Internet engagement profiles, cyberloafing, and academic achievement among high school students

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ABSTRACT

This study examines the relationships among high school students' academic achievement, cyberloafing, problematic internet use, and Internet Engagement Profiles. It further investigates whether these variables differ according to gender, parental education levels, daily study time, and smartphone checking frequency. A cross-sectional correlational research design was employed. The study sample consisted of 598 high school students attending public and private secondary schools, selected through maximum variation sampling. Data were collected using a survey including self-reported GPA, the Problematic Internet Consumption Scale, the Internet Engagement Profile Scale, and a Cyberloafing Scale developed for the present study. Academic achievement was measured using students' self-reported grade point averages. The data were analyzed using independent samples t tests, analysis of variance, and Pearson product moment correlation analysis. The findings revealed significant negative relationships between academic achievement and both cyberloafing and problematic internet use. In contrast, academic achievement was positively associated with the information-seeking Internet Engagement Profile. Male students reported higher levels of problematic internet use and cyberloafing than female students. In addition, longer daily study time and less frequent smartphone checking were associated with higher academic achievement and more adaptive Internet Engagement Profiles. Overall, the results indicate that maladaptive digital behaviors are negatively related to academic outcomes, whereas information-oriented internet engagement supports academic success.

Cite this as

Sarıyıldız, M. S., & Şimşek, A. S. (2025). Internet engagement profiles, cyberloafing, and academic achievement among high school students. *Journal of Educational Innovations & Practices*, 1, Article e4. **https://doi.org/10.65933/fdwatf21**

1 INTRODUCTION

The widespread integration of digital technologies and continuous internet access has fundamentally transformed the learning environments of contemporary adolescents. Although digital connectivity offers important educational advantages such as rapid access to information, enhanced communication, and diversified learning opportunities, it also introduces substantial challenges related to academic engagement and cognitive focus. One of the most critical issues in this context is the increasing tendency to use digital technologies for non-academic purposes during learning related activities, which may weaken sustained attention and academic performance.

Within this framework, problematic internet consumption has emerged as a central construct. This pattern of internet use is characterized not only by high frequency but also by reduced self-regulation, psychological preoccupation, and persistent fear of missing out, often resulting in functional impairments in daily life. A broad consensus in the literature indicates that problematic internet consumption is negatively associated with academic outcomes (Koç & Tamer, 2011). Empirical studies have consistently linked this construct to reduced academic performance (Ceyhan, 2011; Öztabak, 2018), with similar findings reported among high school students (Arslankara & Usta, 2020; Zorbaz & Dost, 2014). In addition, problematic internet consumption has been associated with psychosocial difficulties such as increased social anxiety (Şahan & Çapan, 2017) and feelings of loneliness (Çağır & Gürgan, 2010).

Another closely related phenomenon in educational settings is cyberloafing. Initially conceptualized in organizational contexts (Lim, 2002), cyberloafing refers to engaging in personal and non-academic digital activities during time allocated for academic tasks. In school contexts, this includes activities such as social media use, messaging, online gaming, or unrelated browsing during lessons or study periods. Research has demonstrated that cyberloafing is a significant negative predictor of academic achievement and school success (Akgün, 2019; Ceyhan, 2008; Simanjuntak et al., 2022). Moreover, cyberloafing has been linked to technology related dependencies, including nomophobia (Şahin et al., 2022) and smartphone addiction (Sarıtepeci, 2020), suggesting that this behavior may reflect deeper patterns of problematic internet engagement.

Importantly, the academic consequences of internet use are not uniformly negative. Recent research suggests that the purpose and nature of internet use may be more influential than duration alone (Junco, 2012). In this respect, internet engagement profiles provide a useful framework for differentiating patterns of online behavior (Şimşek & Akbulut, 2022). Active and information seeking internet engagement, characterized by purposeful use of digital resources for learning and inquiry, has been positively associated with academic performance (Garmah, 2023; Kirschner & Karpinski, 2010). In contrast, engagement profiles dominated by passive consumption or entertainment-oriented use have been consistently linked to poorer academic outcomes (Yörük & Taylan, 2018).

These patterns of internet engagement are further shaped by demographic and contextual factors. Parental education levels (İkiz et al., 2015) and parental monitoring practices (Demir et al., 2017) have been identified as important factors influencing adolescents' internet behaviors and academic outcomes. Gender differences in internet use patterns have also been widely examined, although findings remain inconsistent (Gezgin et al., 2018; Zorbaz & Dost, 2014). Additionally, routine behaviors such as frequent smartphone checking, which is closely associated with smartphone addiction (Sarıtepeci, 2020), appear relevant but have rarely been examined within integrated analytical frameworks.

Despite the growing body of research, problematic internet consumption, cyberloafing, and internet engagement profiles have predominantly been examined separately. This fragmented approach limits understanding of how these interrelated behaviors collectively relate to academic achievement. Consequently,

there remains a need for a comprehensive perspective that simultaneously considers these constructs and examines their combined associations with academic outcomes among high school students.

Although extensive research has documented the negative academic consequences of problematic internet use and cyberloafing, these behaviors are often examined in isolation, detached from the broader functional patterns of adolescents' digital engagement. Such an approach limits understanding of how different forms of internet use coexist within students' daily academic routines and how regulatory mechanisms shape their combined impact on academic achievement. From a self-regulation perspective, cyberloafing, problematic internet consumption, and internet engagement profiles should not be treated as independent phenomena, but rather as interconnected behavioral expressions competing for limited cognitive and attentional resources. Academic routines, such as daily study time and habitual smartphone checking, may therefore play a critical regulatory role by either amplifying maladaptive digital behaviors or supporting more purposeful, information-seeking engagement. Without an integrated analytical framework that simultaneously considers these interrelated digital behaviors and their behavioral regulators, it remains difficult to identify which forms of internet engagement undermine academic performance and which may support it. Addressing this problem, the present study examines academic achievement, cyberloafing, problematic internet consumption, and internet engagement profiles within a unified framework, while also considering key demographic and behavioral factors that structure adolescents' everyday digital practices.

In line with this purpose, the following research questions were addressed:

1. Is there a significant difference in academic achievement, cyberloafing, problematic internet consumption, and internet engagement profiles based on gender?
2. Is there a significant difference in these variables based on mother's education level?
3. Is there a significant difference in these variables based on father's education level?
4. Is there a significant difference in these variables based on daily study time?
5. Is there a significant difference in these variables based on smartphone control frequency?
6. Is there a significant relationship between academic achievement, cyberloafing, problematic internet consumption, and internet engagement profiles?

2 LITERATURE REVIEW AND THEORETICAL FRAMEWORK

The relationship between adolescents' digital behaviors and academic outcomes is inherently multifaceted and requires a theoretical perspective that accounts for both individual self-regulation mechanisms and the functional characteristics of internet use. Consistent with the conceptual framework outlined in the introduction, the present study is grounded in self-regulation theory and cognitive resource allocation. Within this framework, internet use is not conceptualized as a uniform activity but rather as a range of behaviors extending from purposeful, information-seeking engagement to uncontrolled and passive consumption. These forms of engagement differ substantially in the extent to which they draw upon limited cognitive resources that are essential for sustained academic engagement and achievement.

2.1 The Cognitive Cost of Digital Distraction: Cyberloafing

Cyberloafing was initially defined in organizational settings as the use of internet access for personal purposes during work hours (Lim, 2002) and has since been adapted to educational contexts to describe students' engagement in non-academic digital activities during instructional or study time. From a theoretical standpoint, cyberloafing reflects deficiencies in attention regulation rather than momentary distraction. It represents a form of mental withdrawal from the learning context, in which cognitive resources are diverted away from academic tasks. When students engage in non-academic activities such as social media use, messaging, or unrelated

browsing during learning time, attentional focus becomes fragmented, leading to reduced depth of information processing. Empirical findings consistently support this interpretation, demonstrating that higher levels of cyberloafing are associated with lower academic performance, reduced classroom engagement, and diminished school success (Akgün, 2019; Ceyhan, 2008; Simanjuntak et al., 2022). Moreover, cyberloafing has been shown to co-occur with broader patterns of problematic digital behavior, including nomophobia and smartphone addiction (Sarıtepeci, 2020; Şahin et al., 2022). These associations suggest that cyberloafing is not merely a situational behavior but is closely tied to underlying self-regulation difficulties.

2.2 Loss of Control: Problematic Internet Consumption

Whereas cyberloafing primarily reflects context-specific distraction, problematic internet consumption captures the compulsive and pervasive dimension of digital behavior. Problematic internet consumption is characterized by diminished self-control, psychological preoccupation with online content, and continued internet use despite negative consequences for daily functioning. In line with the self-regulation perspective adopted in this study, problematic internet consumption represents a failure to align immediate behavioral impulses with longer-term academic goals. The literature provides strong evidence that problematic internet consumption is negatively associated with academic achievement. Studies conducted with high school students have consistently reported negative relationships between problematic internet consumption and grade point averages (Arslankara & Usta, 2020; Ceyhan, 2011; Öztabak, 2018). In addition, problematic internet consumption is embedded within a broader psychosocial context. Research has linked this construct to higher levels of social anxiety, aggression, and loneliness (Çağır & Gürgan, 2010; Durak et al., 2017; Şahan & Çapan, 2017). These findings support a theoretical view in which psychosocial difficulties and problematic internet consumption mutually reinforce one another, contributing to sustained academic difficulties.

2.3 Differentiating Purpose: Internet Engagement Profiles

A key limitation of earlier research on internet use was the tendency to treat online activity as a homogeneous construct. More recent studies, consistent with the Uses and Gratifications perspective, emphasize that the purpose of internet use is a more meaningful predictor of academic outcomes than frequency or duration alone. In this context, internet engagement profiles provide a conceptual framework for distinguishing qualitative differences in online behavior (Şimşek & Akbulut, 2022). Internet engagement profiles differentiate between students who primarily use the internet for information-seeking and academically oriented purposes and those whose engagement is dominated by passive consumption or entertainment-focused use. Empirical evidence indicates that these profiles are associated with distinct academic outcomes. Information-seeking engagement has been positively associated with academic achievement and grade point averages (Garmah, 2023; Kirschner & Karpinski, 2010), whereas engagement characterized by passive or recreational use has been linked to poorer academic performance (Yörük & Taylan, 2018). These findings align with the theoretical assumption guiding the present study that internet use is not inherently detrimental but that its academic impact depends on the nature of the engagement profile.

2.4 Synthesis and Research Gap

Taken together, existing research demonstrates that cyberloafing and problematic internet consumption are associated with adverse academic outcomes, whereas information-seeking internet engagement profiles are linked to more favorable academic performance. However, much of the literature has examined these constructs independently, limiting understanding of how they jointly relate to academic achievement. Research integrating academic achievement, cyberloafing, problematic internet consumption, and internet engagement profiles within a single analytical framework remains limited, particularly among high school populations.

Furthermore, although demographic and behavioral factors such as parental education, daily study time, and

smartphone checking frequency have been examined individually, their roles within an integrated model of internet engagement remain insufficiently explored. Addressing these limitations, the present study adopts a comprehensive relational approach to examine the interrelationships among academic achievement, cyberloafing, problematic internet consumption, and internet engagement profiles, while also considering key demographic and behavioral variables.

3 METHODOLOGY

This study investigates the relationships between high school students' academic achievement, cyberloafing, problematic internet consumption, and internet engagement profiles. In line with this aim, the methodology section presents the research design, characteristics of the study sample, data collection instruments, and data analysis procedures in a manner that ensures methodological transparency and reproducibility.

3.1 Research Design
A cross-sectional correlational research design was employed to examine the degree and direction of associations among the study variables without experimental manipulation. This design is widely used in educational and behavioral research to describe existing conditions and to identify relationships among multiple variables within a natural context. Academic achievement, cyberloafing, problematic internet consumption, and internet engagement profiles constituted the primary outcome variables of the study. Gender, parental education levels, daily study time, and smartphone control frequency were treated as independent variables within the relational framework.

3.2 Participants
The study sample consisted of 598 high school students enrolled in public and private secondary education institutions during the 2022–2023 academic year. A maximum variation sampling strategy, which is frequently employed in studies examining adolescent digital behaviors and problematic internet use, was used to ensure heterogeneity with respect to school type and grade level. Maximum variation sampling was used to ensure heterogeneity across school types and grade levels (Patton, 2015). The sample represented a range of school types, including Anatolian High Schools (54.7%, n = 338), Science High Schools (20.4%, n = 126), Imam Hatip High Schools (13.4%, n = 83), and Vocational High Schools (11.5%, n = 71). Students from all grade levels of secondary education were included, with 22 percent in the ninth grade (n = 131), 25 percent in the tenth grade (n = 147), 42 percent in the eleventh grade (n = 252), and 11 percent in the twelfth grade (n = 65). In terms of gender, the sample comprised 58 percent male students (n = 344) and 42 percent female students (n = 252).

3.3 Data Collection Instruments
Data were collected using a structured survey package consisting of a personal information form and three measurement instruments. The personal information form was designed to obtain demographic and behavioral data related to gender, parental education levels, daily study time, and smartphone control frequency.

Problematic internet consumption was assessed using the Problematic Internet Consumption Scale developed by Şimşek and Akbulut (2022). This instrument consists of 18 items rated on a three-point Likert scale and measures problematic internet use across three dimensions: loss of control, fear of missing out, and dysfunctionality in daily life. Higher scores indicate higher levels of problematic internet consumption. Previous validation studies reported high internal consistency (α = .92; Şimşek & Akbulut, 2022).

Internet engagement profiles were measured using the Internet Engagement Profile Scale, also developed by Şimşek and Akbulut (2022). These 13 items, three-point Likert type scale assesses the purpose of internet use across four subdimensions: passive consumer, information seeker, social user, and content creator. Reliability coefficients for the subdimensions ranged from .70 to .87, indicating acceptable to high levels of internal

consistency.

Cyberloafing behaviors were measured using a five-item scale developed specifically for this study in accordance with the scale development procedures proposed by DeVellis (2016). To establish construct validity, the dataset was randomly divided into two subsamples for exploratory and confirmatory factor analyses. Exploratory factor analysis conducted on the first subsample (n = 237) yielded a single factor structure explaining 48.89 percent of the total variance, with adequate sampling adequacy (KMO = .781) and a significant Bartlett's test of sphericity (p < .001). Confirmatory factor analysis conducted on the second subsample (n = 361) supported the one factor solution and demonstrated good model fit (χ^2/df = 1.85, RMSEA = .049, CFI = .988, GFI = .989). The internal consistency coefficient of the cyberloafing scale was .71, indicating adequate reliability.

3.4 Data Analysis

Data analyses were conducted using SPSS version 26 and LISREL version 8.80. Prior to inferential analyses, the dataset was screened for missing values and outliers. The assumptions of normality were evaluated using the Shapiro–Wilk test, visual inspection of histograms, and Q–Q plots, while homogeneity of variances was assessed using Levene's test. As the data met the assumptions required for parametric analyses, independent samples t tests were used for comparisons involving two groups, and one way analysis of variance was applied for comparisons involving more than two groups. Tukey post hoc tests were conducted to identify the sources of statistically significant differences. Pearson product moment correlation analysis was employed to examine the direction and strength of relationships among academic achievement, cyberloafing, problematic internet consumption, and internet engagement profiles. The significance level for all statistical analyses was set at p < .05.

4 FINDINGS

This section presents the results of the analyses regarding the relationships between high school students' academic achievement, cyberloafing levels, problematic internet consumption (PIC), and internet engagement profiles (IEP), and whether these variables differ according to demographic characteristics including gender, parental education status, daily study time, and smartphone checking frequency.

4.1 Findings Related to Gender

To address the first research question, independent samples t tests were conducted to examine whether academic achievement, problematic internet consumption, internet engagement profiles, and cyberloafing differed according to gender. The results of these analyses are presented in Table 1.

TABLE 1
t-test results of variables by gender

Variable	Group	N	M	SD	t	df	p
Academic Achievement	Male	344	84.66	14.05	-.036	480	.971
	Female	252	84.70	11.82			
Problematic Internet Use	Male	344	59.81	14.20	-2.117	557	.035*
	Female	252	62.39	14.25			
IEP - Passive Consumption	Male	344	77.48	16.03	-3.447	582	.001*
	Female	252	81.91	14.39			
IEP - Information Seeking	Male	344	77.67	16.62	-2.860	581	.004*
	Female	252	81.56	15.76			
IEP - Social Use	Male	344	61.60	18.66	-1.172	585	.242
	Female	252	63.45	19.15			
IEP - Content Creation	Male	344	57.73	19.27	-1.470	585	.142
	Female	252	55.46	17.37			
Cyberloafing	Male	344	65.21	14.66	-2.900	578	.004*

Note. *p < .05, IEP: Internet Engagement Profile.

As shown in Table 1, no statistically significant difference was found between male and female students in terms of high school grade point average, t(480) = −.036, p = .971. In contrast, significant gender differences emerged for several internet related variables. Female students reported significantly higher levels of problematic internet consumption (M = 62.39) than male students (M = 59.81), t(557) = −2.117, p = .035.

With respect to internet engagement profiles, female students scored significantly higher than male students on the passive consumer dimension (female M = 81.91, male M = 77.48), t(582) = −3.447, p = .001, as well as on the information seeker dimension (female M = 81.56, male M = 77.67), t(581) = −2.860, p = .004. No statistically significant gender differences were observed for the social user and content creator dimensions of internet engagement profiles (p > .05).

Regarding cyberloafing behaviors, female students demonstrated significantly higher levels than male students, t(578) = −2.900, p = .004. Taken together, these findings indicate that although academic achievement did not differ by gender, female students reported higher levels of problematic internet consumption, greater engagement in passive and information seeking internet use, and higher cyberloafing behaviors.

4.2 Findings Related to Parental Education Levels
To examine whether students' academic achievement, cyberloafing, problematic internet use, and internet engagement profiles differed according to parental education levels, one way analysis of variance was conducted separately for mothers' and fathers' education levels. The results related to mothers' education level are presented in Table 2, while the corresponding results for fathers' education level are presented in Table 3.

TABLE 2
ANOVA results of study variables by mother's education level

Dependent Variable	Mother's Education Level	N	M	SD	F	p	Post-hoc
Academic Achievement	(1) Primary Education	146	80.8	12.7	18.730	0.000*	1<3, 2<3
	(2) Secondary Education	239	84.5	12.8			
	(3) Higher Education	98	90.9	12.5			
Problematic Internet Use	(1) Primary Education	163	61.7	13.4	0.559	0.572	
	(2) Secondary Education	273	60.3	14.4			
	(3) Higher Education	123	61.4	15.1			
Cyberloafing	(1) Primary Education	169	67.7	14.4	1.893	0.152	
	(2) Secondary Education	282	67.4	15.5			
	(3) Higher Education	129	64.6	15.0			
IEP - Passive Consumption	(1) Primary Education	170	79.7	15.4	0.097	0.908	
	(2) Secondary Education	287	79.3	15.3			
	(3) Higher Education	127	78.9	16.4			
IEP - Information Seeking	(1) Primary Education	169	79.3	15.3	0.000	1.000	
	(2) Secondary Education	286	79.3	16.9			
	(3) Higher Education	128	79.4	16.5			
IEP - Social Usage	(1) Primary Education	169	61.4	17.5	0.660	0.517	
	(2) Secondary Education	288	63.3	19.2			
	(3) Higher Education	130	61.7	19.7			
IEP - Content Creation	(1) Primary Education	171	56.3	17.3	0.188	0.829	
	(2) Secondary Education	287	57.3	19.0			
	(3) Higher Education	129	56.5	18.8			

Note. $p < .05$, IEP: Internet Engagement Profile.

As shown in Table 2, academic achievement differed significantly according to mothers' education level, $F(2, 480) = 18.730$, $p < .001$. Post hoc comparisons revealed a consistent increase in academic achievement as mothers' education level increased, with students whose mothers had higher education outperforming those whose mothers had secondary or primary education. In contrast, problematic internet use, cyberloafing, and internet engagement profiles did not differ significantly according to mothers' education level ($p > .05$).

TABLE 3
ANOVA results of study variables by father's education level

Dependent Variable	Father's Education Level	N	M	SD	F	p	Post-hoc
Academic Achievement	(1) Primary Education	115	80.29	11.82	26.153	0.000*	1<3, 2<3
	(2) Secondary Education	188	82.30	13.77			
	(3) Higher Education	181	89.90	11.56			
Problematic Internet Use	(1) Primary Education	129	60.32	13.87	0.196	0.822	
	(2) Secondary Education	213	61.31	14.72			
	(3) Higher Education	218	61.01	14.06			
Cyberloafing	(1) Primary Education	137	68.20	13.95	6.389	0.002*	1>3, 2>3
	(2) Secondary Education	220	68.84	15.78			
	(3) Higher Education	224	64.07	14.66			
IEP - Passive Consumption	(1) Primary Education	137	79.85	15.20	0.458	0.633	
	(2) Secondary Education	223	79.85	15.64			
	(3) Higher Education	225	78.59	15.61			
IEP - Information Seeking	(1) Primary Education	136	78.84	16.45	0.102	0.903	
	(2) Secondary Education	225	79.28	16.14			
	(3) Higher Education	223	79.64	16.53			
IEP - Social Usage	(1) Primary Education	136	62.93	18.28	0.720	0.487	
	(2) Secondary Education	226	63.21	19.32			
	(3) Higher Education	226	61.20	18.76			
IEP - Content Creation	(1) Primary Education	137	57.77	17.09	0.933	0.394	
	(2) Secondary Education	226	57.46	18.14			
	(3) Higher Education	225	55.45	19.61			

Note. $p < .05$, PIC: Problematic Internet Consumption, IEP: Internet Engagement Profile.

The results presented in Table 3 indicated a significant difference in academic achievement across fathers' education levels, $F_{(2, 481)} = 26.153$, $p < .001$. Students whose fathers had higher education demonstrated significantly higher academic achievement than those whose fathers had secondary or primary education. In addition, cyberloafing behaviors differed significantly according to fathers' education level, $F_{(2, 578)} = 6.389$, $p = .002$, with higher levels of cyberloafing reported among students whose fathers had primary or secondary education. No statistically significant differences were found in problematic internet use according to fathers' education level, $F_{(2, 557)} = 0.196$, $p = .822$. Similarly, none of the internet engagement profile dimensions differed significantly across fathers' education levels ($p > .05$). Overall, these findings suggest that parental education level is strongly associated with academic achievement, whereas its association with problematic internet use and internet engagement profiles is limited. Fathers' education level, however, appears to be related to differences in cyberloafing behaviors.

4.3 Findings Related to Daily Study Time

To examine whether students' academic achievement, cyberloafing, problematic internet use, and internet engagement profiles differed according to daily study time, one way analysis of variance was conducted. The descriptive statistics and analysis results are presented in Table 4.

TABLE 4
ANOVA results of study variables by daily study time

Dependent Variable	Daily Study Time	N	M	SD	F	p	Post-hoc
Academic Achievement	(1) Less than 1 hour	93	76.08	14.00	30.718	0.000*	1-2, 1-3, 1-4, 2-3, 2-4
	(2) 1-2 hours	180	82.98	13.14			
	(3) 2-4 hours	176	89.47	10.06			
	(4) More than 4 hours	34	92.44	10.23			
Problematic Internet Use	(1) Less than 1 hour	109	69.26	16.57	18.300	0.000*	1-2, 1-3, 1-4
	(2) 1-2 hours	205	60.17	12.96			
	(3) 2-4 hours	202	58.27	12.34			
	(4) More than 4 hours	44	55.92	14.51			
IEP - Passive Consumption	(1) Less than 1 hour	110	85.22	13.95	8.612	0.000*	1-2, 1-3, 1-4
	(2) 1-2 hours	218	79.39	15.60			
	(3) 2-4 hours	213	77.35	15.53			
	(4) More than 4 hours	44	73.79	15.09			
IEP - Information Seeking	(1) Less than 1 hour	108	75.54	16.66	4.432	0.004*	1-3
	(2) 1-2 hours	219	78.26	16.51			
	(3) 2-4 hours	214	81.80	15.77			
	(4) More than 4 hours	43	82.35	15.74			
IEP - Social Usage	(1) Less than 1 hour	110	68.11	21.02	4.688	0.003*	1-2, 1-3, 1-4
	(2) 1-2 hours	220	61.45	18.90			
	(3) 2-4 hours	214	61.26	17.47			
	(4) More than 4 hours	44	58.02	17.07			
IEP - Content Creation	(1) Less than 1 hour	110	60.85	20.27	2.734	0.043*	1-2
	(2) 1-2 hours	220	54.69	18.23			
	(3) 2-4 hours	214	56.69	17.78			
	(4) More than 4 hours	44	57.01	17.53			
Cyberloafing	(1) Less than 1 hour	110	76.29	15.93	23.874	0.000*	1-2, 1-3, 1-4, 2-3, 2-4
	(2) 1-2 hours	216	66.85	14.60			
	(3) 2-4 hours	210	63.24	13.31			
	(4) More than 4 hours	45	60.09	12.66			

*Note. *p < .05, IEP: Internet Engagement Profile.*

As shown in Table 4, academic achievement differed significantly according to daily study time, $F(3, 482) = 30.718$, $p < .001$. Academic achievement increased consistently as daily study time increased. Students who studied less than one hour per day demonstrated significantly lower academic achievement compared to those who studied for one to two hours, two to four hours, and more than four hours.

Problematic internet use also differed significantly across study time groups, $F(3, 557) = 18.300$, $p < .001$. Students with shorter daily study time reported higher levels of problematic internet use, with the highest scores observed among those studying less than one hour per day. Problematic internet use decreased progressively as study time increased.

Significant differences were observed across all internet engagement profile dimensions. Passive consumption differed significantly by study time, $F(3, 582) = 8.612$, $p < .001$, indicating that students who studied less than one hour per day exhibited higher levels of passive consumption than all other groups. Information seeking showed a different pattern, with higher scores observed among students who studied for longer durations, F(3,

581) = 4.432, p = .004. In particular, students studying two to four hours per day scored significantly higher than those studying less than one hour. Social usage also differed significantly across groups, F(3, 585) = 4.688, p = .003, with higher social usage reported by students with shorter study times. Content creation showed a smaller but significant difference, F(3, 585) = 2.734, p = .043, indicating higher scores among students studying less than one hour compared to those studying one to two hours.

Finally, cyberloafing behaviors varied significantly according to daily study time, F(3, 578) = 23.874, p < .001. Cyberloafing levels decreased steadily as study time increased, with students studying less than one hour per day reporting significantly higher cyberloafing behaviors than all other study time groups.

Overall, these findings demonstrate that daily study time is a strong behavioral correlate of academic achievement and digital engagement patterns. Longer study duration is associated with higher academic achievement, lower problematic internet use, reduced cyberloafing, and more academically oriented internet engagement profiles.

4.4 Findings Related to Smartphone Checking Frequency

To examine whether students' academic achievement, cyberloafing, problematic internet use, and internet engagement profiles differed according to smartphone checking frequency, one way analysis of variance was conducted. The descriptive statistics and analysis results are presented in Table 5.

TABLE 5
ANOVA results of study variables by smartphone checking frequency

Dependent Variable	Checking Frequency[a]	N	M	SD	F	p	Post-hoc
Academic Achievement	(1) Every 15 min	171	82.02	13.50	3.979	0.008*	1-2, 1-4
	(2) Every 30 min	145	85.91	12.58			
	(3) Every 45 min	80	85.36	12.23			
	(4) Every 60 min	85	87.27	13.65			
Problematic Internet Use	(1) Every 15 min	193	67.41	14.63	24.767	0.000*	1-2, 1-3, 1-4
	(2) Every 30 min	165	59.05	11.60			
	(3) Every 45 min	94	58.06	12.21			
	(4) Every 60 min	106	54.80	14.83			
IEP - Passive Consumption	(1) Every 15 min	199	85.93	13.82	25.992	0.000*	1-2, 1-3, 1-4, 2-4
	(2) Every 30 min	176	78.66	15.12			
	(3) Every 45 min	101	76.16	14.82			
	(4) Every 60 min	107	71.27	15.14			
IEP - Information Seeking	(1) Every 15 min	200	77.64	16.93	1.563	0.197	-
	(2) Every 30 min	176	79.84	15.60			
	(3) Every 45 min	100	79.48	15.03			
	(4) Every 60 min	106	81.78	17.62			
IEP - Social Usage	(1) Every 15 min	201	68.20	20.12	11.628	0.000*	1-2, 1-3, 1-4
	(2) Every 30 min	177	59.83	17.39			
	(3) Every 45 min	101	61.76	17.37			
	(4) Every 60 min	107	56.43	17.46			
IEP - Content Creation	(1) Every 15 min	201	61.13	19.17	5.759	0.001*	1-2, 1-3, 1-4
	(2) Every 30 min	177	54.56	17.98			
	(3) Every 45 min	101	54.51	17.06			
	(4) Every 60 min	107	54.46	18.20			
Cyberloafing	(1) Every 15 min	201	75.81	15.05	52.858	0.000*	1-2, 1-3, 1-4, 2-4
	(2) Every 30 min	176	65.05	12.69			
	(3) Every 45 min	99	61.62	11.43			
	(4) Every 60 min	104	57.51	12.93			

Note: *p < .05. [a] Groups represent the minimum time interval for checking the phone: (1) 15 min, (2) 30 min, (3) 45 min, (4) 60 min.

As shown in Table 5, academic achievement differed significantly according to smartphone checking frequency, F(3, 479) = 3.979, p = .008. Students who checked their smartphones most frequently, at intervals of every fifteen minutes, demonstrated significantly lower academic achievement than those who checked their phones every

thirty minutes or every sixty minutes. This pattern indicates that more frequent smartphone checking is associated with lower academic performance.

Problematic internet use showed a strong and statistically significant variation across smartphone checking frequency groups, F(3, 556) = 24.767, p < .001. Students who checked their smartphones every fifteen minutes reported the highest levels of problematic internet use, and their scores were significantly higher than those of all other groups. Problematic internet use decreased steadily as the interval between smartphone checks increased.

Significant differences were also observed for several internet engagement profile dimensions. Passive consumption differed significantly according to checking frequency, F(3, 580) = 25.992, p < .001, with the highest scores observed among students who checked their smartphones every fifteen minutes. Passive consumption decreased consistently as checking frequency declined. In contrast, the information seeking dimension did not differ significantly across checking frequency groups, F(3, 580) = 1.563, p = .197.

Social usage varied significantly by smartphone checking frequency, F(3, 584) = 11.628, p < .001. Students who checked their phones every fifteen minutes reported significantly higher levels of social usage than students in all other groups. A similar pattern was observed for content creation, F(3, 584) = 5.759, p = .001, with the highest scores again found among the most frequent smartphone checkers.

Finally, cyberloafing behaviors differed markedly across checking frequency groups, F(3, 579) = 52.858, p < .001. Students who checked their smartphones every fifteen minutes exhibited substantially higher cyberloafing levels than those who checked their phones at longer intervals. Cyberloafing decreased progressively as smartphone checking frequency declined.

Overall, these findings indicate that frequent smartphone checking is strongly associated with lower academic achievement, higher problematic internet use, greater engagement in passive and socially oriented internet activities, and elevated cyberloafing behaviors. Less frequent smartphone checking, in contrast, appears to be linked to more adaptive internet engagement patterns.

4.5 Correlations Among Study Variables

The relationships among academic achievement, cyberloafing, problematic internet use, and internet engagement profiles were examined using Pearson product moment correlation analysis. The correlation matrix is presented in Table 6.

TABLE 6

Correlations among academic achievement, cyberloafing, problematic internet use, and internet engagement profiles

Variables	1	2	3	4	5	6	7
1. Academic Achievement	1						
2. Problematic Internet Use	-0.102*	1					
3. IEP - Passive Consumption	-0.076	0.515**	1				
4. IEP - Information Seeking	0.114*	-0.078	0.159**	1			
5. IEP - Social Usage	-0.108*	0.317**	0.401**	0.087*	1		
6. IEP - Content Creation	-0.014	0.200**	0.253**	0.100*	0.477**	1	
7. Cyberloafing	-0.142**	0.664**	0.535**	0.022	0.367**	.0264**	1

*Note: *p < .05, **p < .01, ***p < .001. N = 598.*

As shown in Table 6, academic achievement was weakly but significantly negatively correlated with cyberloafing (r = −.142, p < .01) and problematic internet use (r = −.102, p < .05). A weak negative relationship was also observed between academic achievement and social usage (r = −.108, p < .05). In contrast, academic achievement was weakly and positively associated with information seeking (r = .114, p < .05). No significant relationships were found between academic achievement and passive consumption or content creation (p > .05).

Cyberloafing demonstrated strong and significant positive relationships with problematic internet use (r = .664, p < .01) and passive consumption (r = .535, p < .01). In addition, weaker but significant positive correlations were observed between cyberloafing and social usage (r = .367, p < .01) as well as content creation (r = .264, p < .01). No significant relationship was found between cyberloafing and information seeking.

Problematic internet use was moderately and positively correlated with passive consumption (r = .515, p < .01) and showed weaker but significant positive relationships with social usage (r = .317, p < .01) and content creation (r = .200, p < .01).

Finally, the subdimensions of internet engagement profiles were positively interrelated. Moderate positive correlations were observed between social usage and content creation (r = .477, p < .01) and between passive consumption and social usage (r = .401, p < .01). Information seeking displayed very weak but positive correlations with the other engagement profiles. Overall, the correlation findings indicate that maladaptive internet-related behaviors, particularly problematic internet use and cyberloafing, are closely intertwined and negatively associated with academic achievement, whereas information-seeking engagement shows a small but positive association with academic outcomes.

5   CONCLUSIONS

This study provides an integrated examination of the relationships among academic achievement, cyberloafing, problematic internet use, and internet engagement profiles among high school students. The findings indicate that although academic achievement does not differ significantly by gender, gender is meaningfully associated with patterns of digital behavior. In line with previous research, male students reported higher levels of cyberloafing, problematic internet use, and passive consumption, whereas female students demonstrated stronger information-seeking engagement. These results suggest that gender differences are more pronounced in how students interact with digital technologies than in academic outcomes themselves.

Family background emerged as a significant contextual factor, particularly with respect to academic achievement. Both maternal and paternal education levels were positively associated with students' academic performance, supporting earlier findings that highlight the role of parental educational capital in shaping academic outcomes (Gomez et al., 2017; İkiz et al., 2015). However, parental education showed limited associations with problematic internet use and internet engagement profiles, indicating that while family background contributes to academic success, it may play a less direct role in regulating adolescents' everyday digital behaviors. These findings are consistent with previous studies emphasizing the need for family-based educational awareness rather than assuming a direct protective effect of parental education on digital habits (Demir et al., 2017).

Behavioral factors related to students' daily routines were among the strongest correlates of both academic and digital outcomes. Increased daily study time was consistently associated with higher academic achievement, lower levels of problematic internet use and cyberloafing, and a shift from passive consumption toward information-seeking internet engagement. These results align with evidence suggesting that purposeful academic routines can buffer the negative effects of excessive or unregulated internet use (Ahmed et al., 2022; Koç & Tamer, 2011). In contrast, frequent smartphone checking was linked to lower academic achievement, higher problematic internet use, and elevated cyberloafing, reinforcing previous findings that habitual phone checking reflects difficulties in self-regulation and sustained attention (Gezgin et al., 2018; Akgün, 2019).

The correlation findings further supported these patterns by demonstrating that cyberloafing and problematic internet use are closely intertwined and negatively associated with academic achievement, whereas information-seeking engagement shows a small but positive association with academic success. Taken together, these results emphasize that internet use among adolescents cannot be understood solely in terms of frequency or intensity.

Rather, the purpose and regulation of use play a critical role in determining whether internet engagement supports or undermines academic outcomes (Kirschner & Karpinski, 2010; Garmah, 2023).

Overall, the findings of this study contribute to the literature by moving beyond a deficit-oriented view of adolescent internet use. Internet engagement is not inherently detrimental; instead, its academic implications depend on how students regulate their digital behaviors and the extent to which internet use is oriented toward information seeking rather than passive or distracting activities. By providing empirical evidence on the joint roles of cyberloafing, problematic internet use, engagement profiles, and contextual factors, this study offers a nuanced foundation for educational stakeholders seeking to promote more adaptive digital practices. These insights may inform the development of educational interventions and guidance strategies aimed at fostering purposeful internet use, strengthening self-regulation, and supporting academic achievement in digitally saturated learning environments.

6   DISCUSSION

6.1 Demographic and Socioeconomic Mechanisms Underlying Digital Engagement

The findings indicate that academic achievement does not differ significantly by gender, whereas clear gender-based differences emerge in digital behaviors. Male students reported higher levels of problematic internet use, cyberloafing, and passive consumption within Internet Engagement Profiles, while female students demonstrated stronger information-seeking profiles. This pattern suggests that gender differences are reflected not in academic outcomes themselves but in how students engage with digital technologies. From a self-regulation perspective, these differences point to variation in the dominant Internet Engagement Profiles adopted by male and female students, rather than differences in academic capability. Accordingly, gender appears to shape the *form* of digital engagement rather than its academic consequences directly.

Parental education levels were strongly associated with academic achievement but showed limited explanatory power for Internet Engagement Profiles and problematic internet use. Both maternal and paternal education levels were positively related to students' academic performance, consistent with prior research emphasizing the role of family educational capital in academic development (Gomez et al., 2017; İkiz et al., 2015). However, the absence of significant differences in problematic internet use and Internet Engagement Profiles across parental education levels suggests that adolescents' digital engagement patterns may operate relatively independently of socioeconomic background. This finding aligns with Demir et al. (2017) and indicates that Internet Engagement Profiles are more likely shaped by individual self-regulation capacities and peer contexts than by parental educational status alone. Conceptually, this dissociation reinforces the need to distinguish between structural factors influencing academic achievement and behavioral mechanisms underlying digital engagement.

6.2 Behavioral Regulation and Internet Engagement Profiles

Behavioral variables related to daily routines provided important insight into the mechanisms linking Internet Engagement Profiles to academic outcomes. Increased daily study time was associated with lower levels of problematic internet use and cyberloafing, as well as with a shift in Internet Engagement Profiles from passive consumption toward information seeking. This pattern suggests that structured academic routines not only limit maladaptive digital behaviors but also promote more adaptive forms of internet engagement. In this respect, study time functions as a regulatory context within which Internet Engagement Profiles are reorganized toward academically supportive uses.

Smartphone checking frequency emerged as a particularly sensitive indicator of self-regulatory difficulties. More frequent checking was associated with higher problematic internet use, elevated cyberloafing, and less

adaptive Internet Engagement Profiles characterized by passive consumption and social usage. These findings support attentional control accounts suggesting that frequent interruptions undermine sustained cognitive engagement and increase susceptibility to distractive online behaviors (Gezgin et al., 2018; Akgün, 2019). Importantly, smartphone checking frequency appears to reflect habitual regulation failures rather than intentional internet use, making it a proximal behavioral mechanism through which Internet Engagement Profiles translate into academic consequences.

From a theoretical standpoint, the use of Internet Engagement Profiles allows for a differentiated interpretation of digital behavior that extends beyond deficit-oriented models focused solely on problematic use. The positive association between information-seeking Internet Engagement Profiles and academic achievement, contrasted with the negative associations observed for cyberloafing and problematic internet use, underscores the functional heterogeneity of internet use. These findings support the argument that internet use is not inherently detrimental to academic achievement; instead, its impact depends on the dominant Internet Engagement Profile adopted by the student. This distinction is consistent with the work of Kirschner & Karpinski (2010) and highlights the value of Internet Engagement Profiles as a conceptual framework for understanding how digital engagement can either support or undermine learning.

7   PRACTICAL IMPLICATIONS

The findings of this study provide several practical implications for educational practitioners, policymakers, and designers of educational technologies, particularly in relation to adolescents' digital engagement and academic outcomes. Rather than treating internet use as a uniform risk factor, the results emphasize the importance of differentiating between Internet Engagement Profiles and focusing on behavioral regulation mechanisms.

For educational practitioners and school counselors, the findings suggest that digital guidance programs should be sensitive to gender-based differences in Internet Engagement Profiles. Male students' higher levels of cyberloafing, passive consumption, and problematic internet use, alongside lower engagement in information seeking, indicate the need for targeted digital literacy interventions. Programs that encourage active and goal-oriented internet use, such as inquiry-based learning tasks or structured digital research activities, may help shift students' engagement from passive consumption toward information seeking. Importantly, these interventions should focus on developing self-regulation skills rather than imposing restrictive controls.

The results also highlight smartphone checking frequency as a critical behavioral target for educational practice. Frequent checking was strongly associated with lower academic achievement, higher problematic internet use, and increased cyberloafing. This finding suggests that classroom and counseling practices should prioritize strategies that strengthen attentional control and self-monitoring. Rather than relying solely on prohibitive phone policies, educators may benefit from incorporating structured focus strategies that help students gradually extend uninterrupted study periods and develop awareness of habitual checking behaviors.

From a policy and family guidance perspective, the differentiated roles of maternal and paternal education levels have important implications. While parental education was primarily associated with academic achievement, fathers' education level showed a specific relationship with cyberloafing behaviors. This pattern indicates that family-based digital guidance initiatives should involve both parents and explicitly address digital regulation practices at home. Policies aimed at supporting parental awareness should move beyond academic support and include guidance on modeling and monitoring everyday digital behaviors.

For designers of educational technologies, the findings underscore the importance of prioritizing information-seeking Internet Engagement Profiles over passive consumption. Given that information seeking was the only engagement profile positively associated with academic achievement, educational platforms should be designed to promote active inquiry, critical exploration, and content production. Features that reward sustained

engagement, problem solving, and information synthesis may help align students' digital behaviors with academic goals, reducing the likelihood of passive or distractive use.

8   LIMITATIONS AND FUTURE DIRECTIONS

Despite its contributions, this study has several limitations that should be considered when interpreting the findings. First, the cross-sectional design limits the ability to draw causal conclusions. So, group differences were examined, the correlational and cross-sectional nature of the design does not allow causal interpretations. The findings should therefore be interpreted as associative rather than explanatory. Although significant associations were identified among academic achievement, cyberloafing, problematic internet use, and Internet Engagement Profiles, the temporal direction of these relationships cannot be determined. Longitudinal designs are therefore necessary to examine how digital engagement patterns evolve over time and how changes in Internet Engagement Profiles relate to academic development.

Second, the sample was drawn from a specific educational and geographical context, which may limit the generalizability of the findings. While the sample size was adequate, future research should replicate the study across different regions, school types, and cultural contexts to assess the robustness of the observed relationships. Comparative studies across diverse educational settings may provide further insight into contextual factors shaping digital engagement.

Third, academic achievement was measured using self-reported grade point averages, which may be subject to reporting bias. Although self-reports are commonly used in educational research, future studies should incorporate objective academic records to strengthen measurement validity. Additionally, the scope of the study was limited to the variables included in the measurement instruments, leaving other potentially relevant psychological and environmental factors unexplored.

Building on these limitations, several directions for future research emerge. Longitudinal and experimental studies are needed to test the causal effects of reducing smartphone checking frequency and modifying Internet Engagement Profiles on academic outcomes. Qualitative research may also be valuable in exploring the motivational and contextual factors underlying gender differences in digital engagement. Furthermore, future studies should examine specific parental mediation strategies to better understand how family dynamics influence cyberloafing and problematic internet use. Finally, intervention-based research is warranted to evaluate programs designed to support students in transitioning from passive consumption toward information-seeking Internet Engagement Profiles.

APPENDICES

Appendix A: The Cyberloafing Scale Items

The following items constitute the uni-dimensional Cyberloafing Scale developed and validated within the scope of this study to measure high school students' non-academic digital behaviors. The scale utilizes a 3-point Likert-type response format (1=Never, 2=Sometimes, 3=Often/Always).

Items:
1.   I check my phone/accounts even if there is no notification.
2.   I engage with my phone (games, surfing, messaging, etc.) when I feel bored.
3.   I check my phone immediately when a notification arrives.
4.   I frequently take breaks [from work/study] to spend time on the phone.
5.   My attention is distracted by the phone during times when I need to focus.

Appendix B: Categorization of Demographic and Independent Variables

To ensure the reproducibility of the statistical analyses (ANOVA), the specific categories used for the independent variables in the data collection instrument are detailed below.

1. Smartphone Control Frequency

Participants were asked, "Within a typical day, how frequently do you check your phone?" The responses were categorized into four groups for analysis:

- Every 15 minutes (High Frequency)
- Every 30 minutes
- Every 45 minutes
- Every 60 minutes (Low Frequency)

2. Daily Study Time

Participants were asked, "How many hours do you study individually outside of school hours?"

- Less than 1 hour
- 1–2 hours
- 2–4 hours
- More than 4 hours

3. Parental Education Level

Both mother's and father's education levels were originally collected in four categories but recoded into three for analysis due to low sample sizes in the postgraduate category.

- Primary Education
- Secondary Education (High School)
- Higher Education (Undergraduate and Postgraduate combined)

DECLARATIONS

Author Contributions

MSS: Conceptualization, Investigation, Data Curation, Writing – Original Draft

ASS: Conceptualization, Methodology, Formal Analysis, Supervision, Writing – Review & Editing Methodology, Formal analysis, Resources, Data Curation, Writing – Original Draft, Writing – Review & Editing, Visualization, Supervision,

Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Ethics Committee Approval

Ethical approval for this study was obtained from the Kırşehir Ahi Evran University Social and Humanities Scientific Research and Publication Ethics Committee (Date: 29.12.2022, Decision No: 2022/10/09). In addition, institutional permission for data collection was granted by the Kırşehir Governorship Provincial Directorate of National Education (Date: 17.01.2023).

Funding / Financial Support

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit

sectors.

AI Declaration

During the preparation of this manuscript, Gemini (Google) was used for language improvement, translation, and text editing purposes. The authors reviewed and edited all AI-assisted content and take full responsibility for the accuracy, integrity, and originality of the final manuscript.

Data Availability Statement

The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

Acknowledgments

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