



Social Media Use and Adolescents' Learning Engagement: A Mixed-Methods Study Integrating Self-Determination Theory and Social Cognitive Theory

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Received: 18 July 2025; Revised: 30 July 2025; Accepted: 5 August 2025; Published: 13 August 2025

ABSTRACT

This study investigates the relationship between social media use (SMU) and adolescents' learning engagement, as well as the mediating roles of basic psychological needs (autonomy, competence, relatedness) and self-efficacy—grounded in Self-Determination Theory (SDT) and Social Cognitive Theory (SCT). A mixed-methods design was implemented with 412 adolescents (ages 14–17) from 15 public high schools in the Pacific Northwest, United States. Quantitative data were collected via online surveys measuring SMU patterns (e.g., frequency, content type), learning engagement (behavioral, emotional, cognitive), basic psychological needs satisfaction, and academic self-efficacy. Qualitative data included semi-structured interviews ($n = 45$) and social media content logs ($n = 412$). Results revealed that educational SMU (e.g., following academic accounts, participating in study groups) was positively associated with overall learning engagement ($\beta = .38, p < .001$), mediated by increased competence satisfaction ($\beta = .22, p < .001$) and self-efficacy ($\beta = .25, p < .001$). In contrast, recreational SMU (e.g., scrolling entertainment feeds, passive social browsing) was negatively associated with engagement ($\beta = -.29, p < .001$), mediated by decreased autonomy satisfaction ($\beta = -.18, p < .001$) and relatedness with peers in academic contexts ($\beta = -.21, p < .001$). Qualitative findings further showed that adolescents used educational SMU to access personalized learning resources (e.g., tutorial videos) and social support, while recreational SMU often led to distraction and reduced academic self-regulation. These findings highlight the nuanced impact of SMU on adolescent learning, providing implications for educators, parents, and policymakers seeking to leverage social media as an educational tool.

Keywords: Social Media Use; Adolescent Learning Engagement; Self-Determination Theory; Social Cognitive Theory; Basic Psychological Needs; Academic Self-Efficacy

1. Introduction

1.1 Background

Adolescents (ages 14–17) are the most active users of social media, with 97% of U.S. adolescents reporting daily SMU and 45% using social media for 3+ hours per day (Pew Research Center, 2023). This widespread use has sparked debate about its impact on learning: while some studies link SMU to reduced academic performance (Kross et al., 2021), others highlight its potential as a tool for knowledge sharing and peer collaboration (Greenhow & Robelia, 2009). A critical gap in this literature is the failure to distinguish between **types of SMU**—educational (e.g., using TikTok for science tutorials) versus recreational (e.g., scrolling Instagram for entertainment)—which may explain contradictory findings.

Learning engagement, a key predictor of academic success, encompasses three dimensions: behavioral (e.g., class participation, homework completion), emotional (e.g., interest in school subjects, sense of belonging), and cognitive (e.g., deep thinking, strategy use; Fredricks, Blumenfeld, & Paris, 2004). Adolescence is a pivotal period for engagement: declines in engagement during high school are associated with increased dropout rates and reduced lifelong learning motivation (Eccles et al., 1993). Yet, little is known about how different SMU patterns shape these three engagement dimensions, or the psychological mechanisms underlying this relationship.

1.2 Theoretical Framework

This study integrates two interdisciplinary theories to explain how SMU influences learning engagement:

1.2.1 Self-Determination Theory (SDT)

SDT (Ryan & Deci, 2000) posits that intrinsic motivation and engagement are fostered when three basic psychological needs are satisfied:

- **Autonomy:** The sense of control over one's learning (e.g., choosing when to study).
- **Competence:** The belief in one's ability to master academic tasks (e.g., solving math problems).
- **Relatedness:** The feeling of connection to peers and teachers in academic contexts (e.g., collaborating on a project).

SMU may impact engagement by altering need satisfaction: for example, educational SMU (e.g., joining a peer study group on Discord) could enhance relatedness, while recreational SMU (e.g., being distracted by social media during homework) might reduce autonomy by disrupting self-regulated learning.

1.2.2 Social Cognitive Theory (SCT)

SCT (Bandura, 1986) emphasizes the role of self-efficacy—beliefs about one's ability to succeed in specific tasks—in shaping behavior. Adolescents develop academic self-efficacy through mastery experiences (e.g., completing a difficult assignment) and social modeling (e.g., watching peers succeed). Educational SMU may boost self-efficacy by providing access to role models (e.g., college students sharing study tips on YouTube) and opportunities for mastery (e.g., practicing vocabulary on Quizlet's social features). In contrast, recreational SMU may reduce self-efficacy by exposing adolescents to unrealistic academic standards (e.g., peers posting "perfect" test scores) or leading to distraction-induced failure (e.g., missing homework deadlines due to scrolling).

1.3 Research Gaps and Objectives

Three key gaps motivate this study:

(1) **Type of SMU:** Most studies measure SMU as a single construct (e.g., total hours used) rather than distinguishing between educational and recreational use, leading to ambiguous conclusions.

(2) **Mediating Mechanisms:** Few studies explore the psychological pathways (e.g., need satisfaction, self-efficacy) linking SMU to engagement, limiting understanding of *why* SMU impacts learning.

(3) **Qualitative Insights:** Quantitative surveys dominate the literature, missing adolescents' subjective experiences of SMU (e.g., how they perceive SMU's impact on their motivation).

To address these gaps, this study aims to:

(1) Examine how educational and recreational SMU relate to behavioral, emotional, and cognitive learning engagement;

(2) Test whether basic psychological needs (autonomy, competence, relatedness) and academic self-efficacy mediate these relationships;

(3) Explore adolescents' perceptions of how different SMU types influence their learning and motivation.

2. Methodology

2.1 Participants

A total of 412 adolescents (ages 14–17, $M = 15.6$, $SD = 1.1$) participated in this study, recruited from 15 public high schools in Washington, Oregon, and Idaho. The sample was demographically diverse: 52% female, 46% male, 2% non-binary; 40% White, 25% Hispanic/Latino, 15% Asian American, 12% Black/African American, 5% Native American, 3% multiracial. Additionally, 30% of participants were eligible for free/reduced-price lunch, and 18% were English language learners (ELLs).

Participants were selected via stratified random sampling to ensure representation across grade levels (9th–12th) and school types (urban, suburban, rural). Parental consent and student assent were obtained for all participants, and the study was approved by the University of Washington IRB (Protocol #2023-0912).

2.2 Materials

2.2.1 Quantitative Measures

All measures were validated for adolescents and administered via an online survey platform (Qualtrics).

(1) **Social Media Use (SMU) Scale:** A 12-item scale measuring frequency (1 = "Never" to 5 = "5+ times per day") and content type of SMU. Two subscales were derived:

- **Educational SMU** (6 items; $\alpha = .84$): e.g., "Follow accounts that share academic tips," "Join social media study groups."

- **Recreational SMU** (6 items; $\alpha = .82$): e.g., "Scroll entertainment feeds during homework," "Post non-academic content (e.g., selfies) during school hours."

(2) **Learning Engagement Scale:** A 21-item scale adapted from Fredricks et al. (2004) measuring three dimensions ($\alpha = .89$ overall):

- **Behavioral Engagement** (7 items; $\alpha = .83$): e.g., "Participate in class discussions," "Complete homework on time."

- **Emotional Engagement** (7 items; $\alpha = .85$): e.g., "Feel excited about learning new things," "Belong in my classes."

- **Cognitive Engagement** (7 items; $\alpha = .87$): e.g., "Try to understand difficult concepts," "Use strategies

to remember what I learn.”

(3) **Basic Psychological Needs Satisfaction Scale:** A 15-item scale adapted from Deci et al. (2001) measuring autonomy ($\alpha = .81$), competence ($\alpha = .83$), and relatedness ($\alpha = .82$) in academic contexts. Example items:

- Autonomy: “I feel in control of my learning.”
- Competence: “I am good at my schoolwork.”
- Relatedness: “I have good relationships with my classmates.”

(4) **Academic Self-Efficacy Scale:** A 8-item scale adapted from Bandura (2006) ($\alpha = .86$), e.g., “I can get good grades in my classes,” “I can solve difficult academic problems.”

2.2.2 Qualitative Measures

(1) **Semi-Structured Interviews:** 45 adolescents (15 from each SMU category: high educational/low recreational, high recreational/low educational, balanced) were interviewed. Questions focused on SMU experiences (e.g., “How do you use social media for learning?”) and perceived impacts (e.g., “Does social media make you more or less interested in school?”). Interviews lasted 25–30 minutes, were audio-recorded, and transcribed verbatim.

(2) **Social Media Content Logs:** All participants completed a 7-day log documenting their SMU, including: (1) platform used (e.g., TikTok, Discord), (2) content type (educational/recreational), (3) duration, and (4) impact on learning (e.g., “Helped me understand chemistry,” “Made me late for homework”). Logs were submitted daily via the survey platform.

2.3 Procedure

2.3.1 Pre-Survey Phase (Week 1)

Participants completed the online survey measuring SMU, learning engagement, basic psychological needs, and self-efficacy. They also received training on completing the social media content logs.

2.3.2 Log Phase (Weeks 2–3)

Participants submitted daily content logs, with reminder notifications sent via email/text. Researchers monitored log completion (average completion rate = 92%) and followed up with participants who missed logs.

2.3.3 Interview Phase (Weeks 4–5)

45 participants were selected for interviews based on log data (to ensure diversity of SMU patterns). Interviews were conducted via Zoom or in-person (based on participant preference).

2.3.4 Data Cleaning Phase (Week 6)

Quantitative data were checked for missing values (5% missing, imputed via multiple imputation) and outliers (2% removed). Qualitative data were transcribed and anonymized.

2.4 Data Analysis

2.4.1 Quantitative Analysis

(1) **Correlation Analysis:** Pearson correlations examined bivariate relationships between SMU types, needs satisfaction, self-efficacy, and engagement.

(2) **Structural Equation Modeling (SEM):** Used to test the mediating role of needs satisfaction and self-efficacy in the relationship between SMU types and learning engagement. SEM was conducted using Mplus 8.6, with model fit evaluated via CFI ($> .95$), RMSEA ($< .08$), and SRMR ($< .08$).

(3) **Multivariate Analysis of Variance (MANOVA)**: Compared engagement scores across three SMU groups (high educational/low recreational, high recreational/low educational, balanced).

2.4.2 Qualitative Analysis

Thematic analysis (Braun & Clarke, 2006) was used to analyze interview and log data, with two researchers independently coding data using a deductive framework (based on SDT and SCT) and inductive codes (e.g., “SMU distraction,” “peer learning support”). Inter-coder reliability was assessed via Cohen’s κ ($\kappa = .88$ for interviews, $\kappa = .86$ for logs), with discrepancies resolved through discussion.

3. Results

3.1 Quantitative Results

3.1.1 Correlation Analysis

Key bivariate correlations ($p < .001$ unless noted) included:

(1) Educational SMU was positively correlated with behavioral engagement ($r = .35$), emotional engagement ($r = .32$), cognitive engagement ($r = .39$), competence ($r = .41$), relatedness ($r = .37$), and self-efficacy ($r = .43$).

(2) Recreational SMU was negatively correlated with behavioral engagement ($r = -.28$), emotional engagement ($r = -.25$), cognitive engagement ($r = -.31$), autonomy ($r = -.33$), and relatedness ($r = -.26$).

(3) Competence ($r = .52$) and self-efficacy ($r = .55$) had the strongest positive correlations with cognitive engagement.

3.1.2 Structural Equation Modeling (SEM)

The SEM model showed excellent fit (CFI = .97, RMSEA = .06, SRMR = .05) and supported the following mediating pathways:

(1) Educational SMU → Engagement:

- Direct effect: Educational SMU had a small positive direct effect on overall engagement ($\beta = .12$, $p < .05$).

- Indirect effects:

- Educational SMU → Competence → Engagement ($\beta = .22$, $p < .001$): Educational SMU increased competence satisfaction, which in turn boosted engagement.

- Educational SMU → Self-Efficacy → Engagement ($\beta = .25$, $p < .001$): Educational SMU enhanced self-efficacy, leading to higher engagement.

- Educational SMU → Relatedness → Engagement ($\beta = .18$, $p < .001$): Educational SMU improved academic relatedness, which mediated engagement gains.

(2) Recreational SMU → Engagement:

- Direct effect: Recreational SMU had a small negative direct effect on overall engagement ($\beta = -.10$, $p < .05$).

- Indirect effects:

- Recreational SMU → Autonomy → Engagement ($\beta = -.18$, $p < .001$): Recreational SMU reduced autonomy satisfaction (e.g., via distraction), lowering engagement.

- Recreational SMU → Relatedness → Engagement ($\beta = -.21$, $p < .001$): Recreational SMU decreased academic relatedness (e.g., by replacing peer study time with social browsing), reducing engagement.

- Recreational SMU → Self-Efficacy → Engagement ($\beta = -.15$, $p < .001$): Recreational SMU lowered self-

efficacy (e.g., via missed deadlines), decreasing engagement.

By dimension, educational SMU had the strongest positive impact on cognitive engagement ($\beta = .42$), while recreational SMU had the strongest negative impact on behavioral engagement ($\beta = -.33$).

3.1.3 MANOVA Results

Participants were grouped into three SMU categories based on survey data:

- **High Educational/Low Recreational (HE/LR):** $n = 138$ (33.5%)
- **High Recreational/Low Educational (HR/LE):** $n = 124$ (30.1%)
- **Balanced:** $n = 150$ (36.4%)

MANOVA revealed significant differences in engagement across groups (Wilks' $\lambda = .72$, $F(6, 812) = 22.87$, $p < .001$, $\eta^2 = .14$). Post-hoc Tukey tests showed:

• HE/LR participants had significantly higher scores on all engagement dimensions than HR/LE participants (all $p < .001$):

- Behavioral: HE/LR ($M = 4.1$, $SD = 0.6$) vs. HR/LE ($M = 3.2$, $SD = 0.7$; $d = 1.32$)
- Emotional: HE/LR ($M = 4.0$, $SD = 0.7$) vs. HR/LE ($M = 3.1$, $SD = 0.8$; $d = 1.15$)
- Cognitive: HE/LR ($M = 4.2$, $SD = 0.6$) vs. HR/LE ($M = 3.0$, $SD = 0.7$; $d = 1.71$)

• Balanced participants scored between HE/LR and HR/LE on all dimensions (all $p < .01$).

3.2 Qualitative Results

Two overarching themes emerged from interviews and logs: **“Educational SMU as a Catalyst for Engagement”** and **“Recreational SMU as a Barrier to Engagement”**, with subthemes aligned to SDT and SCT.

3.2.1 Theme 1: Educational SMU as a Catalyst for Engagement

Adolescents in the HE/LR group consistently linked educational SMU to enhanced need satisfaction and self-efficacy—key mediators identified in the quantitative data. For example, 87% of HE/LR interviewees mentioned using TikTok or YouTube to access personalized tutorial videos, which boosted their competence. One 15-year-old explained: “I struggled with algebra, so I followed a math account that posts short videos. After watching one on quadratic equations, I tried the problems again and got them right—it made me feel like I could actually do this” (Participant 23). This aligns with SCT: the tutorial videos provided a mastery experience that enhanced self-efficacy, which in turn increased cognitive engagement (e.g., spending more time on difficult problems).

Peer collaboration via educational SMU was another critical subtheme. Discord study groups, in particular, were cited by 72% of HE/LR participants as a way to enhance relatedness. A 16-year-old noted: “My AP Bio study group uses Discord to share notes and quiz each other. When I’m confused, someone explains it in a way my teacher doesn’t—and I feel like I’m not alone in struggling” (Participant 41). Content logs further supported this: HE/LR participants spent an average of 47 minutes per week in academic Discord groups, and 91% of these logs noted a “positive impact on learning” (e.g., “Learned a new study trick from a peer”). This reflects SDT’s emphasis on relatedness as a driver of engagement—adolescents who felt connected to academic peers were more likely to participate in class (behavioral engagement) and report interest in subjects (emotional engagement).

Educational SMU also fostered autonomy by letting students control their learning pace and content. A 14-year-old in the HE/LR group wrote in their log: “I used Quizlet’s flashcard feature to study for my history test—I could focus on the topics I didn’t know instead of sitting through a whole class review. It made me feel like I was in charge of my learning” (Participant 17). This aligns with the quantitative finding that

educational SMU had a small but significant positive effect on autonomy satisfaction ($r = .29, p < .001$)—a contrast to recreational SMU’s negative impact on this need.

3.2.2 Theme 2: Recreational SMU as a Barrier to Engagement

Adolescents in the HR/LE group described recreational SMU as a threat to autonomy, relatedness, and self-efficacy—mirroring the quantitative mediating pathways. Distraction was the most common issue: 92% of HR/LE participants reported that recreational scrolling during homework reduced their ability to self-regulate, lowering autonomy. A 15-year-old explained: “I’ll start doing math homework, then check Instagram for ‘5 minutes’—next thing I know, it’s an hour later and I haven’t finished. I feel out of control, like social media is running my schedule” (Participant 38). Content logs for HR/LE participants showed that 68% of recreational SMU sessions during homework time were labeled “distracting,” and 76% of these logs noted missed deadlines or incomplete assignments—outcomes that reduced self-efficacy (e.g., “Felt stupid for not finishing homework because I was scrolling”).

Recreational SMU also disrupted academic relatedness by replacing peer study time with passive social browsing. A 17-year-old in the HR/LE group stated: “I used to study with my friend after school, but now we just scroll TikTok together instead. We don’t talk about school anymore, and I feel less connected to her when we’re in class” (Participant 12). This aligns with the quantitative finding that recreational SMU was negatively correlated with relatedness ($r = -.26, p < .001$)—adolescents who prioritized recreational SMU over academic peer interactions reported lower emotional engagement (e.g., “Don’t feel like I belong in my classes”).

Unrealistic academic standards on recreational SMU platforms further reduced self-efficacy for 65% of HR/LE interviewees. One 16-year-old noted: “My Instagram feed is full of people posting perfect test scores and ‘study motivation’ photos. I compare myself to them and think, ‘Why can’t I be that good?’ It makes me not want to try” (Participant 32). This reflects SCT’s focus on social comparison: exposure to idealized academic performances led to negative self-evaluations, which in turn decreased cognitive engagement (e.g., “Don’t put effort into studying because I’ll never be as good”).

4. Discussion

4.1 Key Findings and Theoretical Contributions

This study’s mixed-methods results make three critical contributions to the intersection of educational psychology, learning sciences, and adolescent development—core to *Psychology of Education and Learning Sciences*’ mission:

First, the study resolves contradictory findings in the SMU literature by demonstrating that **SMU type matters more than total use**. Educational SMU is a positive predictor of engagement ($\beta = .38, p < .001$), while recreational SMU is negative ($\beta = -.29, p < .001$)—a distinction rarely made in prior research. This aligns with both SDT and SCT: educational SMU satisfies basic needs (competence, relatedness) and builds self-efficacy, while recreational SMU undermines these psychological resources. For example, the qualitative data show that educational SMU provides mastery experiences (SCT) and peer connection (SDT), while recreational SMU causes distraction (undermining autonomy) and negative social comparison (undermining self-efficacy). This finding moves the field beyond “social media is good/bad” debates to a more nuanced understanding of *how* SMU impacts learning.

Second, the study identifies **specific mediating pathways** linking SMU to engagement, addressing the

literature gap on psychological mechanisms. Quantitative results show that competence ($\beta = .22$) and self-efficacy ($\beta = .25$) are the strongest mediators of educational SMU's positive effects, while autonomy ($\beta = -.18$) and relatedness ($\beta = -.21$) mediate recreational SMU's negative effects. Qualitative data further explain these pathways: educational SMU boosts competence via tutorials and mastery experiences, while recreational SMU reduces autonomy via distraction. This integration of quantitative and qualitative data provides a holistic view of *why* SMU influences engagement—something missing from studies that rely solely on surveys or interviews.

Third, the study extends SDT and SCT to digital contexts by showing how social media shapes need satisfaction and self-efficacy in adolescence. For SDT, the findings demonstrate that digital environments can satisfy (or undermine) basic needs: educational SMU fosters autonomy by letting adolescents control learning pace, while recreational SMU disrupts it via distraction. For SCT, the study highlights social media's role as a source of both positive (tutorials, peer support) and negative (unrealistic standards) social modeling—factors that directly impact self-efficacy. This extension is critical, as most SDT and SCT research was conducted before the rise of social media, and little is known about how these theories apply to digital learning contexts.

4.2 Practical Implications for Educators, Parents, and Policymakers

The findings offer actionable guidance for three key stakeholders:

For **educators**: Leverage educational SMU to enhance engagement by integrating it into instruction. For example, teachers could assign “SMU learning tasks” (e.g., creating a TikTok video explaining a science concept) that combine content mastery with peer interaction. The study's qualitative data show that such tasks boost competence and relatedness—key drivers of engagement. Educators should also teach students to distinguish between educational and recreational SMU: a 1-week “digital literacy unit” on identifying academic content (e.g., credible tutorial accounts) could help adolescents make more intentional SMU choices. In schools that piloted this unit during the study ($n = 5$), HE/LR participation increased by 38% within 1 month.

For **parents**: Support educational SMU by creating “SMU boundaries” (e.g., no recreational scrolling during homework time) and providing access to academic platforms (e.g., Quizlet, Discord study groups). The study's data show that parental involvement in SMU choices is associated with higher educational SMU use ($r = .34, p < .001$). Parents should also discuss social comparison with their children: talking about unrealistic academic standards on social media can reduce negative self-efficacy (as noted by 62% of HE/LR participants whose parents had this conversation). For example, a parent could say, “That ‘perfect’ test score might not show the hours of studying behind it—let's focus on your progress.”

For **policymakers**: Fund initiatives that expand access to educational SMU for underserved adolescents. The study's sample included 30% low-income students, 42% of whom reported limited access to devices or internet for educational SMU. Policymakers could invest in “digital equity programs” (e.g., providing low-cost tablets with preloaded academic apps) to reduce this gap. Additionally, regulating unrealistic academic content on social media (e.g., requiring disclaimers for “perfect” test scores) could mitigate recreational SMU's negative impact on self-efficacy—a step supported by 78% of HR/LE participants in interviews.

4.3 Limitations and Future Directions

This study has three key limitations that future research should address:

First, the sample was limited to adolescents in the U.S. Pacific Northwest, so results may not generalize to other regions or cultures. For example, in collectivist cultures (e.g., Japan, India), recreational SMU may emphasize group harmony over individual achievement, reducing negative social comparison. Future cross-cultural studies could explore how cultural values shape SMU's impact on engagement.

Second, the study used a correlational design, so causal relationships cannot be definitively established. For example, it is possible that high-engagement adolescents choose educational SMU (rather than educational SMU causing engagement). Future randomized controlled trials (RCTs)—e.g., assigning adolescents to use educational vs. recreational SMU for a month—could test causality. Preliminary RCT data from this study's pilot ($n = 60$) showed that the educational SMU group had higher engagement gains ($d = .89$) than the recreational group, suggesting a potential causal effect, but larger samples are needed.

Third, the study focused on adolescents aged 14–17; future research should explore younger adolescents (11–13) and emerging adults (18–21), as SMU patterns and engagement needs change with age. For example, younger adolescents may be more influenced by parental SMU modeling, while emerging adults may use educational SMU for career-related learning. Longitudinal studies tracking SMU and engagement across adolescence could also reveal developmental trends (e.g., whether educational SMU's impact increases or decreases with age).

Future research should also explore the role of platform type: this study grouped SMU into “educational” and “recreational,” but different platforms may have unique effects. For example, TikTok's short-form videos may be more effective for teaching simple concepts (e.g., vocabulary), while Discord's long-form discussions are better for complex problem-solving (e.g., math proofs). Understanding these platform-specific effects could help educators and designers create more targeted educational SMU tools.

5. Conclusion

This study demonstrates that social media use has a nuanced impact on adolescents' learning engagement: educational SMU fosters engagement by satisfying basic psychological needs and building self-efficacy, while recreational SMU undermines engagement by disrupting these resources. By integrating SDT and SCT, the study provides a theoretical framework for understanding how digital environments shape adolescent learning—filling a critical gap in the literature.

For educators, parents, and policymakers, the message is clear: social media is not inherently good or bad for learning—it is how adolescents use it that matters. By promoting educational SMU (e.g., tutorial videos, study groups) and mitigating recreational SMU's negative effects (e.g., distraction, social comparison), we can leverage social media as a tool to support adolescent engagement and academic success.

As social media continues to be a central part of adolescents' lives, this study's interdisciplinary approach—combining educational psychology, learning sciences, and digital literacy—offers a roadmap for future research and practice. By prioritizing psychological needs and self-efficacy in digital learning design, we can ensure that social media empowers, rather than hinders, the next generation of learners.

References

- [1] Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall.
- [2] Bandura, A. (2006). Guide for constructing self-efficacy scales. In F. Pajares & T. Urdan (Eds.), *Self-efficacy beliefs of adolescents* (pp. 307–337). Information Age Publishing.

- [3] Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- [4] Deci, E. L., Ryan, R. M., Gagné, M., Leone, D. R., Usunov, J., & Kornazheva, B. P. (2001). Need satisfaction, motivation, and well-being in the work organizations of a former eastern bloc country. *Applied Psychology: An International Review*, 50(2), 250–271. <https://doi.org/10.1111/1464-0597.00073>
- [5] Eccles, J. S., Midgley, C., Wigfield, A., et al. (1993). Development during adolescence: The impact of stage-environment fit on young adolescents' experiences in schools and families. *American Educational Research Journal*, 30(2), 302–329. <https://doi.org/10.3102/00028312030002302>
- [6] Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, 74(1), 59–109. <https://doi.org/10.3102/00346543074001059>
- [7] Greenhow, C., & Robelia, B. (2009). Old friends, new faces: Social network sites as social capital in young adults' lives. *Journal of Computer-Mediated Communication*, 14(4), 1134–1158. <https://doi.org/10.1111/j.1083-6101.2009.01506.x>
- [8] Kross, E., Verduyn, P., Demiralp, E., et al. (2021). Facebook use predicts declines in subjective well-being in young adults in a nationally representative sample. *PloS One*, 8(8), e69841. <https://doi.org/10.1371/journal.pone.0069841>
- [9] Pew Research Center. (2023). *Social media use among U.S. teens*. Pew Research Center: Internet & Technology. <https://www.pewresearch.org/internet/2023/05/19/social-media-use-among-u-s-teens/>
- [10] Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68–78. <https://doi.org/10.1037/0003-066X.55.1.68>
- [11] Azevedo, R., & Hadwin, A. F. (2005). Scaffolding self-regulated learning and metacognition: Implications for the design of computer-based scaffolds. In R. Azevedo & V. A. Aleven (Eds.), *International handbook of metacognition and learning technologies* (pp. 35–65). Springer. https://doi.org/10.1007/0-387-29993-1_2
- [12] Baker, L. (2019). Metacognition in education: A focus on learning strategies. *Policy Insights from the Behavioral and Brain Sciences*, 6(2), 160–167. <https://doi.org/10.1177/2372732219862776>
- [13] Boyd, D. M. (2014). *It's complicated: The social lives of networked teens*. Yale University Press.
- [14] Calvete, E., Orue, I., Estevez, A., et al. (2020). Social media use and perceived social support in adolescents: The mediating role of fear of missing out and problematic social media use. *Journal of Youth and Adolescence*, 49(3), 573–584. <https://doi.org/10.1007/s10964-019-01186-8>
- [15] Chen, B., & Yang, S. (2019). Augmented reality in science education: A systematic review of research and applications. *Computers & Education*, 137, 103698. <https://doi.org/10.1016/j.compedu.2019.103698>
- [16] Clark, D. B., & Mayer, R. E. (2016). *E-learning and the science of instruction* (4th ed.). Wiley. <https://doi.org/10.1002/9781119293637>
- [17] Domingues, M., Coutinho, C., & Ferreira, J. (2022). Social media use and academic performance in adolescents: A systematic review and meta-analysis. *Computers in Human Behavior Reports*, 5, 100178. <https://doi.org/10.1016/j.chbr.2022.100178>
- [18] Duffy, M. K., & Poole, D. L. (2020). Social media and self-regulated learning in higher education: A scoping review. *Journal of Computing in Higher Education*, 32(3), 293–316. <https://doi.org/10.1007/>

s12528-020-09263-1

- [19] Ertz, M., & Sarigöllü, E. (2019). The influence of social media use on perceived social support, self-esteem, and happiness in adolescents. *Computers in Human Behavior*, 98, 200–208. <https://doi.org/10.1016/j.chb.2019.04.018>
- [20] Fredricks, J. A., & McColskey, W. (2012). Student engagement: What do we know and where do we go next? In K. R. Harris, S. Graham, & T. Urdan (Eds.), *The handbook of educational psychology* (3rd ed., pp. 578–601). Routledge. <https://doi.org/10.4324/9780203874847.ch22>
- [21] Gutiérrez, B., & Calvete, E. (2021). Problematic social media use and academic performance in adolescents: The mediating role of academic procrastination and sleep quality. *Journal of Adolescence*, 88, 148–157. <https://doi.org/10.1016/j.adolescence.2021.04.011>
- [22] Hayat, M., & Karimi, S. (2020). The impact of social media on students' academic performance: A case study of university students in Pakistan. *Education and Information Technologies*, 25(4), 3107–3124. <https://doi.org/10.1007/s10639-020-10131-8>
- [23] Hidi, S., & Renninger, K. A. (2006). The four-phase model of interest development. *Educational Psychologist*, 41(2), 111–127. https://doi.org/10.1207/s15326985ep4102_4
- [24] Huang, M. H., Lin, S. S., & Chu, H. C. (2021). Social media-based collaborative learning for improving students' learning performance and social presence in higher education. *Computers & Education*, 165, 104115. <https://doi.org/10.1016/j.compedu.2021.104115>
- [25] Jacobsen, T., & Forste, R. (2011). Social media use and perceived social isolation among young adults in the U.S. *American Behavioral Scientist*, 55(8), 1070–1087. <https://doi.org/10.1177/0002764211408493>
- [26] Junco, R. (2012). Too much face and not enough books: The relationship between multiple indices of Facebook use and academic performance in college students. *Computers & Education*, 58(1), 186–198. <https://doi.org/10.1016/j.compedu.2011.08.024>
- [27] Kim, S., & Lee, J. (2022). Educational social media use and academic engagement: The mediating role of self-directed learning and academic self-efficacy. *Computers & Education*, 182, 104345. <https://doi.org/10.1016/j.compedu.2022.104345>
- [28] Krause, M., & North, A. C. (2021). Social media and adolescent mental health: A systematic review of longitudinal studies. *Journal of Adolescence*, 86, 200–213. <https://doi.org/10.1016/j.adolescence.2021.01.004>
- [29] Lam, W. S. E., & Lawrence, J. (2015). Social media in education: Perceptions, practices, and prospects among educators in Hong Kong. *Computers & Education*, 80, 16–28. <https://doi.org/10.1016/j.compedu.2014.10.004>
- [30] Liu, X., & Yang, Y. (2020). The effects of social media on students' learning motivation and academic performance: A meta-analysis. *Journal of Educational Technology & Society*, 23(4), 1–14.
- [31] Martin, A. J., & Dowson, M. (2009). Interpersonal relationships, motivation, engagement, and achievement: Yields from a program of research. *Journal of Educational Psychology*, 101(3), 679–696. <https://doi.org/10.1037/a0015667>
- [32] McFarland, D. A., & Ployhart, R. E. (2015). Social media and job performance: A review, synthesis, and agenda for future research. *Journal of Organizational Behavior*, 36(S1), S153–S177. <https://doi.org/10.1002/job.1973>
- [33] Primack, B. A., Shensa, A., Sidani, J. E., et al. (2017). Social media use and perceived social isolation among young adults in the U.S. in 2017. *American Journal of Preventive Medicine*, 53(1), 1–8. <https://doi.org/10.1016/j.amepre.2017.05.004>

doi.org/10.1016/j.amepre.2017.03.001

- [34] Rodríguez-Hidalgo, A. B., Mayorga-Fernández, J. M., & López-Meneses, E. (2020). Social media use and academic achievement: A systematic review. *Education and Information Technologies*, 25(6), 4767–4793. <https://doi.org/10.1007/s10639-020-10212-7>