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CLASSROOM TECHNOLOGY POLICIES, TECHNOLOGY USAGE, AND MIND-WANDERING

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ABSTRACT

CLASSROOM TECHNOLOGY POLICIES, TECHNOLOGY USAGE, AND MIND-WANDERING

Technology usage has been rapidly increasing in college classrooms since 2019. This has shown to be a challenge for educators in higher education due to the increase in off-task usage. Many educators try to combat technology usage in their classrooms through technology policies in their syllabus, in hopes of reducing off-task behaviors such as mind-wandering. The purpose of this study was twofold: first we determined whether classroom technology policies impacted students' technology usage. Then, we investigated whether access to technology in the classroom was associated with more mind-wandering during class. Two hundred sixty-eight college students completed an online survey that assessed their digital device usage, engagement, and mind-wandering. Results indicated that from participants' perspectives, the instructor's technology policy had a significant effect in the course where students used technology the least, but it did not have an effect in the course where they used technology the most. Results also indicated that mind-wandering was significantly higher in the course where participants used technology the most, than in the course where they used technology the least. Results showed that there was a significant negative correlation between technology policy and enforcement in the course where participants reported using technology the least, indicating that more enforcement of technology policies was associated with less technology use. Results also indicated that participants who were less interested in the course topic were more likely to use technology during class, and those who used technology during class more often were more likely to mind-wander. Implications for classroom technology policies are discussed.

Keywords:
Mind-wandering, Technology Policy, Engagement, Technology Use

In dedication to my mom, dad, sister, gram, and fiancé.

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I would like to thank my family for being so supportive through this whole journey and always being my number one fans. I would also like to thank my fiancé for always supporting me and encouraging me to do my best. I would like to thank my professors for having faith in me and for helping me become the best version of myself, and the best school psychologist I can be. Finally, I want to thank my cohort, I couldn't have done it without you and all your constant support.

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Introduction

Mind-wandering is the drifting of the mind from what is going on in front of you to thoughts that are not relevant to the task (Hollis & Was 2016; Mooneyham & Schooler 2013). Mind-wandering alone can be harmful to students' attention to classroom material, but when paired with technology, the issue becomes much wider spread (Risko et al., 2013). When a student finds themselves mind-wandering in a classroom, they are more than likely not interested in the topic being taught, so their mind begins to drift and think of other things (Wammes et al., 2019). If the student is using a laptop, phone, or tablet in class, it is easy for them to pull up other tabs to look at things not related to classroom activities (Risko et al., 2013). When technology is easily accessible in the classroom, students that engage in multitasking behaviors are more likely to experience deficits in knowledge retention (Junco & Cotton, 2011). Shifting back to in-person instruction after multiple years of learning in an environment where technology was not only readily available, but required, has created a shift in students' learning approaches. Students are now relying on their electronic devices more than before to learn material (Butler Samuels et al., 2021).

With readily available access to technology comes a big hurdle in preventing multitasking from occurring. In this sense, multitasking can also be considered task-switching which is performing two or more cognitive tasks at a time. This is shown to be harmful for students' learning through the increase in cognitive load (Hartanto & Yang, 2022). In the present study, I will investigate the relationship between mind-wandering and classroom technology policies. Specifically, I will examine whether classroom technology policies that allow (or do not prohibit) technology are associated with more mind-wandering among students in those classes. I will also examine how technology access increases students' self-reported mind-wandering.

Literature Review

Individual Differences in Mind-Wandering

Not all types of mind-wandering are the same and it is important to discuss that not everyone multitasks in the same way. For example, Junco and Cotton (2011) found that students engaged in non-academic multitasking (e.g., using social media) had negative academic outcomes. However, students engaged in academic multitasking (e.g., homework, notetaking, and researching) did not have negative outcomes, presumably because they were engaged in course-related activities, despite not consistently attending to what was happening in the classroom.

Other research indicates that students with higher self-control tend to have fewer off-task thoughts than students with lower self-control (Moon et al., 2020). Use of self-control strategies is associated with fewer off task thoughts and behaviors. In other words, if someone has better self-control strategies, they will be less likely to be off task than someone who does not have good strategies. This could impact student's technology use in class, thus consequently impacting mind-wandering if students with worse self-control are more likely to mind-wander when using technology. Forster and Lavie (2009) found that high perceptual load reduces mind-wandering. In other words, students who are tasked with thinking about many things at one time are less likely to mind-wander than students who do not have a high perceptual load. This suggests that characteristics of the classroom environment and expectations may influence students' tendencies to mind-wander. Thus, individual differences may influence students' mind-wandering. In addition, external factors such as policies may also play a role.

Consequences of Classroom Technology Use

Technology use has grown rapidly around the world for many years (Gupta, 2012). However, within the last three years, the use of technology has grown particularly quickly in college classrooms (Khlaif et al., 2022). The world is shifting towards more online learning to accommodate students and families as the educational response to the COVID-19 pandemic (Butler Samuels et al., 2021). Aspects of this shift may lead to more mind-wandering, which often leads to poor academic performance (Loh et al., 2016). One explanation for this relationship is that when students use their devices in the classroom, they often are engaged in multitasking or off task activities not related to the class (Quesenberry, 2022).

Although using laptops to take notes is becoming more common, research suggests that it is not as effective as students perceive it to be (Demirbilek & Talan, 2018; Mueller & Oppenheimer, 2014). Students who engage in multimedia multitasking perform worse on reading comprehension tasks, quizzes, and exams, compared to students who do not media multitask (Downs et. al., 2015). Students often think that they can multitask effectively while staying engaged, when in fact the opposite is often true; multimedia multitasking can be harmful to students' learning by creating more work for their brain to perceive information effectively (Aagaard, 2015; Downs et al., 2015; McCoy, 2013). Even students' own self-reports can reveal higher rates of multitasking when using technology in the classroom. Jamet et al. (2020) conducted an ecological study to mimic a classroom environment. Students were assigned to take notes either on paper or on laptop. Students then took a learning survey to see how much multitasking occurred. Multimedia multitasking behaviors were more frequent for the students that took notes on their laptop.

Despite the known determinants of media multitasking in the classroom, not all academic technology use is harmful, and some types may be more useful for academic purposes than others. For example, among students using electronic devices in the classroom, students using laptops are more likely to be on task than students using their phones (McGloin et al., 2017). This could be because when students are bored, they often turn to their phones to entertain themselves, whereas laptops can serve academic purposes (e.g., notetaking, searching for course related content).

Approximately 92% of the time, when students are using their phones in class, they are texting (Kim et al., 2019). Students report using their phones for 25% of class time in 90% of their classes (Aljomaa et al., 2016; Kim et al., 2019; Tindell & Bohlander 2012). Phone access can prompt mind-wandering regardless of student interaction with devices (Stothart et al., 2015). In other words, just having the device in class and getting a notification can prompt mind-wandering (e.g., wanting to respond to the notification, concerns related to the message) which can lead to poor academic performance. Randall et al. (2014) found that individuals that have less cognitive resources (e.g., lower general mental ability and lower working memory capacity) would be more likely to mind-wander. It was also determined that individuals with more cognitive resources were less likely to mind-wander and were more likely to maintain their attention to the given task.

Classroom Technology Use and Mind-Wandering

With the increase of technology use in the classroom comes a greater risk of students' mind-wandering, especially through internet browsing (Hollis & Was, 2016). Recent evidence suggests that university students who use laptops during lecture/course work are only on task 37% of the time (Wammes et al., 2019). Similarly, Risko et al. (2013) found that students who

were given a computer during a lecture video were significantly more likely to mind-wander than students who were not given a computer. In their experiment, students that were given a computer were also given an email account where they had to respond to emails during the lecture, this created more opportunity for the participants to mind-wander, simulating technology use in a typical college classroom.

If students are not interested in the topic at hand, they are more likely to shift their attention to thinking about unrelated topics. This shift creates a lapse in attention, which is more likely to occur when tools such as laptops are introduced (Wammes et al., 2019). Students who find a lecture uninteresting are more likely to multimedia multitask than students who enjoy the lecture (Kane et al., 2021). According to Was et al. (2019), during both live and recorded online lectures, college students had a greater increase in mind-wandering as the lecture went on. Students tended to mind-wander more toward the second half of the lecture, especially in the online lecture format. Students' placement in the classroom was associated with their mind-wandering. Students who sat in the back of the classroom were more likely to get off task, find the lecture less interesting, and engage in multimedia multitasking more than students who sat in the front of the classroom. Aagaard (2015) noted that the newer generation of students are so used to multitasking through phones and laptops that they cannot stay focused long enough to complete tasks, due to being so accustomed to switching tasks rapidly.

Course Technology Polices

Students may be more distracted by their devices in a class that permits cell phone use. This could be because allowing phone use in the class sends a message to students that they are capable of switching between tasks such as texting and taking notes on the lecture (Chen & Yan, 2016). Patterson and Patterson (2017) found that teachers' classroom policies vary. Among full-

time faculty surveyed, 4% did not allow laptops in class, 20% of classes require their students to use a laptop, and 67% allow laptop use in the classroom. Morris and Sarapin (2020) conducted a nationwide survey of 150 college instructors to examine classroom technology policies, enforcement of those policies, and use of technology for academic purposes in the classroom. Half of the higher education instructors surveyed felt strongly about their enforcement of mobile phone policies. Students who use phones without structure have the potential to become distracted, which is likely to have harmful effects (e.g., learning, attention, engagement, and classroom climate). The literature in this area is minimal, however, so it is important to learn more about instructors' technology policies to determine whether they impact students' use of technology for academic and non-academic purposes. Even less is known about the level to which instructors enforce their own classroom technology policies, and how this level of enforcement impacts students' technology use and subsequent mind–wandering.

Summary

Current evidence suggests that technology use in the classroom often leads to mind-wandering in college students. In the classroom, technology use is becoming more increasingly common, in some cases technology is even required. If technology use increases students' mind-wandering during class, technology may be in turn harming these students' academic performance. Instructors' technology polices, however, may influence this relationship. Instructors' course technology policies vary, so it is important to determine how these policies influence students' technology use, and consequently, their mind-wandering during class.

The Present Study

The purpose of the present study is twofold: 1) to determine whether classroom technology policies impact students' technology use, and 2) to investigate whether access to technology in the classroom is associated with more mind-wandering during class.

The research questions for the present study are as follows:

1. What are students' perceptions of instructors' technology policies?
2. To what degree does an instructor's technology policy influence students' self-reported technology usage?
3. To what degree does instructors' levels of enforcement of technology policy strictness influence students' self-reported technology usage?
4. To what degree does classroom technology use impact students' mind-wandering during class?
5. Do students who are less engaged use technology for off-task purposes more often, and consequently mind-wander more during class compared to students who are more engaged?

Due to the variability in technology policies reported in the literature (Morris & Sarapin 2020; Patterson & Patterson 2017), the first research question is exploratory. For the second research question, I hypothesize that policy alone will not influence levels of technology use. For the third research question, I hypothesize that stronger levels of technology policy enforcement (e.g., specific immediate consequences for violating the policy, or frequent reference to the policy in class) will be associated with less frequent technology use during that instructor's class. For the fourth research question, consistent with previous literature (Hollis & Was 2016; Risko et al., 2013; Wammes et al., 2019), I hypothesize that more frequent classroom technology use will be

associated with more frequent mind-wandering during class. For the fifth research question, I hypothesize that students who are less interested in the course topic will be more likely to use technology during class, and those who use technology during class more often are more likely to mind-wander.

Method

Participants

Participants were 268 undergraduate students from Western Kentucky University who received course credit for participation. Demographic information included questions regarding race, ethnicity, gender, age, year in school, major, minor, and GPA. Those questions can be found in Appendix A. Over a duration of 3 months participants were given the opportunity to take the Technology use survey. The total number of participants that completed the survey was 268 (203 female, 58 male, 2 nonbinary, 2 other, 3 missing). Of these participants 83.2% were Caucasian/White, 6.7% Black/African American, 3% Black/White, 2.6% Asian or Pacific Islander, 1.5% other, 0.7% Native American, 0.4% Hispanic, and 0.4% prefer not to say. Of participants surveyed 90.7% indicated they were not Hispanic or Latino, 5.6% indicated they were Hispanic or Latino, and 2.2% indicated they preferred not to say. Among participants, 44% were freshmen in college, 24.3% were sophomores, 20.1% were juniors, and 10.4% were seniors. The mean college GPA was 3.29, $SD = 0.54$

Procedure

The study was approved by Western Kentucky University's Institutional Review Board prior to data collection. The study was administered online using Qualtrics survey software. Participants were provided an informed consent form with the purpose of the study, an explanation of procedures, confidentiality, benefits, risks, and the right to discontinue

participation in the study at any point. If participants agreed and wished to continue with the study, they indicated consent by moving to the next page. Participants completed a battery of self-report measures on a smartphone, tablet, or computer. The study used a within-subjects design. Participants completed the *Student Engagement* (Mazer's 2012), *Mind-Wandering Questionnaire* (MWQ; Mrazek et al., 2013), and the adapted *Digital Distraction Survey* (Flanigan et al., 2023) questionnaires twice: Once for the class in which they used technology the most, and once for the class in which they used technology the least.

Measures

Participants completed four instruments: the Student Engagement Scale, the Mind-Wandering Questionnaire, the Digital Distraction Survey, and a Demographics questionnaire. Participants took each survey twice, once about the class they used technology in the most, and once about the class they used it in the least.

Student Engagement

Mazer's (2012) 13-item Student Engagement Scale was used to monitor student engagement. See Appendix B. Participants reported how frequently they took part in each of the engagement activities which was scored on a seven-point Likert scale ranging from never to very often. Mazer (2012) determined the reliability for the Student Engagement Scale was calculated using Cronbach's alpha ($\alpha = .90$) indicating excellent internal consistency.

Mind-Wandering Questionnaire (MWQ)

Mrazek et al. (2013) created the Mind-Wandering Questionnaire which is a four item self-assessment questionnaire that rates trait levels of mind-wandering. See Appendix C. Items are rated on a six-point Likert scale ranging from 1 (almost never) to 6 (almost always). Items include statements such as *"I have difficulty maintaining focus on simple or repetitive work"* and

"*While reading, I find I have not been thinking about the text and must therefore read it again."* The total score for the mind-wandering questionnaire for all four items can range from 4-24. The items are reported in the results (Table 1) as an average based on the 1-6 range of the Likert scale. The reliability for the Mind-Wandering Questionnaire was calculated using Cronbach's alpha (a = 0.85), indicating good internal consistency. Marek et al. (2013) determined that the MWQ demonstrated convergent validity through the use of a probe-caught method for determining mind-wandering. The Mind-Wandering Questionnaire was also determined to be face-valid for assessing mind-wandering, meaning that the MWQ looked like it would measure mind-wandering as it was meant to across samples. It was determined that the MWQ had a high internal consistency along with good homogeneity and predicted mind-wandering for the populations that were assessed.

Digital Distraction Survey

Flanigan et al. (2023) created a 31-item survey that was adapted for this study into an 18 – item survey to specifically address technology usage. See Appendix D. The first section contains five items regarding digital device use during class for off task purposes. Items include statements such as *"Approximately what percentage of time (0-100%) do you spend using your digital devices for off-task purposes during a typical class period?"* The second section contains seven items regarding student perceptions of strategies that teachers use in order to reduce off-task behavior in their classrooms. Items for this section are rated on a 5–point scale ranging from 1 (Very Ineffective) to 5 (Very Effective). Items include statements such as *"Having a technology policy in the syllabus"* and "*Instructor verbally reminds the whole class of the course technology policy after seeing that students are off task."* The total score of this section ranges from 5 to 25. There was no listed reliability or validity for this survey. Reliability was not

calculated for the Digital Distraction Survey due to the nature of the survey. Subscales were not able to be comprised because the adaptation only asks one question per topic as a consequence of this, we are not able to calculate a total score.

Results

In the class where participants reported the most technology use for off-task purposes ("most tech class"), they reported spending on average of 37.84% of class time, *SD* = 25.49 on off-task technology. In contrast, participants reported spending an average of 11.26% of class time on off-task technology in the class where they used off-task technology least often ("least tech class") *SD* = 16.09. Time using technology for off task purposes was significantly higher in the course where participants used technology in the most, compared to the course where they used technology the least (see Table 1). On a 4-point scale ranging from 1-Very Unlikely to 4-Very Likely, participants indicated that the likelihood of getting caught using their device in the most tech class was lower *M* = 1.88, *SD* = 0.84 than the likelihood they would get caught in the least tech class *M* = 2.47, *SD* = 1.16.

Table 1

T-test Comparisons between Most Used and Least Used Technology Classes

	Most Use Class		Least Use Class		*t*(261)	*p*	Range of Scales
	M	*SD*	*M*	*SD*			
Off-Task Use of Technology (%)[a]	37.59	25.35	11.09	16.13	-15.77	< .001	1-100
Policy Strictness	2.53	0.62	1.96	0.82	9.27	< .001	1-3
Mind-Wandering	3.86	1.16	2.51	1.27	-13.83	< .001	1-4
Engagement	6.20	1.78	7.57	1.71	10.97	< .001	1-13

[a]Percent of class time.

This study assessed the difference between the class that participants used technology in the most and the class that they used technology in the least. All participants were tasked with taking the same survey twice; once about the class they use technology in the most and once for the class they use technology in the least. The results from paired sample *T*-tests are listed above. Mind-wandering and engagement values indicate the average amount of mind-wandering and engagement rather than the total amount.

Participants were also asked if the class where they used technology for off-task purposes the most often had a technology policy in the syllabus. A total of 25.3% of participants said their instructor had a technology policy, 36.6% of participants said there was no policy, and 38.1% did not know if there was a technology policy. In the class where participants used technology the least often, 55.3% said that their instructor had a technology policy, 18.65% said there was no technology policy, and 26.1% did not know.

Participants reported that the policy in the class where they used technology the most was stricter than the policy in the class where they use technology the least (see Table 1). Participants reported that they spent more time using their devices for off task purposes in the class that did not have as strict of a technology policy. A one-way ANOVA was conducted to test the hypothesis that the strictness of technology polices has an effect on frequency of off-task device use in class. In the class where participants use their devices for off-task purposes the most, the technology policy was not as strict, indicating a significant effect of policy on off-task device usage, $F(2,250) = 10.76$, $p < 0.001$. The effect size, eta squared (η2), was .079, indicating a medium effect. Tukey's HSD post hoc test showed that participants were more likely to use their devices for off task purposes if the course policy was vague (see Table 2) than if the policy was strict, ($p < 0.001$) or not strict, ($p < 0.001$).

Table 2

Strictness of Technology Polices Effect on Frequency of Off-task Device Use in Class.

	Strict		Vague		Not Strict	
	M	*SD*	*M*	*SD*	*M*	*SD*
Amount of Off-Task Device Use (most)	35.93	29.44	28.10	20.43	43.50	25.49
Amount of Off-Task Device Use (least)	6.47	10.84	9.24	10.40	18.40	22.19

Note. Most indicates the course where participants reported using technology the most. Least indicates the course where participant reported using technology the least.

A one-way ANOVA revealed that strictness of technology policy had a significant effect on amount of off-task technology use in the class where students used technology the least, $F(2,251) = 13.80$, $p < 0.001$. The effect size, eta squared (η2), was .032, indicating a small effect. Tukey's HSD post hoc test showed that when technology policies were classified as not strict, participants reported using their devices significantly more than when policies were vague or strict ($p < .001$). There was no significant difference in the amount of technology use reported when participants viewed policies as strict versus vague (see Table 2).This does not align with my hypothesis that policy alone will not influence technology use; policy alone can influence the amount of off-task technology use participants report.

The next question that was explored was the impact of technology policy strictness on the amount of mind-wandering in the class where participants used technology for off-task purposes the most. A one-way ANOVA revealed a significant effect of the strictness of technology policy on the amount of mind-wandering in the class where participants used technology in the most, $F(2,260) = 13.03$, $p < 0.001$. The effect size, eta squared (n2), was .032, indicating a small effect. A paired samples *t*-test indicated that mind-wandering was significantly higher in the course where participants used technology the most than in the course where they used technology the least (see Table 1). Consistent with previous literature, this supports my hypothesis that more

frequent classroom technology use will be associated with more frequent mind-wandering during class.

There was not a significant correlation between enforcement of technology policies and device usage in courses where participants used technology the most $r(251) = -.106$, $p = .09$. However, there was a significant negative correlation between technology policy enforcement and technology usage in the course where participants reported using technology the least $r(251) = -.214$, $p = < .001$, indicating that more enforcement of technology policies was associated with less technology use. This supports my hypothesis that the stronger the enforcement of the policy the less likely students will use technology in that course.

Engagement was significantly lower in the course where participants used technology the most, than in the course they used technology in the least (see Table 1). A mediation analysis was conducted to test the hypothesis that engagement in the course would impact off-task technology use, and consequently mind-wandering during class. Mediation models were estimated using general linear model (GLM) mediation in the jamovi project (2024) to examine the relationships between engagement (independent variable), time off task (mediator), and mind-wandering (dependent variable) in the class where participants used technology the most. Each model included a direct and indirect path (mediated by technology use) between engagement, mind-wandering in classes where participants used technology the most.

Engagement had both a direct, $B = 0.03$, $p = < .001$ and indirect, $B = 0.02$, $p = < .001$ (through technology use) effect on mind-wandering in the class participants used technology in the most. Engagement also had both a direct, $B = 0.04$, $p = < .001$, and indirect, $B = 0.02$, $p = < .001$ (through technology use) effect on mind-wondering in the class participants used technology in the least. The results of the mediation analysis supported my hypothesis for the

fifth research question; participants who were less interested in the course topic were more likely to use technology during class, and those who use technology during class more often were more likely to mind-wander.

Discussion

In the present study, I demonstrated the influence of technology policies on usage of technology for off-task purposes in college classrooms, and how this in turn impacts the amount of mind-wandering among participants. The results indicated that from participants' perspectives, the instructor's technology policy mattered in the course where students used technology the least; however, the policy was not followed as closely in the course where they used technology the most. This suggests that students' perceptions of the impact of the policy in the course where they use technology the least is accurate. This means the policy on technology use mattered for the class where participants used technology the least or, in other words, the policy was successful and their perception of the policy mattered and did impact their technology use or lack thereof. This leads to the question of whether the course where participants used technology the most has a less effective technology policy, which could explain why participants are using their devices more in these courses.

In addition to participants' perception of policy as strict, not strict, or vague, participants' perceived enforcement also impacted participants' technology use. Greater enforcement of technology policies was associated with less technology use. The results of the present study indicate that educators would likely benefit from enforcing their technology policies in order to reduce device usage in their classroom. This is consistent with previous literature that about half of instructors felt strongly about the enforcement of their technology policies (Morris & Sarapin, 2020). However, the literature in this area is minimal.

Mind-wandering was significantly higher in the course where participants used technology the most, compared to the course where they used technology the least. This is consistent with previous literature that suggests with a greater increase of technology use comes a greater risk of mind-wandering as a consequence (Hollis & Was, 2016; Risko et al., 2013; Wammes et al., 2019). Engagement was also significantly lower in the course where participants used technology the most. Engagement had a direct and indirect effect on mind-wandering in both the class participants used technology in the most and in the class where participants used technology in the least. This is consistent with my hypothesis that participants who are less engaged in the course topic are more likely to use technology and thus, more likely to mind-wander. This is also consistent with previous literature that suggests that student often think they can multitask while staying engaged when the opposite is true (Aagaard, 2015; Downs et. al., 2015; McCoy, 2013). There is no previous literature that compares technology policies, technology use, and mind-wandering – making this study the first of its kind**.**

Limitations and Further Research

There are at least three potential limitations of the present study. The external validity of our results may be limited due to the use of self-reported engagement, mind-wandering, and technology use. Due to the sample (college students), the generalizability of the findings may not extend beyond this population. All students that participated in this study were from the same university. Future research may want to consider recruiting participants from other universities across various states with more diverse student populations. This study was also only conducted with college students in psychology courses, many of whom were in a general education course rather than a major course. It may also be interesting to explore the K-12 population to see if the results translate from universities to K-12 public education. Another limitation of this study was

the absence of observations of classroom technology use. Future researchers may wish to observe classroom technology use to determine whether participants' self-reports align with actual usage. Previous literature discusses technology policies from the instructor's perspective; however, few studies have examined how college students view instructors' technology policies. Future researchers may want to investigate what students vs. faculty define as "vague" in a technology policy to gain a better understanding of the policies and the effectiveness. Future researchers could qualitatively examine the level of importance of the course to students and whether importance has an impact on mind-wandering. Future researchers may also wish to investigate the impact of variables such as future oriented goal versus a present achievement goal on classroom engagement and mind-wandering.

Conclusion

This is the first study to examine the relationships among technology policies, technology usage, and mind-wandering. The present study indicates that strictness of technology polices have an impact on the likelihood of off task device usage among students. Participants reported mind-wandering significantly more often in the class where they used technology the most. Engagement was significantly lower in the course where participants reported mind-wandering the most. Engagement had both a direct and indirect (through technology use) effect on mind-wandering despite the level of technology use reported. This indicates that when participants were not engaged in the course material, they spent more time using technology, which led to more mind-wandering. As an implication for educators based on the results of this study, we recommend your students view your technology policy as strict. The results of this study showed that if technology polices were strict, participants were less likely to mind-wander and use their devices for off-task purposes than if the technology policy was not strict. Finally, enforcement of

the classroom technology policy had a significant effect on participants' technology use, a finding that may be useful to educators in considering whether to reinforce their technology policies throughout the semester, which my results indicate may reduce students' off-task technology use in the classroom.

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Appendix A

Demographics

Start of Block: Dem block

DemIns Please answer the questions below.

Dem1 What is your gender?

- ○ Female
- ○ Male
- ○ Nonbinary
- ○ Transgender
- ○ Other
- ○ Prefer not to say

Dem2 What is your age?

_____

Dem3 Which race(s) do you identify as?

- ☐ Asian or Pacific Islander
- ☐ Black/African American
- ☐ Caucasian/White
- ☐ Native American
- ☐ Other (specify) _____
- ☐ ⊗ Prefer not to say

Dem4 What is your ethnicity?

- ○ Hispanic or Latino
- ○ Not Hispanic or Latino
- ○ Prefer not to say

Dem5 What is your major?

▼ Accounting ... Writing

Dem6 What is your minor or second major?

_____

Dem7 What is your current year in college?

- ○ Freshman
- ○ Sophomore
- ○ Junior
- ○ Senior

Skip To: Dem10 If What is your current year in college? = Freshman

Dem8 What is your current GPA?

_____

Dem9 What was your high school GPA?

_____

Dem10 Did you take the SAT or the ACT?

- ○ SAT
- ○ ACT
- ○ Both
- ○ Neither

Display This Question:

If Did you take the SAT or the ACT? = SAT

Or Did you take the SAT or the ACT? = Both

Dem11 What was your SAT Composite (Total) score?

_____

Display This Question:

If Did you take the SAT or the ACT? = ACT

Or Did you take the SAT or the ACT? = Both

Dem12 What was your ACT score?

_____

Dem13 Is English your first language?

- ○ Yes
- ○ No

Display This Question:

If Is English your first language? = No

Dem14 ***What*** is your first language and ***when*** did you learn English (e.g., how old were you?)

_____

Dem15 What class are you completing this Study Board requirement for (e.g., PSY 100, PSYS 210)?

_____

SerChk Did you engage in this study in full seriousness? (i.e., did not click through questions, etc.)

(Note: your response to this question will not affect your awarding of credit for participation in this study)

- ○ Yes
- ○ No

End of Block: Dem block

Appendix B

Mazer's (2012) Student Engagement Scale

1. Listened attentively to the instructor during class.

2. Gave your teacher your full attention during class

3. Listened attentively to your classmates' contributions during class discussions.

4. Attended class.

5. Participated during class discussions by sharing your thoughts/opinions

6. Orally (verbally) participated during class discussions

7. Thought about how you can utilize the course material in your everyday life.

8. Thought about how the course material related to your life.

9. Thought about how the course material will benefit you in your future career.

10. Reviewed your notes outside of class.

11. Studied for a test or quiz.

12. Talked about the course material with others outside of class.

13. Took it upon yourself to read additional material in the course topic area

Appendix C

Mrazek et al.‘s (2013) Mind-Wandering Questionnaire (MWQ)

Mind-wandering is the drifting of the mind from what is going on in front of you to thoughts that are not relevant to your current task. Based on this definition, answer the following questions.

1. In this class, I have difficulty maintaining focus.
2. In this class, I do things without paying full attention.
3. In this class, I find myself listening with one ear and thinking about something else at the same time.
4. In this class, I mind-wander during lectures and presentations.

Appendix D

Flanigan et al.'s (2023) Digital Distraction Survey

1) Which of the following digital devices do you bring to this class on a regular basis (select all that apply)

A. Smartphone
B. Cell phone (non-smartphone)
C. Laptop
D. Tablet
E. Smart watch
F. Other: _____

2) (SURVEY TIME 1) Thank about the classes you are currently taking. Out of all your current classes, which class do you use your digital devices for off task behavior MOST often? Write the name of that class here. _____

2) (SURVEY TIME 2) Thank about the classes you are currently taking. Out of all your current classes, which class do you use your digital devices for off task behavior LEAST often? Write the name of that class and the instructor's name here. _____

3) For the rest of the questions, think about [INSERT NAME OF CLASS FROM #2].

4) Approximately what percentage of time (0-100%) do you spend using your digital devices for off-task purposes during a typical class period in NAME OF CLASS?

5) Identify how you use your digital devices for off-task purposes during NAME OF CLASS (select all that apply):

A. Texting/messaging on my phone
B. Texting/messaging on my computer
C. Texting/messaging on my smart watch
D. Social media on my phone
E. Social media on my computer
F. Browsing the Internet on my phone
G. Browsing the Internet on my computer
H. Shopping on my phone
I. Shopping on my computer
J. Gaming on my phone
K. Gaming on my computer
L. Doing homework for other classes
M. Doing homework for this class
N. Other_____

6) Which of the following best represents the likelihood of being caught using your digital devices for off-task purposes during a typical class period in NAME OF CLASS?

A. Very unlikely

B. Unlikely
C. Likely
D. Very likely

7) Does your instructor have a technology policy in their syllabus?

A. Yes
B. No
C. I don't know

8) In your opinion, how strict is the policy?

A. Strict
B. Vague
C. Not strict

9) The following questions ask whether your instructor for INSERT CLASS uses common strategies for reducing student use of mobile devices for off-task purposes during class.

How effective are each of the following strategies at reducing your use of mobile devices for off-task purposes during INSERT CLASS?

Strategy	1	2	3	4	5	
Having a technology policy in the syllabus	Very Ineffective	Moderately Ineffective	Little to No Impact on Device Use	Moderately Effective	Very Effective	My instructor does not do this.
Instructor calls out students during class for off-task device use	Very Ineffective	Moderately Ineffective	Little to No Impact on Device Use	Moderately Effective	Very Effective	My instructor does not do this.
Instructor talks to student after class or sends an email regarding off-task device use	Very Ineffective	Moderately Ineffective	Little to No Impact on Device Use	Moderately Effective	Very Effective	My instructor does not do this.
Loss of points after caught using device (i.e.,	Very Ineffective	Moderately Ineffective	Little to No Impact on	Moderately Effective	Very Effective	My instructor does not do this.

grade deduction)			Device Use			
Instructor bans device use during class	Very Ineffective	Moderately Ineffective	Little to No Impact on Device Use	Moderately Effective	Very Effective	My instructor does not do this.
Instructor uses active learning teaching strategies (e.g., class discussions, activities) to keep students engaged and reduce the temptation to use devices	Very Ineffective	Moderately Ineffective	Little to No Impact on Device Use	Moderately Effective	Very Effective	My instructor does not do this.
Instructor verbally reminds the whole class of the course technology policy after seeing that students are off task	Very Ineffective	Moderately Ineffective	Little to No Impact on Device Use	Moderately Effective	Very Effective	My instructor does not do this.

11) Are there any other ways in which your instructor for INSERT CLASS reacts to off-task device use in their classes? If so, what are those reactions?

12) Which of the following statements most aligns with your belief?

A.My INSERT CLASS instructor has the right to determine course technology polices and consequences on their own

B. My INSERT CLASS instructor should get student input when determining which course technology policies and consequences to use

C. My INSERT CLASS instructor has no right to control whether students use their digital devices during class

D. Other _____

13) How aware do you think your INSERT CLASS instructor is about the amount of off-task device usage that takes place in their classrooms? Select the response option that most closely aligns with your perception:

A. My instructor underestimates the amount of off-task device usage taking place in their classroom

B. My instructor has an accurate view about the amount of off-task device usage taking place in their classroom

C. My instructor overestimates the amount of off-task device usage taking place in their classroom

14) On a scale of 1-10, in general, how much do you think your INSERT CLASS instructor cares whether students use their devices for off-task purposes during class?

Instructor Does Not Care at All									Instructor Cares a Lot
1	2	3	4	5	6	7	8	9	10

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