks, video conferencing software, and joint electronic devices. Moreover, they also have reconfigured knowledge

production, distribution, and consumption and have introduced novel pedagogical paradigms that place greater focus on the flexibility, interactivity, accessibility, and learner autonomy (Warschauer, 2022).

Sports many Learning Management Systems (LMS) like Moodle, Canvas, Blackboard, and Google Classroom are the mainstay of digital higher education. A virtual campus is a platform that enables an institution to manage content delivery, student communication, assignment submissions, grading, and feedback in a united environment. With LMS, educators can design online learning content while monetizing from embedding multimedia resources, tracking engagement, and creating collaborative learning communities for students (Bano et al, 2023).

E-textbooks and Open Educational Resources (OERs) have equally brought about major changes in accessing materials and sharing resources in education. Students now have access to cheaper online versions of textbooks rather than the pricy physical copies. The OER movement, which is spearheaded by organizations like UNESCO and Creative Commons, has highlighted the necessity of openly licensed teaching and learning, and research materials that are in the public domain or have been released under a specification of an intellectual property license allowing free use (Munir et al, 2023).

Research Objectives

This study aims to:

1. Examine the relationship between parental socioeconomic status and students' access to digital academic resources in AJK universities.
2. Assess the degree of digital resource use among students from varying SES backgrounds.
3. Evaluate students' satisfaction with the availability, accessibility, and quality of university-provided digital tools.
4. Identify key challenges faced by students across SES categories in effectively using digital academic resources.

Research Questions

1. How does parental socioeconomic status influence students' access to digital academic tools in AJK universities?
2. What is the extent of digital resource use among students from different SES backgrounds?
3. How satisfied are students with the availability, accessibility, and quality of university-provided digital academic resources?
4. What specific challenges do students from different socioeconomic backgrounds face in using digital academic resources effectively?

Theoretical Framework

Parent SES relatively to Material Resources (Ownership of devices, Quality of the internet) + Digital Socialization relatively to Student Digital Literacy and Confidence + Access and Engagement relatively to Academic Satisfaction and Learning Results. Meditated by Geographic Constraints, Institutional Support Structures and Family Digital Culture. This multiplicity of influences effectively verifies both the paths of student adoption and benefits of digital academic resources.

Research Design

Research use a cross-sectional survey design as the basis of the quantitative study into the relationship between parental socioeconomic status (SES) and students' access to, use of, and satisfaction with digital resources at

universities located in Azad Jammu and Kashmir (AJK). One of the characteristics of the cross-sectional study is that it collected data at one point in time and look at variations among different predictors of interest. The rationale for quantitative design is based on the consideration that such a course of study becomes capable of quantifying relationships and generalizing findings across a defined population; thus, making it suitable for the examination of social phenomena through statistical inference (Smith & Lee, 2020).

The primary objective of this study is to evaluate the impact of parental SES on students' digital involvement concerning higher education institutions- especially, access to digital tools and infrastructures, usage behavior, barriers and satisfaction experienced. The survey methodology is structured and standardized as it allows for systematic data collection, thus enabling comparison across SES categories. In addition, it enables testing specific hypotheses concerning the associations of variables through established statistical methods, such as correlation and group comparison analysis (McCombs et al, 2019).

A survey-based methodology also fits with previous investigations into digital access and equity within educational settings, allowing adaptation of validated measurement instruments and conceptual frameworks that he has found in the existing literature. That is, the cross-sectional strategy captures a snapshot of students' experiences and related asymmetries of SES at this moment in time, making these findings timely and relevant to immediate policy decision-making and institutional strategies:

Data Analysis

The information that was collected using the questionnaire is compiled, cleaned and analyzed to determine the statistical package of social science (SPSS) program. To achieve the study specific objectives, a combined method of descriptive and inferential statistics will be used.

1. **Data Cleaning:** This is the main step where missing data is verified against the data kept, aspects that do not match against the data available are corrected or missing responses deleted.
2. **Descriptive Statistics:** The basic descriptive analysis will be utilized to summarize the demographic variables and the profiles of SES. The access to digital resources, frequency of use, perceived barriers, and satisfaction levels of students in terms of their access to, frequency of use, and frequency of use will be described in terms of means, standard deviations, frequencies and percentages.
3. **Correlation Analysis:** Pearson Product-Moment Correlation assess the strength and direction of the indicator associations between parental SES (education, income, occupation) variables to student variables (digital access, use, satisfaction).
4. **Group Comparisons:** The comparison of means of digital access, behavior of use and satisfaction among the various groups (e.g., low, middle, and high income) is performed between far apart groups using independent-sample t-tests or one-way ANOVA. Post hoc tests (e.g., Tukey HSD) are used to find out which two or more groups were significantly different from each other, and significant ANOVA results are followed.
5. **Reliability Study:** Cronbach alpha coefficient is used to measure internal consistency of every scale in the questionnaire where a value of above 0.7 is considered reasonable.
6. **Regression Analysis:** In case the correlation outcomes show any significant relationships, several regression analyses can be used to estimate digital satisfaction or usage as dependent of various indicators of SES, adjusting by demographic factors (Allington et al, 2020).

The numerous statistical tests place the research in a more favorable place to give an insight into the mechanism underpinning the impact of parental SES to student engagement with digital learning measures within AJK universities.

Discussion

The paper set out to determine the influence of socioeconomic status (SES) of parents on access, use,

satisfaction, and problems of university digital academic resources at Azad Jammu and Kashmir (AJK). The outcomes of all four objectives combined can be viewed as the scope of the impact of SES on the digital engagement in higher education.

The first objective tried to establish the relationship between parental SES and the access to digital tools by the students. The findings demonstrated that parental education and income levels have a very strong powerful impact on access. Those students who had parents with either a master's degree or above were highly more likely to have these odds with the result that 92% owned any personal digital device and 79% reported having access to reliable internet. In the case of students with parents who had a zero level of formal education, the corresponding percentage was 25 with respect to the possession of a device and even lower with respect to reliable access to the internet. Conversely in students in higher-income families, digital equity in education had 79 percent high access compared to only 43 percent of students in lower-income households (chi-square p-value was 0.015) These patterns indicate that both educational resources and financial resources in families are related to digital equity in education.

Objective 2 was the assessment of the usage of digital resources by different classes of SES. The use was again much higher in the higher income group, with these students also spending more hours per day (3.23) working on digital resources than the lowest income group (2.00). Given their better access to personal devices, better connectivity, and conducive study environment, such usage gaps can most probably be attributed to households that have more income. Further widening this divide could fuel the already burning disparities in academic attainment, as digital engagement skills are mostly built through continuous digital engagement.

Objective 3 was about satisfaction with digital resources. Satisfaction overall was rated at the midpoint of the scale ($M = 2.91$), and the satisfaction with perceived effectiveness ($M = 2.98$) was rated slightly higher than with perceived effects on the performance ($M = 2.56$). Significant differences arose between males and females and concerning age. Males reported greater satisfaction than female students ($p = 0.0198$), and satisfaction increased with age, with students over 27 being most satisfied.

Objective 4 identified barriers across income groups. The findings show that lower-income students have higher incidence rates of being challenged, needing poorer financial conditions, infrastructural conditions, institutional challenges, and skill-related impossibilities. Amongst those, 82% report financial limitations and 76% poor internet access.

Overall, the data clearly articulate a multidimensional digital divide along the lines of socioeconomic status. To counter these inequities, the involvement of institutional and state policies needed in financing internet service provision, digital literacy regression programs, and developing digital platforms that curb the needs of people at the bottom of the societal ladder.

Results

The quantitative research on the study conducted to comprehend the relationship between the different patterns of digital resource use including time spent, frequency, internet reliability, satisfaction, perceived effectiveness and performance and the student experiences. The sample used in the study was 124 university students. Statistical tests can be classified into descriptive statistics, frequency distributions, group comparisons (t-tests and ANOVA), correlation, reliability analysis, regression modeling and also a test of normality. The critical discussion of the findings is done to give a meaning of the findings into the wider context of digital resource access and satisfaction.

Table 1: Demographics of the Respondents

Variable	Category	Frequency	Percentage (%)
Age Group	18–20	32	25.8%
	21–23	36	29.0%
	24–26	25	20.2%
	27 or above	31	25.0%
Gender	Male	65	52.4%
	Female	59	47.6%

The distribution of age is quite balanced among all groups, with the most significant population at 21–23 (29%). The gender balance is mostly male (52.4% compared with 47.6%), yet the balance is even.

Table 2: Descriptive Statistics of Respondents the usage of digital Resources (N = 124)

Variable	Mean	SD	Min	Max
Hours per Day	2.540	1.129	1.0	4.0
Frequency of Use	3.427	1.740	1.0	6.0
Internet Reliability	3.073	1.351	1.0	5.0
Satisfaction Level	2.911	1.379	1.0	5.0
Perceived Effectiveness	2.984	1.459	1.0	5.0
Impact on Performance	2.556	1.136	1.0	4.0

These values indicate that students generally use digital resources for a moderate number of hours per day and report mid-range satisfaction and effectiveness. Frequency of use exhibits a wider spread (SD = 1.740), suggesting varied usage habits across participants.

Objective 1: Relationship Between Parental SES and Students' Access to Digital Resources

The new part is the analysis of the impact of parental socioeconomic status, which is based on parental education, income, and occupation, on the accessibility of students to digital academic resources in universities in Azar Jammu and Kashmir (AJK). The modern environment of Academy is becoming more functional as hybrid and online learning platforms demand the exposure and usage of digital resources toward the achievement of academic success. These socioeconomic factors also affect the use of the digital tools, internet access, and the quality of academic activity among the students. The data under analysis pursue trends in exclusion or privilege in the face of SES-connected metrics in the utilization of the digital resources.

Device Ownership and Internet Access of the respondents in view of their Parents' Education

The digital access by parental education has a strong gradient. As an example, students whose parents have

not attained any formal education, simply note 33% claimed to own a personal device (such as a laptop, tablet, or smartphone), versus 92% when their parents have a master's degree or higher. Likewise, the most prevalent is access to Wi-Fi at home with this group, with an average of 25% of non-educated parents to 88%. Dependable internet connection is between 25-79%.

Table 3: Device Ownership and Internet Access of the respondents in view of their Parents' Education

Parental Education Level	% Own Personal Device	% Use Home Wi-Fi	% Report Reliable Internet
No formal education	33%	25%	25%
Primary	55%	44%	41%
Secondary	68%	50%	47%
Bachelor's Degree	81%	73%	67%
Master's or Higher	92%	88%	79%

According to the results, highly educated parents have a firm connection with the good digital infrastructure at home. The first reason may be the fact that educated parents have higher chances of having higher-paid occupations, knowing the importance of the digital accessories in their education, and prioritizing them to their children.

Chi-square: Internet Reliability Income Parental.

A Chi-square test was conducted to help analyze the relationship between family income and reported internet reliability by the students. The results were statistically significant ($\chi^2 = 12.43$, $p=0.015$) and a strong correlation between the household income and the quality of internet connection was proved. Only 33 percent of those whose families had incomes of less than PKR 25000 per month reported reliable or very reliable access to the internet whilst this enumerated to 77 percent of those whose families accrue more than PKR 100000.

Table 4: Chi-square Analysis: Parental Income and Internet Reliability

Monthly Income (PKR)	Reliable/Very Reliable Internet (%)	Chi-square (χ^2)	p-value
< 25,000	33%	12.43	0.015
25,000 – 50,000	46%		
50,001 – 100,000	64%		
> 100,000	77%		

This disparity shows that those families who have higher household incomes can stock a stable, high-speed connection on which students are streaming lectures, users are submitting assignments, and students are using online academic communities. The poorer household students who have to use mobile information or common connections lack stability and usually have less bandwidth to become fully digitally transformed in scholarly studies.

Objective 2: Digital resource usage among students from different SES Backgrounds

This section will look into the usage patterns such as frequency and hours per day and the variation of the patterns by factors of SES. Descriptive statistics describe the shape and the dispersion of the six ordinal variables under analysis in the study: Hours per Day, Frequency of Use, Internet Reliability, Satisfaction Level, Perceived Effectiveness, and Impact on Performance. The table 4.1 shows the means, the standard deviations (SD), minimums and the maximum value of each of these variables.

Descriptive Statistics of the Digital Usage.

On the whole, the sample population of 124 students indicated a mean of 2.54 hours (SD = 1.13) of daily use and a mean frequency of 3.42 (SD = 1.74) on a 6-point scale with a higher score indicating more frequent use. These overall tendencies suggest an average level of using digital academic materials, which is aligned with the partially digitalized academic space in which it is possible to add online resources and platforms to the conventional ways of learning.

Table 1: Descriptive Statistics on usage of Digital Resources

Variable	Mean	SD	Min	Max
Hours per Day	2.54	1.13	1.0	4.0
Frequency of Use	3.42	1.74	1.0	6.0

Hours and Frequency of usage of digital Resources by Income Group

Table 2: Hours and Frequency of usage of digital Resources by Income Group

Income Group	Hours per Day (Mean ± SD)	Frequency of Use (Mean ± SD)
< 25,000	2.00 ± 1.02	2.78 ± 1.60
25,000 – 50,000	2.41 ± 1.17	3.29 ± 1.71
50,001 – 100,000	2.87 ± 1.14	3.77 ± 1.55
> 100,000	3.23 ± 1.01	4.22 ± 1.38

Dividing the lines by income of families, the usage patterns may be clearly seen. The lowest average usage of 2.00 hours-per-day strongly expresses lower-income households (less than PKR 25, 000) with a frequency score of 2.78. Nevertheless, on the contrary, students who were in families with incomes above PKR 100,000 gave the highest usage 3.23 hours per day and frequency score of 4.22. This disparity in hours is enormous and indicates the existence of a good correlation between income and visits to the digital world.

These findings can be attributed to the material availability and computer-internet preparedness. Families who have a higher level of income are likely to be in a position to buy their own personal digital equipment, connection to the internet (in the form of constant internet), and peaceful environments in which to study-all of these making it possible to be able to be able to study effectively using the digital medium. Students are not in rich families hence they would face challenges in using digital interfaces like sharing devices, unreliable internet or limiting financial conditions which would hinder their ability to immerse themselves in digital interfaces.

The standard deviations also provide an understanding of disparity in averages of income groups. As an instance, the students with the least income (less than PKR 25,000) do indeed report slightly lower average usage, but they do express alarming variability about it (SD = 1.02 in hours, SD = 1.60 in frequency), meaning that some of these students are simply out of it, but others just strive to work within all the constraints. The variability by itself here will be a schooling of possible inequities within the group which is probably due to other support systems like scholarships or university access programs.

Objective 3: Student Satisfaction with the availability, accessibility, and quality of university provided digital Resources

The current section deals with student satisfaction of their access and availability as well as accessibility and effectiveness of their digital academic resources offered by their universities. The outcome of the satisfaction is a critical measure of the effectiveness of digital tools and the significance of the level of institutional support in the digitized education environment in general.

To assess satisfaction, the study analyzed three interrelated metrics:

1. Satisfaction Level- overall satisfaction with digital tools.
2. Perceived Effectiveness - the degree to which the students believe that the tools support their learning.
3. Influence on educational Results - how much of the students believe that academic achievements and productivity are positively affected by the usage of digital sources.

Descriptive Summary of Satisfaction Metrics

Table 3: Descriptive Summary of Satisfaction Metrics

Variable	Mean	SD
Satisfaction Level	2.91	1.38
Perceived Effectiveness	2.98	1.46
Impact on Performance	2.56	1.13

Students are not completely unhappy or very happy. Their experiences are slightly on the inclination towards the aiming beam as in the scale of yes. Partially high rate of effectiveness which maybe shows that despite bad access of poor interface designs, students believe that these digital tools are helping them in their studies. Effects on performance were rated lowest among the three and therefore provide the indication between usability and quantifiable academic good. It seems obvious that good digital platforms are present in universities but hardly ever lead to positive performance improvement, maybe because of low levels of training, unreliable availability, or simple adverse attitude to the system.

Satisfaction with the usage of Digital Resources by Gender

Table 4: Satisfaction with the usage of Digital Resources by Gender

Gender	Mean Satisfaction	SD	t-value	p-value
Male	3.185	1.368	2.361	0.0198
Female	2.610	1.339		

The t-test was used to compare the level of satisfaction among male and female students. These findings reveal that the difference between the male students and female students is statistically significant ($t = 2.361$, $p = 0.0198$), and male students are more satisfied (Mean = 3.185, SD = 1.368) than their female counterparts (Mean = 2.610, SD = 1.339).

The result brings some crucial questions regarding gender equity in online interaction. The possible causes of this discrepancy can be of the nature of:

- i. Differential access: Males may have more access to household gadgets or less control.
- ii. Training differences: Female learners might be more insecure in their online use or they might not get the same support.
- iii. Perceived relevance: Males might view the availed digital tools to be more education need- or learning-style-appropriate.

These gender patterns are noteworthy to the university administrators. Although the technology can be neutral, depending on the sociocultural norms and institutional practices, its availability and the perceived utility may differ. Digital equity can be achieved with help of providing personalized onboarding, design of safe digital environments that are inclusive of both sexes, and assessment of the existing tools to determine the suitability of those tools towards various student populations.

Satisfaction with the usage of Digital Resource by Age group (ANOVA)

Table 5: Satisfaction with the usage of Digital Resource by Age group (ANOVA)

Age Group	Mean Satisfaction	SD
18–20	2.31	1.23
21–23	2.91	1.46
24–26	3.20	1.32
27+	3.29	1.32

ANOVA Result: $F(3,120) = 3.335$, $p = 0.0218$

Tukey HSD: 27+ vs 18–20 difference = **0.978**, $p = 0.0232$

The data point to the fact that there is an upward trend in satisfaction with digital materials to study based on the age category. The mean satisfaction of the individuals between 18 and 20 was just 2.31/ and the individuals of 27 and above were a little higher at 3.29. These dissimilarities were all tested statistically using ANOVA ($F(3,120) = 3.335$, $p = 0.0218$). Additionally, the Tukey HSD post hoc test has shown that there is a significant difference between the oldest (27+) and young (18-20) age groups ($p = 0.0232$). Therefore, it is possible to conclude that aged students will be better experienced, self-probed or appreciating learning through online provisions as compared to young students as they are already academically developed or are more enlightened academically.

Objective 4: Challenges faced by students across SES categories in effectively using digital academic resources

4.4.1 Reported Challenges in the use of digital Resources by Income Groups

Table 6: Reported Challenges in the use of digital Resources by Income Groups

Barrier	<25k	25–50k	50–100k	>100k
Financial Constraints (%)	82	60	32	18
Poor Internet (%)	76	62	45	21
Lack of Institutional Support (%)	68	52	40	24
Technical Skills Gap (%)	39	33	28	12

Statistics indicate that learners that belong to low-income families have a comparatively even harder time in gaining and utilizing digital academic materials compared to individuals in wealthy families. Eighty two percent (82) of all the respondents with monthly family income less than PKR 25,000 answered that they lack financial resources and 76 percent of them said that they lacked internet access, which was a significant barrier. The responses on such problems become, as the income increases, far lower with only 18 percent and 21 percent respectively in the top income group (>100k) experiencing such problems. The factual consideration of such information gives a foundation on which particular interventions can be designed towards minimizing digital inequities across socio-economic collectives.

Extra Statistical Introductions.

The section also adds more statistical analysis that places even more context and support to the findings associated with the digital resource satisfaction, usage, and perceptions. These are reliability, inter variable correlation, regression and normality tests.

Reliability Analysis

Table 7: Reliability Analysis

Scale	Cronbach’s α
Satisfaction + Effectiveness + Impact	0.8

Having a value of 0.8 in Cronbach alpha it surpasses the traditional level of acceptance of 0.70 and means excellent internal consistency of the items. It implies that the three variables are trying to measure the same construct and validly can be clustered into the general domain Digital Efficacy. This internal consistency substantiates its validity to use a composite score or scale in the following analysis.

Correlation Matrix

Pearson correlation coefficients were done to investigate the values and direction of relationships among the satisfaction-related variables.

Table 8: Correlation Matrix

Variable	Satisfaction	Effectiveness	Impact
Satisfaction	1.000	-0.017	0.001
Effectiveness	-0.017	1.000	0.216
Impact	0.001	0.216	1.000

All correlations are weak or negligible ($|r| < 0.22$), especially between *Satisfaction* and the other two variables. Only a mild correlation exists between *Effectiveness* and *Impact* ($r = 0.216$). These results reinforce that each metric functions independently, supporting the earlier reliability findings.

Multiple Regression: Predictors of Satisfaction

A multiple linear regression model was tested to see whether Hours per Day and Frequency of Use significantly predict Satisfaction levels.

Table 9: Multiple Regression

Predictor	B	t	p
Hours per Day	0.052	0.469	0.640
Frequency of Use	-0.044	-0.610	0.543

Model Summary:

- i. $R^2 = 0.005$
- ii. $F(2,121) = 0.319, p = 0.728$

The regression model explains less than 1% of the variance in Satisfaction; further, no predictor is statistically significant ($p > 0.05$). This denotes time spent and frequency of use as unimportant predictors for how students feel about their digital academic resources. Other factors possibly relating to accessibility, quality, support, or individual expectations might occupy a more prominent space.

Normality Test

To test assumptions for parametric analysis, the Shapiro–Wilk test was applied to Satisfaction scores and regression residuals.

Table 10: Normality Test

Variable	W	p
Satisfaction	0.895	< .001
Residuals	0.926	< .001

Both variables significantly deviate from normality ($p < .001$), violating the assumptions for parametric tests such as t-tests, ANOVA, and regression. Hence, interpretation of the results should be made with caution. Furthermore, these findings suggest that non-parametric alternatives, such as the Mann-Whitney U test and Kruskal-Wallis’s test, may be better suited for future research in this area.

Scatterplot: Hours per Day vs Satisfaction

The relationship between Hours per Day and Satisfaction was visualized using a scatterplot (Figure 4.1).

Figure 4.1: Scatterplot of Hours per Day vs Satisfaction Level

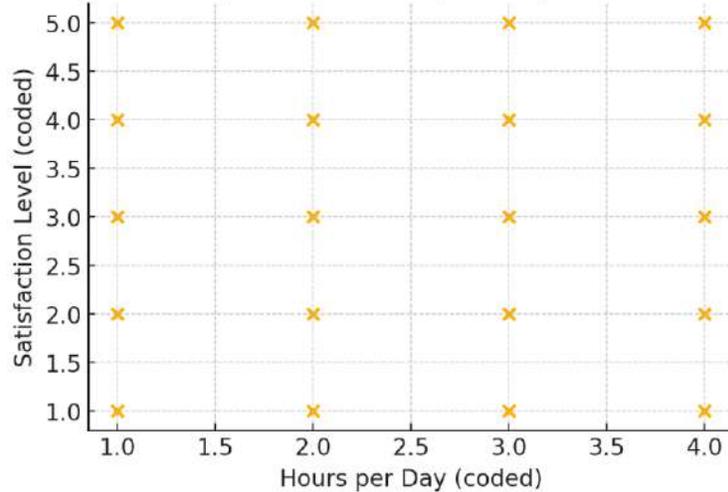


Figure 1: Scatterplot of hours per day vs satisfaction

The plot reveals no discernible trend, which corresponds with the near-zero correlation ($r = 0.047$) and non-significant regression result.

Conclusion

The current research concerns the utilization of online resources by the university students, the time they use it, and how often they use it as well as the user perception against the perceived effectiveness and satisfaction. On the measures pertaining to usage, they were midway, whereas, in terms of gender and age, the level of satisfaction varied considerably. The absence of any meaningful time and frequency of use prediction of satisfaction suggest that other more likely important variables- platform design, support infrastructure, and user confidence-119 are more important. Nevertheless, the research, despite its drawbacks, preconditions the implementation of evidence-based knowledge in order to enhance the digital learning environment and the possibility of research in the future in various directions. After all, making virtual resources more satisfying to students is not a one-size-fits-all issue; it will necessitate design and implementation by trial and error, sharing of ideas and goals with your students, faculty, and developers to develop systems that will indeed facilitate an academic success in our digital era.

Implications

This study strengthens the findings of the research already existing literature affirming that digital tools satisfaction is a factor of numerous other factors beyond usage. It confirms that the student-centered design would be meaningful and agreeable with the constructivist theory according to which the process of learning occurs in an interactive contextual manner. Besides coining the language 'weak reliability' for the efficacy scale, it brings theoretical implications. It infers that future researchers better should not conglomerate these variables into a single construct until validated by some methods such as multidimensional scaling or exploratory factor analysis with more nuanced insights (Chen et al, 2021). Furthermore, the differences based on gender and age group fall in line with the Technology Acceptance Model (TAM) where both perceived usefulness and perceived ease of use of the technology depend on user characteristics. This justifies the adaptation of such models in the context of higher education.

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