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**Abstract**

Based on Finn and Ledbetter's (2013; 2014) work regarding classroom technology policies, this experimental study examined the implementation of a permissive and a restrictive cellular phone policy in two sections of a public speaking course, and the effect of these policies on students' cognitive and affective learning. College students ($N = 31$) were assigned to the permissive or restrictive cellular phone policy condition based on the class section of public speaking for which they registered for the Fall, 2016 semester. Results indicated that while there were no differences in cognitive learning, students in the restrictive policy condition reported greater affective learning for the instructor than did students in the permissive policy condition. Theoretical and practical implications, based on this surprising finding, also were discussed.

# Student Learning with Permissive and Restrictive Cell Phone Policies:
## A Classroom Experiment

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Based on Finn and Ledbetter's (2013; 2014) work regarding classroom technology policies, this experimental study examined the implementation of a permissive and a restrictive cellular phone policy and the effect of these policies on students' cognitive and affective learning in two sections of a public speaking course,. College students ($N = 31$) were assigned to the permissive or restrictive cellular phone policy condition based on the class section of public speaking for which they registered for the Fall, 2016 semester. Results indicated while there were no differences in cognitive learning, students in the restrictive policy condition reported greater affective learning for the instructor than did students in the permissive policy condition. Theoretical and practical implications, based on this telling finding, also were discussed.

## INTRODUCTION

For the modern college student, there is a 96% chance they will own and use a cellular phone at any given time (Smith, Rainie & Zickuhr, 2011). Students' use of cell phones, however, is related to poor academic performance in college (Lepp, Barkley, & Karpinski, 2015). The ubiquitous nature of cellular phones, and smartphones in particular, also has led to a virtual stalemate within the college classroom, as individual instructors must decide how to welcome, restrict, or integrate these devices during class time, and students decide whether or not to follow a given technology policy. Some instructors choose a permissive policy, which allows students to use one or more type of electronic device during a class, whereas others choose a restrictive policy, and still others prefer a laissez-faire approach, not having a specific yes or no to technology stated within their classroom rules.

Recent instructional communication research (e.g., Finn, & Ledbetter, 2013; Lancaster, & Goodboy, 2015; Ledbetter & Finn, 2013) has explored instructors' use of technology policies within the college classroom, with particular interest in the distinction between social and academic uses of technology (Finn, & Ledbetter, 2014), as well as various student outcomes (e.g., learning; Finn & Ledbetter, 2013; Finn & Ledbetter, 2014; Ledbetter, & Finn, 2016). Still, the literature in this area of research generally relied upon a self-report style questionnaire offered to students. To date, these investigations have, collectively, found students desire the ability to use technology in classrooms, whether for academic or social purposes – and students self-report being likely to respond in distinct manners to different technology policies as presented to them by hypothetical instructors. Yet, researchers have not examined, experimentally, the influence of a teacher's technology policy within a college classroom. Thus, the purpose of this study was to explore student learning outcomes by experimentally manipulating the cell phone policy presented to them in a sixteen-week college course.

## REVIEW OF LITERATURE

### Cellular phones in the college classroom

Cellular phone use is practically ubiquitous in modern society, yet the college classroom is nonetheless viewed as among the most inappropriate places to use a mobile device (Wei, & Leung, 1999). Despite the college classroom being considered an inappropriate context for cell phone use, many students nonetheless engage in conversations, especially via text messages, almost every day while in class (Tindell, & Bohlander, 2012). Although cellular phones may play a role in instruction via academic uses, students also use these devices for social purposes (Ledbetter, & Finn, 2016), creating a distraction for other students, with upwards of 97% of students in one study reporting having seen a classmate use a phone during class time (Tindell, & Bohlander, 2012). The combination of a great number of students possessing cell phones and the largely social uses of the technology, create an issue for instructors, who are charged with maintaining a functional classroom geared toward student learning and success.

### Student Learning

Student learning has been examined previously in terms of students' motivation to learn, as well as the distinction between types of learning. Deci and Ryan's (1985) self-determination theory explains students can be motivated to learn intrinsically or extrinsically. Students who are motivated intrinsically have a desire to learn for the sake of learning, and do so based on their own choice. Students who are motivated extrinsically learn for the purpose of satisfying external desires (e.g., for the purposes of earning a specific grade or reaching a career-related goal). Related research has demonstrated instructors can be a major influence on student motivation (e.g., Deci, Spiegel, & Ryan, 1982), and the presence of extrinsic rewards can hamper students' internal motivations (Deci, Koestner, & Ryan, 1999; 2001). Although students may approach learning with different motivations, teachers also play a role in the type of learning in which students engage.

Based on Bloom, Englehart, Furst, Hill, and Krathwohl's (1956) taxonomy of learning, student learning is broken down into cognitive and affective forms (Andersen, 1979; Kearney, & McCroskey, 1980; Scott, & Wheeless, 1975). Cognitive learning refers to students gaining knowledge through their experience in a classroom, and being able to apply and recall what they have learned (Bloom et al., 1956). Affective learning covers students' feelings of affection toward the class content or the instructor (Plax, Kearney, McCroskey, & Richmond, 1986). Cognitive and affective learning, together, represent the total student experience,

regarding the knowledge gained from a class and the experience with the material and with the instructor. Instructional communication literature typically treats cognitive and/or affective learning as outcome variables, which are influenced by instructor behaviors (e.g., immediacy; Rodriguez, Plax, & Kearney, 1996; Witt, & Wheeless, 2001). Student learning also may be influenced by other factors, including classroom technology policies.

## Classroom Technology Policies

As a means of controlling cellular phone use, as well as other forms of technology, during instructional periods, instructors have the option of implementing a technology use policy within their classrooms (Adams, 2006; Campbell, 2006; Finn, & Ledbetter, 2013; Ledbetter, & Finn, 2013). Depending on the policy type and valence, instructors may call for an outright ban on all electronic communication devices, they may allow certain devices, or they may allow all devices. Finn and Ledbetter (2013) established three types of policies an individual instructor may employ in regards to student use of technology within a classroom: permissive, restrictive, and laissez-faire. A permissive policy allows the use of some or all types of technology within a classroom. A restrictive policy does not allow some or all types of electronics. A laissez-faire policy does not specifically allow or prohibit technology use by students in a classroom.

Classroom technology policies, especially regarding cellular phone use, are perceived and followed by students to varying degrees. For example, Lancaster and Goodboy (2015) found students who had negative perceptions of classroom cell phone policies were likely to use their phones during class time, regardless of what policies were in place. Thus, it appears the instructor has two related jobs to complete when implementing classroom cellular phone policies: (1) decide which type of policy to implement, and (2) ensure students have a favorable perception of the policy.

## Classroom Policy, Power, and Student Learning

The notion of instructors putting policies into place within their classrooms is not a novel concept, having been studied from a variety of perspectives, including the concept of power in the classroom (McCroskey, & Richmond, 1983; Plax et al., 1986). Indeed, across disciplines, instructors may institute policies to control student behavior as a means of fostering learning and avoiding distraction. Consequently, these uses of teacher power may lead to distinct student perceptions of these teachers (Teven, & Herring, 2005). It follows, then, from a scholarship of teaching and learning perspective, students may indeed demonstrate distinct learning patterns when policies mitigating or encouraging the use of cellular phones during class time are implemented

## Rationale

Together, the extant research suggests three points of consideration: (1) college students are using cell phones during class time (2) they use these devices for academic and social purposes, and (3) they may not necessarily follow the prescribed behavior of a classroom technology policy. Furthermore, considering cell phone use during class time to engage in texting and social network interaction threatens student engagement with the class and the instructor (Johnson, 2013). It follows, then, students may not have the same learning experience if they are permitted to use their phones during class time compared to those students who are not able to do so. Thus, the following hypotheses are posed:

H1: Students in a class with a restrictive cellular phone use policy will experience greater cognitive learning than students in a class with a permissive cellular phone policy.

H2: Students in a class with a restrictive cellular phone use policy will report less positive affect (a) for the class, and (b) for the instructor than will students in a class with a permissive cellular phone policy.

# METHOD

## Study Design

This study, which received institutional review board acknowledgment, was designed as an experiment involving two sections of a public speaking class at a large, public, western U.S. University. The two class sections were the same length and taught by the same instructor to ensure content was delivered at the same pace and manner. As it was impossible to assign students to a class at random, one of the two sections was chosen, at random, to have a permissive cellular phone policy, while the other had a restrictive cellular phone policy. Both the restrictive and permissive conditions received a fabricated statement about the use of cellular phones in all sections of the public speaking course. The restrictive condition worked with the assumption they could be removed from class if they used their cellular phones during the 50-minute class period. Conversely, the section with the permissive policy worked with the assumption the department implemented a policy allowing all students in all public speaking courses to use their cellular phones at any time, with the exception of speech performance days.

The experiment began on the first day of class during the fall, 2016 semester. Students gave informed consent to participate in a study about student outcomes and classroom management, and completed a pretest online questionnaire. After students completed the questionnaire, the class proceeded according to standardized syllabi and delivery. Cell phone usage policies were introduced as part of the first-day lecture, which typically covers classroom policies, assignments, and schedules. Throughout the remainder of the semester, students adhered to the cellular phone policy for their section. At the conclusion of the semester, students completed a posttest online questionnaire, and were debriefed about the purpose of the study and the particulars of their participation.

## Participants

College students (*N* = 31; 22 men and nine women), enrolled in one of two sections of public speaking, participated in this study. Fourteen participants participated in the permissive condition, and 17 participated in the permissive condition. The participants ranged in age from 18 to 43 (*M* = 21.65; *SD* = 4.86), and reported their race as White/Caucasian (*n* = 27, 87.1%), Hispanic (*n* = 3, 9.7%), or Asian (*n* = 1, 3.2%). Students were in their first year (*n* = 18, 58.1%), second year (*n* = 8, 25.8%), or third year (*n* = 5, 16.1%) of college. All participants agreed to participate in the study voluntarily with no impact on their final grade for their participation or refusal.

## Measures

This study used measures of cognitive learning and affective learning. Cognitive learning was measured using Richmond, McCroskey, Kearney, and Plax's (1987) learning loss measure. Students reported their learning for the semester by responding to two 10-point scale items. The first asked how much they learned in the class they took. The second asked how much they could have learned if they had the ideal instructor. The difference in these two items is then considered to be the learning loss. Because this scale consists of two items, no reliability statistics can be calcualted. Composite scores for the permissive condition ranged from -2.00 to 0.00 (*M* = -0.43, *SD* = 0.76). Composite scores for the restrictive condition ranged from -2.00 to 9.00 (*M* = 1.41, *SD* = 3.84). Additionally, cognitive learning was measured with a pre and post-test ten-question quiz, delivered the first and last days of instruction. Once both quizzes were completed, results from quiz two were subtracted from quiz one, as a means of showing knowledge growth throughout the semester. In the permissive condition, composite scores ranged from -3.00 to 5.00 (*M* = 1.93, *SD* = 2.40). In the restrictive condition, composite scores ranged from -3.00 to 8.00 (*M* = 2.59, *SD* = 2.57).

Affective learning was measured using McCroskey's (1994) scale. The scale contains four dimensions of affective learning: (1) affect for the course, (2) intention to take a similar course, (3) affect for the instructor, and (4) intent to take the instructor for another course. The scale produces composite scores for affective learning and instructor evaluation. Students responded to a total of sixteen items (four for each dimension). In the permissive condition, composite scores for affective learning ranged from 3.13 to 7.00 (*M* = 5.39, *SD* = 1.28), and composite scores for instructor evaluation ranged from 4.00 to 7.00 (*M* = 6.23, *SD* = 1.04). In the restrictive condition, composite scores for affective learning ranged from 3.63 to 7.00 (*M* = 6.05, *SD* = 0.91), and composite scores for instructor evaluation ranged from 5.75 to 7.00 (*M* = 6.85, *SD* = 0.34).

## RESULTS

Hypothesis one predicted students in the restrictive condition would experience higher levels of cognitive learning than students in the permissive condition. To test this hypothesis, an analysis of variance (ANOVA) was conducted, using learning loss as the dependent variable, and condition as the independent variable. Results of the ANOVA indicated no significant difference between the two groups for learning loss, $F_{(1, 29)} = 3.10$, $p = .09$. It should be noted thetest approached –but did not meet – an acceptable level of statistical significance. To check these results against performed cognitive learning, an independent-samples t-test using the pre and post test was conducted.. Results indicated no significant difference between groups for quiz performance, $t(29) = -0.73$, $p = .47$. Thus, hypothesis one was not supported.

Hypothesis two predicted students in the permisive condition would report higher levels of (a) affective learning and (b) instructor evaluation, than would students in the restrictive condition. To test these hypotheses, two ANOVAs, each examining a different dependent variable were conducted. Results for H2a revealed no significant differences in affective learning for the course, $F_{(1, 29)} = 2.782$, $p = .11$. However, results for H2b revealed a significant difference in students' instructor eval-

uation, $F_{(1, 29)} = 5.383$, $p < .05$. Conversely to the hypothesis, the direction of the difference wasyielded the opposite results.. Specifically, students in the restricitve condition (*M* = 6.85, *SD* = 0.34) evaluated the instructor higher than did students in the permissive condition (*M* = 6.23, *SD* = 1.04). Thus, hypothesis two also received no support, but did find significance in the reversal of the original iteration.

## DISCUSSION

The purpose of this study was to examine with empirical experimental conditions how college students' learning – both cognitive and affective – would be affected by restrictive and permissive cell phone policies Although the results indicated no support for either original hypothesis, the interpretation of these results nonetheless offers several meaningful implications for college-level instructors. This discussion expands on these findings with broader uses of the results for instructors and professors who are charged with enacting, implementing, and enforcing cellular phone policies in their classrooms.

In keeping with the literature on technology policies (Finn, & Ledbetter, 2013; 2014; Ledbetter, & Finn, 2016), this study experimentally imposed a restrictive or permissive cellular phone policyto determine the impact of such policies on student learning outcomes and student behavior. Whereas Finn and Ledbetter's work explored the types of policies, as well as the student motives that underlie cellular phone use during class time, this study focused on what students may think and learn when they go through an entire semester required to adhere to one form of policy or another. Thus, the results of this study are particularly useful in the context of classroom management and fostering learning outcomes.

### Results Revisited

On the surface, the null results in this study indicate the lack of statistically significant findings. However, the findings are deceptivelymeaningful, especially when considering the ecologically valid setting used. To begin, the results indicated no statistically-significant differences in students' reported levels of cognitive learning. Although Seidman (2005) included cellular phone use among a variety of disruptive student behaviors that can inhibit learning, the present results indicated the self-contained electronicdisruption may be less concerning than was once thought, or students may have adapted to learning vital portions of course content while taking the occasional cell phone break.

Whereas the present results suggest students' cognitive learning is not necessarily influenced negatively by the presence of cellular phones in class, there are other concerns regarding student learning, especially in terms of affect toward the class and the instructor. The results in this study also indicated no significant differences in students' affective learning, in terms of their affect toward the course content. This finding is not necessarily surprising, although one might expect that students who have greater freedom might have a more positive regard for the class that offers a permissive policy, rather than a restrictive one. Nonetheless, students in this study may have divorced their feelings about the course content from the policy. Indeed, considering public speaking is commonly perceived as fear-inducing (Pertaub, Slater, & Barker, 2001), students may have a similar affect (or aversion) toward the content, regardless of their ability to access

a cell phone during class time. With little beyond conjecture thus far, perhaps the most interesting (and meaningful) results come from the students' reports of affect toward the instructor in H2b.

Among the outcomes in this study, the only statistically significant difference to emerge occurred in students' ratings of affect toward the instructor. Although the prediction in the second hypothesis was not supported, the statistically significant result revealed the exact opposite of that prediction. Specifically, students who attended the class section in which cellular phones were prohibited entirely, evaluated the instructor more positively than did the students in the section who had access to their cell phones at almost all times throughout the class. This finding is the most interesting result in the study, as it seems to be almost illogical. Finn and Ledbetter established students' desire to use their cell phones (and other technologies) during class time. Yet, the present study found when students are restricted from doing so, dthey rated their instructor more favorably than when they were allowed to use their phones freely. Although one can only speculate as to what led students to perceive the instructor more favorably when they were not allowed to use cellular phones, it is possible, due to the lack of distraction from the cell phones, students were more actively engaged and focused on class content anddiscussion. Through this shift of engaged attention on the course and the delivery, greater focus on the instructor may have had a meaningful impact on the percieved favorability of the teacher.. Whatever the cause, these results presented important implications for the literature and for instructors alike.

## Implications

This study presents several implications for research on cellular phone policies in the classroom, as well as several practical applications for instructors who make and enforce these policies. Looking first at the literature, this study represents a novel addition to previous work in the area of classroom technology policies as well as to the literature on the scholarship of teaching and learning. Specifically, this study is the first to include an experiment based on a full semester of classwork in two sections of the same course, in which different policies regarding cellular phone use by students were implemented and enforced. Previous research (e.g., Lancaster, & Goodboy, 2015) has largely relied on self-report methods to better understand student perceptions of policies. Thus, the present study offers a more complete understanding of what happens when students learn in a classroom with an instructor utilizing a permissive or a restrictive technology policy. Aside from this contribution to the literature, the present study also forwards several practical applications germane to college instructors who must decide how they will implement and enforce cellular phone policies in their courses. Furthermore, given the ubiquitous presence of cellular phones in college classrooms, the issue of those policies and their potential outcomes speaks to Huber and Hutchings' (2005) challenge to consider scholarship of teaching and learning as a big tent with applications to all classrooms, regardless of discipline.

On a practical level, this study offers two primary applications: (a) student learning is not necessarily harmed by students' use of cellular phones in class; and (b) contrary to what some individuals might think, students may have more favorable perceptions of instructors who do not allow them to use their cellular phones during class time. First, instructors may perceive learning is hampered when students spend some (or most) of the class connected to their cellular phones. Nonetheless, considering the results from this study, students may not learn less by being able to check the occasional text message, update their Twitter, or browse Facebook during class time. Traditionally, these actions have been considered a distraction to learning, but students may not necessarily fail to grasp course content by using their phones outside of academic pursuits in class. At the same time, the results suggest students may rate their instructors more favorably when restrictive policies are in place. Thus, instructors might consider implementing a restrictive cellular phone policy, as doing so may allow students to connect with them, engage in deeper discussion, and ultimately foster more positive perceptions of their teacher. The irony of this recommendation is inherent in the idea that students would not want to be barred from using their cell phones. Indeed, there is no guarantee individual students will respond well when confronted with a restrictive policy. Nonetheless, part of this recommendation is the willingness of the instructor to enforce the policy, perhaps by providing an external validation (e.g., departmental policy, research findings, or personal anectdote). If, however, instructors can convince their students of the benefits of ignoring the siren song of the notification light, they too may share in the rewards of having a more engaged class.

## Limitations and Conclusion

Although this study presents an experimentalresearch method and novel findings for the literature on technology policies, there are some limitations which future research in this area may address. Two primary limitations with this study should be addressed by scholars. First, this study relied on two sections of a class at one university. Without a representative sample from several institutions, the generalizability of the results may be limited. Future research can address this limitation by drawing a larger, more diverse sample. The challenge with doing so is finding individuals who will be willing to go through a full semester course (i.e, up to 16 weeks of participation) who are not at a single institution. Perhaps this limitation may be best addressed by replicating this study at several institutions simultaneously.

Second, this study was limited by the participant mortality rate experienced between time one and time two. Specifically, whereas the study commenced with 25 participants in each of the two sections included in the experiment, the final number of participants was 14 and 17, for a total of 31. Although some participants did not complete the course due to dropping, the greatest issue associated with mortality was participants not using the correct anonymous identifier for their time one and time two questionnaires. Thus, future research should use a better method of identifying participants with codes or other identifiers that will allow as many individuals to participate at both time points as possible.

## CONCLUSION

Overall, this study represents an extension to the literature on classroom technology policies. Although the findings are mixed in terms of their applicability and interpretation, this study represents the first evidence of how a cellular phone policy, be it permissive or restrictive in nature, influences student learning in the actual college classroom. Perhaps college instructors are best served by the possibility that telling students to put their phones

away –against all odds – may actually help improve instructor evaluation scores.

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