



Media Multitasking and Its Effects on Cognitive Functioning Among Educated Youth

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ABSTRACT

Background: Digital technologies have created highly connected learning environments in which smartphones, social networking applications, online resources and entertainment media coexist with academic activity. Media multitasking may therefore place competing demands on attention and working memory. **Objective:** This study examined patterns of technological immersion and media multitasking and their reported relationships with concentration, forgetting and information retention among educated youth in Faisalabad, Pakistan. **Method:** A quantitative, survey-based design was used with 500 respondents. Descriptive statistics were used to characterize digital engagement and cognitive experiences, while Pearson chi-square tests and Spearman rank-order correlations were used to examine hypothesized associations. **Results:** Technological immersion was substantial: 65.8% of respondents reported more than four hours of daily internet use; smartphones were the most frequently reported primary study device (38.4%); 48.8% reported more than ten notifications during a study hour; and 61.4% reported more than ten study-social-media switches per hour. A significant association was found between daily internet usage and concentration duration, $\chi^2(9)=18.407$, $p=.031$, and between applications opened while studying and forgetting study content, $\chi^2(9)=23.684$, $p=.005$. In contrast, several Spearman correlations were non-significant, including daily internet use and forgetting ($\rho=-.065$, $p=.149$), applications opened and concentration duration ($\rho=-.048$, $p=.286$), and notifications and study experience ($\rho=.009$, $p=.844$). **Conclusion:** The findings support a contextual rather than deterministic interpretation of digital technology and cognition. The cognitive significance of media multitasking appears to depend on the type and timing of digital engagement, the academic context, and users' regulation of digital interruptions.

Introduction

The rapid expansion of smartphones, social networking platforms, online learning systems and streaming services has transformed the communicative environment in which educated young people study and interact. Rather than consuming one medium at a time, students can now read academic material while receiving notifications, messaging, browsing social media or viewing videos. Media multitasking consequently represents both a behavioural pattern and a cognitive condition in which attention is repeatedly allocated across competing information streams.

The growing prevalence of technological immersion has intensified scholarly concern regarding the cognitive implications of continuous multitasking behaviors. Technological immersion refers to the deep integration of digital technologies into everyday human experiences, where individuals remain persistently connected to digital platforms for communication, entertainment, learning, and social interaction. Within this immersive technological environment, educated youth are increasingly exposed to fragmented attentional patterns, rapid information switching, and persistent sensory stimulation. Researchers argue that these conditions may reshape cognitive functioning, perceptual experience, and information-processing capacities among younger populations (Drody et al., 2025).

The rapid consumption of digital content in multitasking environments can reinforce superficial processing habits, making it more difficult for individuals to engage in sustained and meaningful cognitive activities (Ralph et al., 2025).

The educational relevance of this transformation is considerable. Learning depends on sustained attention, working memory, encoding, comprehension and retrieval. When unrelated digital activity competes with a learning task, available cognitive resources may be redirected from the primary task. The thesis frames this issue through Cognitive Load Theory (CLT), which emphasizes the limited capacity of working memory and the possibility that competing information demands can produce cognitive overload (Sweller, 1988; Sweller et al., 2019). The framework is particularly useful for interpreting notifications, application switching and simultaneous academic/non-academic activity as additional demands on a cognitively limited system.

Recent scholarship reviewed in the thesis indicates that media multitasking is associated with attentional control, working-memory performance, comprehension and academic outcomes, although the strength and direction of effects vary by task and context. Research has also emphasized that multitasking should not automatically be equated with impairment: certain interactive activities may support flexibility under specific conditions. This study therefore adopts a balanced empirical approach and distinguishes statistically significant associations from non-significant relationships.

Literature Review and Theoretical Framework

Technological immersion and media multitasking

Technological immersion extends beyond screen time to the continuous integration of digital devices and platforms into academic, social and recreational routines. Smartphones in particular combine communication, entertainment, information seeking and education in one portable

interface. In educational settings, the resulting overlap makes rapid task switching easy and normal. Reviews of digital multitasking indicate that concurrent and sequential forms of multitasking place different demands on cognition and that working memory is an important component in explaining performance differences (Zhong et al., 2025).

Evidence concerning memory is similarly important. Media multitasking during learning can divide attention at the point of encoding, while repeated switching may interfere with maintenance and integration of information. Hutasuht et al. (2024) reported effects of media multitasking on working-memory performance among university students, while Uncapher et al. (2024) examined differences in working and long-term memory associated with media multitasking. These findings provide a conceptual basis for examining forgetting and information retention in the present survey.

Cognitive Load Theory

Cognitive Load Theory proposes that working memory has limited capacity for processing new information, while learning involves the organization and integration of information with knowledge structures in long-term memory (Sweller, 1988; Sweller et al., 2019). In the present context, academic content constitutes the primary learning demand, whereas irrelevant notifications, social media, messages and entertainment can introduce additional extraneous demands. Repeated movement between activities may therefore reduce the cognitive resources available for sustained concentration and meaningful processing.

The thesis explicitly applies CLT to concentration, attention, information retention, forgetting, mental exhaustion and perceived cognitive strain. Importantly, CLT does not establish that every instance of technology use is harmful. Rather, it predicts that cognitive demands become problematic when they exceed available processing capacity. This distinction is consistent with the present study's mixed inferential results.

Research gap and study contribution

The thesis identifies three related gaps. First, much of the literature has concentrated on individual cognitive outcomes rather than integrating attention, memory, information processing and perceptual experience. Second, much empirical evidence comes from developed or controlled settings, leaving comparatively less contextualized evidence from developing environments. Third, real-world student behaviour involves overlapping academic, social and entertainment media rather than a single isolated digital activity. The present study addresses these gaps through empirical evidence from educated youth in Faisalabad and its surrounding context.

Research Questions and Hypotheses

The study asked how educated youth use multiple media during academic tasks, how such practices relate to concentration and information retention, how digital immersion is experienced, and which strategies respondents consider useful for reducing cognitive overload. The statistical hypotheses focused on daily internet use and concentration, application opening and forgetting, notifications and study experience, study–social-media switching and information remembered, phone checking and examination recall, age and study experience, and education level in relation to forgetting, problems and study experience.

Method

Design and setting

The thesis reports a quantitative research design using a survey-based approach to investigate media multitasking, cognitive overload and information retention among youth in Faisalabad. The design enabled measurable variables to be examined using descriptive and inferential statistics. The study was situated primarily in Faisalabad and surrounding areas, within the wider Pakistani context.

Participants

The analytic sample comprised 500 respondents. The sample was 61.4% male (n=307), 37.8% female (n=189), and 0.8% preferred not to say (n=4). The largest age group was 21–23 years (50.2%, n=251), followed by 24–26 years (20.0%, n=100), 18–20 years (15.8%, n=79), and above 26 years (14.0%, n=70). Educationally, 67.6% held BS (H) status, 20.2% were in the MS/MPhil category, and 12.2% were PhD respondents.

Measures and analysis

The thesis operationalized digital immersion and multitasking through variables including daily internet usage, primary study device, applications used while studying, notifications per study hour, study–social-media switching, phone checks per day, concentration duration, study experience, forgetting, information remembered and reported problems. Descriptive frequencies and percentages were calculated. Pearson chi-square tests assessed associations among categorical variables, and Spearman rank-order correlations assessed monotonic relationships. Statistical significance was evaluated at $\alpha=.05$.

Results

Digital engagement profile

Indicator	Finding
Daily internet use	65.8% reported more than 4 hours/day
Primary study device	Smartphone 38.4%; laptop 31.6%; tablet 16.0%; desktop 14.0%
Study-hour notifications	48.8% reported more than 10 notifications/hour
Study–social-media switching	61.4% reported more than 10 switches/hour
Phone checking	36.4% checked 51–100 times/day; 33.6% checked 20–50 times; 16.4% >100 times
Concentration	20–40 minutes was the largest category (42.6%)
Forgetting study content	73.6% reported some degree of forgetting

The descriptive pattern indicates a highly connected learning environment. More than half of the sample reported frequent smartphone checking and frequent movement between study and social media. This does not by itself demonstrate cognitive impairment, but it establishes the behavioural context in which competing cognitive demands may occur.

Reported cognitive and experiential difficulties

Reduced motivation was the most frequently reported major problem (35.0%), followed by stress (30.8%), confusion (18.2%) and forgetfulness (16.0%). In a separate measure of disadvantages, time wastage was selected by 33.8%, poor memory by 29.0%, poor concentration by 26.2%, and stress by 11.0%. Following multitasking, approximately 31% reported mental exhaustion and approximately 30% reported being unable to continue, whereas about 19% reported feeling relaxed. These measures represent self-reported experiences and should not be interpreted as objective neurological impairment.

Hypothesis testing

Relationship	Test result	Decision
Daily internet use × concentration duration	$\chi^2(9)=18.407$, $p=.031$	Significant; reject H_0
Apps opened while studying × forgetting	$\chi^2(9)=23.684$, $p=.005$	Significant; reject H_0
Notifications/hour × study experience	$\chi^2(9)=8.381$, $p=.496$	Not significant; retain H_0
Age × study experience	$\chi^2(9)=11.465$, $p=.245$	Not significant; retain H_0
Education × study experience	$\chi^2(6)=8.363$, $p=.213$	Not significant; retain H_0
Education × forgetting	$\chi^2(6)=1.644$, $p=.949$	Not significant; retain H_0
Education × biggest problem	$\chi^2(6)=1.644$, $p=.949$	Not significant; retain H_0

The two statistically significant chi-square findings indicate that categories of daily internet use differed in their distribution across concentration-duration categories and that application use while studying was associated with reported forgetting. Because chi-square tests establish association rather than temporal or causal direction, the results should not be interpreted as evidence that internet use or application opening causes cognitive decline.

Spearman relationship	P	p	Interpretation
Daily internet use × forgetting	-.065	.149	Negligible, non-significant
Apps opened × concentration duration	-.048	.286	Negligible, non-significant
Notifications × study experience	.009	.844	Negligible, non-significant
Study–social-media switches × information remembered	-.006	.902	Negligible, non-significant
Phone checks × examination recall	.025	.573	Negligible, non-significant

Discussion

The findings portray educated youth as operating within a technologically saturated environment. Smartphones are central study devices, internet exposure is high, and switching between study and social media is common. This pattern is compatible with scholarship describing media multitasking as a routine feature of contemporary digital life rather than an exceptional behaviour. The significant association between internet-use category and concentration duration also indicates that the relationship between overall digital exposure and attention deserves contextual analysis.

The association between applications opened while studying and forgetting is particularly relevant to CLT. When academic content is processed alongside unrelated application content, cognitive resources may be allocated to competing information. The observed association is therefore theoretically compatible with the proposition that extraneous demands can interfere with learning. At the same time, the non-significant Spearman association between daily internet use and forgetting cautions against treating total exposure time as a simple proxy for memory outcomes.

The mixed results are important. Notifications were not significantly associated with study experience, and study–social-media switching was not significantly correlated with information remembered. Phone checking was likewise unrelated to examination recall in the Spearman analysis. These findings support a differentiated model in which the type, purpose, timing and context of digital activity may matter more than raw frequency alone. They also prevent an overly deterministic claim that technology use inevitably damages cognition.

Implications

1. Educational institutions can promote focused-study practices and digital self-regulation without requiring complete withdrawal from technology.
2. Students may reduce avoidable cognitive competition by separating academic tasks from recreational media use during demanding study periods.
3. Notification management, phone distancing and intentional application control can be incorporated into digital-learning guidance.
4. Educators can include media-literacy activities that teach students to recognize task switching and manage competing digital demands.
5. Future interventions should be tested experimentally rather than assuming that all digital engagement has the same cognitive effect.

Limitations

The study is survey-based and relies substantially on self-reported behaviour and experiences. Consequently, the findings cannot establish causation or objective cognitive impairment. The sample is concentrated in Faisalabad and surrounding areas and should not automatically be generalized to all Pakistani youth. The source thesis also reports several categorical variables, which can obscure finer-grained differences in actual usage duration or task characteristics. Future work should combine survey measures with objective digital traces, experimental attention and memory tasks, and longitudinal designs.

Conclusion

Educated youth in the study operate within a highly immersive digital environment characterized by substantial internet use, smartphone dependence for study, frequent notifications and repeated study–social-media switching. Two associations—daily internet use with concentration duration and application use while studying with forgetting—were statistically significant, whereas several other hypothesized relationships were not. The overall evidence therefore supports a contextual interpretation of media multitasking. Digital technology is neither uniformly harmful nor uniformly beneficial; its cognitive significance depends on how, when and why it is integrated into demanding activities.

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