

Self-Monitoring With a Twist: Using Cell Phones to CellF-Monitor On-Task Behavior

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Abstract

Self-monitoring is regarded throughout the literature as an effective classroom intervention. Researchers have used self-monitoring interventions to improve school-related behavior of students with varying disabilities across a variety of settings. Although research supports the use of self-monitoring, traditional self-monitoring techniques may be unappealing to students and inefficient for use in the classroom. Cell phones hold great promise for increasing the acceptability and efficiency of self-monitoring interventions. The purpose of this article is to describe a self-monitoring technique that incorporates cell phones and text messages. We provide step-by-step instructions for setting up and implementing CellF-Monitoring in a classroom.

Keywords

education, self-monitoring interventions, technology, students with disabilities

Introduction

Self-monitoring is a research-based classroom intervention in which a student (a) assesses his or her behavior to determine whether a targeted behavior has occurred and then (b) records the occurrence or nonoccurrence of the targeted behavior (Mace, Belfiore, & Hutchinson, 2001; Nelson & Hayes, 1981). Researchers have successfully used self-monitoring to improve many school-related behaviors, including time on task and academic productivity (Reid, 1996). The success of self-monitoring has been attributed to multiple factors, including frequent performance feedback and, in some variations, positive reinforcement for exhibiting appropriate behavior (McDougall, 1998).

Researchers have reported positive outcomes when self-monitoring has been used with a diverse range of student populations, including students with learning disabilities (Amato-Zech, Hoff, & Doepke, 2006), emotional and behavioral disorders (EBDs; Blood, Johnson, Ridenour, Simmons, & Crouch, 2011), and high-functioning autism (Cihak, Wright, & Ayres, 2010). In addition, self-monitoring has been successfully implemented across settings, including general education classrooms (Harris, Friedlander, Saddler, Frizzelle, & Graham, 2005), special education classrooms (Graham-Day, Gardner, & Hsin, 2010), and alternative settings (Axelrod, Zhe, Haugen, & Klein, 2009).

Research clearly supports the use of self-monitoring; however, traditional self-monitoring techniques can be impractical in certain classroom settings (Amato-Zech et al., 2006; Gulchak, 2008). Currently, the majority of self-monitoring interventions rely on overt cueing systems to prompt students to assess their behavior (McDougall, Skouge, Farrell, & Hoff, 2006; Rankin & Reid, 1995). Possible

cueing systems include using a prerecorded tone emitted through an audio player (e.g., cassette tape recorder, CD player) with or without headphones for students to hear the cue (Graham-Day et al., 2010; Harris et al., 2005), a kitchen timer, or verbal prompts from the teacher (Amato-Zech et al., 2006). Although effective, these cueing systems have some potential disadvantages. For example, conspicuous cueing devices or cues that others can hear may be regarded as stigmatizing or aversive to the student who is self-monitoring and might be distracting to other students in the classroom (Amato-Zech et al., 2006). In an effort to minimize distraction, researchers have used covert cueing devices. Amato-Zech and colleagues (2006) used the MotivAider—a pager that alerts the student to self-monitor at specified intervals by vibrating. The MotivAider is a viable alternative to traditional cueing systems; however, it still needs to be paired with a traditional recording system. Traditional recording systems also have some potential drawbacks. Recording systems, which students use to record their evaluation, often consist of a piece of paper on which the student tallies the occurrence or nonoccurrence of the target behavior. These recording sheets can get damaged or lost and are usually the only documentation of the student self-monitoring.

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Furthermore, traditional self-monitoring techniques restrict the intervention to stationary settings. Overt cueing systems and paper-and-pencil recording systems make it difficult for a student to self-monitor outside of the classroom, thus excluding opportunities to self-monitor in settings where there is little individualized attention (e.g., hallways, lunchrooms, playgrounds). Self-monitoring techniques that are perceived as socially unacceptable by students or inefficient by teachers may reduce the chance that self-monitoring interventions will be implemented in the classroom (Reid, 1996).

To address the concerns mentioned above, educational researchers have begun to examine the use of technology in self-monitoring interventions, particularly for students with disabilities. For example, Gulchak (2008) used a digital mobile device as a self-monitoring system for an 8-year-old student with EBD. Alarms on the daily calendar of the personal digital assistant (PDA) cued the student to determine whether he was on-task or off-task and record the answer using a drop-down menu on the mobile device. Results of the study supported the use of a handheld computer as an all-inclusive self-monitoring device. Self-monitoring increased the student's on-task behavior from 64% to 98%. Gulchak also reported that, at the start of the study, the student expressed excitement about using the PDA. Blood et al. (2011) used an even more commonly used digital mobile device for their study. Blood and colleagues taught a 10-year-old student with EBD to use an iPod Touch to provide video modeling and as a self-monitoring cueing device. The student increased his time on task from 44% during baseline to 99% during the intervention phase. The results of the Gulchak and Blood et al. studies indicate that self-monitoring techniques using digital mobile devices can be just as effective as traditional self-monitoring techniques.

Self-Monitoring and Cell Phones

Cell phones hold great promise for increasing the acceptability and efficiency of self-monitoring interventions. They are relatively inexpensive, socially acceptable, and already prevalent among school-age youth. According to Rideout, Foehr, and Roberts (2010), in 2009, almost 70% of 8- to 18-year-olds owned a cell phone. Using a device that has become commonplace among students might make self-monitoring interventions more motivating and appealing to students. Using a cell phone to self-monitor is not as stigmatizing as traditional techniques—a student using this type of device to self-monitor should not draw nearly as much attention from other students in the class as sitting near a CD player and wearing headphones. A cell phone can also make self-monitoring interventions more efficient. Essentially, a cell phone is a private, personal cueing device that a student can carry around in his or her pocket.

Therefore, students can continue to self-monitor even during activities that require the student to move around the classroom. Just as important, using this technology for self-monitoring means that students can self-monitor their behavior outside of the classroom. For example, students can continue to self-monitor in the hallways, at lunch, and in elective classes such as art and music. In addition, self-monitoring interventions can be carried-out beyond the school setting. Students can also use these devices to monitor their behavior at home and in vocational settings.

The use of cell phones for self-monitoring might be a relatively new concept in educational settings; however, researchers in the health and medical fields have used cell phones and text messaging for quite some time to monitor health behaviors for a variety of purposes, including asthma self-management (Ostojic et al., 2005) and diabetes self-management (Franklin, Waller, Pagliari, & Greene, 2006; Kwon et al., 2004).

Even more recently, researchers in the health and medical fields also found that using cell phones increased intervention acceptability and adherence rates, especially when paired with text messaging. Shapiro et al. (2008) examined the role of text messaging in the monitoring of healthy behaviors by children, including physical activity and consumption of sugary beverages. In their study, children (and their families) were randomly assigned to one of three groups: (a) self-monitoring with text messaging, (b) self-monitoring with paper diaries, and (c) no-monitoring control group. Notably, the children recruited to participate in the study wanted to use text messaging much more than the paper diary. Prior to randomization, 100% of children expressed that they wanted to be assigned to the text messaging intervention.

Cell-Monitoring

The research we have reviewed suggests that incorporating cell phones and text messaging into self-monitoring interventions for students with disabilities could significantly enhance implementation and outcomes. We realize that some schools have policies that prohibit the use of cell phones at school; however, we contend that school policy makers are more likely to lift such bans if researchers demonstrate that cell phones can be used for purposes that are educationally relevant, such as self-monitoring. Cell phones and text messaging have the potential to be highly motivating and highly practical tools that could replace traditional self-monitoring approaches. Students and adults alike have come to rely on cell phones for not only communication but also for daily planning, getting information, taking pictures, watching videos, and listening to music (Horrigan, 2009). For students, integrating a device that is widely used by their peers without disabilities can potentially make self-monitoring more appealing and

motivate students to participate in the intervention with high levels of adherence. Said differently, teachers might see less resistance from students who need the benefits of self-monitoring if the process incorporated text messaging rather than traditional paper-and-pencil approaches. Therefore, CellF-Monitoring is a viable alternative to traditional self-monitoring techniques.

CellF-Monitoring utilizes a cell phone as an all-inclusive self-monitoring device. The cell phone can be used for two critical steps of self-monitoring: cueing and recording by way of text messages. For cueing, teachers set up automated text messages through social media programs with guided questions (e.g., Are you on task?) to assess the target behavior, which are sent to the student's cell phone at fixed intervals. The cell phone—set on vibrate—discreetly alerts the student to the incoming text message. For recording, the student responds to each text message as indicated by the teacher during the CellF-Monitoring training session (e.g., Yes, No; 1, 0). The teacher and student can meet to review the student data by looking at the text message log on the cell phone or the message log on the social media website. During this teacher–student meeting, the teacher can assess student responses for accuracy and truthfulness in recording.

CellF-Monitoring: Designing the Intervention

You will follow the same guidelines to design the CellF-Monitoring intervention that you would follow to design a traditional self-monitoring intervention. Numerous articles have been published with step-by-step directions for designing and implementing a self-monitoring intervention (Carter, 1993; Dunlap, Dunlap, Koegel, & Koegel, 1991; King-Sears & Bonfils, 1999; McConnell, 1999; Menzies, Lane, & Lee, 2009; Rafferty, 2010; Rankin & Reid, 1995). Although the directions vary somewhat from article to article, the following steps are inherent in each:

- Step 1: Identify and operationally define the target behavior.

Begin by identifying the most overt or problematic behavior and rephrase the target behavior in positive terms. For example, positive language for off-task behavior would be on-task behavior. This way, the student will be monitoring positive, desirable behavior instead of problematic, undesirable behavior. Then, operationally define the target behavior in observable, measurable terms such as “using materials appropriately” or “raising my hand to speak.”

- Step 2: Collect baseline data.

Once you have identified and operationally defined the target behavior, you will collect baseline data. You will use these data to determine when and where the student will

self-monitor (e.g., math class, reading class, whole group instruction, independent work).

- Step 3: Design the intervention.

After you have identified when and where the intervention will be implemented, you will determine how the student will self-monitor, which includes how often and using what materials. The student can be cued to self-monitor anywhere from every 30 s to every 5 min or more depending on the frequency and duration of the target behavior. For traditional self-monitoring interventions, you would also choose a cueing procedure (e.g., audio, visual, verbal, physical) and a recording system (e.g., recording sheet). For CellF-Monitoring, however, a cell phone will function as the cueing procedure and the recording system.

- Step 4: Teach the student how to self-monitor.

You will teach and show the student how to use the self-monitoring intervention (student training instructions specific to CellF-Monitoring are provided in a later section of this article). After the training session, have the student practice self-monitoring once or twice in the setting where you will implement the intervention.

- Step 5: Implement the intervention and monitor student progress.

At this point, the student begins to use the self-monitoring intervention. While self-monitoring is in place, you will continue to collect data the same way you collected baseline data. You will use these data to track student progress by comparing the student's target behavior before you implemented the intervention to his or her behavior while self-monitoring and adjust the intervention as needed. Adjustments to the intervention could include adjusting how often the student is cued to self-monitor, reinforcing accurate recording, or adding goal-setting and self-graphing components.

- Step 6: Maintenance and generalization.

Once the student has demonstrated improved behavior as a result of the intervention, you will gradually fade the intensity of the intervention by increasing the self-monitoring intervals (e.g., from cueing every minute to every 3 min) and slowly removing any components (e.g., reinforcement, goal-setting, self-graphing) you added to the initial intervention. You will also continue to collect behavior data to determine whether the target behavior maintains at acceptable levels during the fading process. If the target behavior does not maintain acceptable levels, reinstate the intervention. If the behavior does maintain, provide the



Figure 1. Activating the privacy setting.

student with the opportunity to self-monitor in an addition setting or during a different time of the day.

CellF-Monitoring: The Equipment

The only piece of equipment required for CellF-Monitoring is a cell phone for the student who is monitoring his or her behavior. Most cell phones will work for CellF-Monitoring as long as they have a vibrate option and are capable of sending and receiving text messages. As stated earlier, a vast majority of students own a cell phone, many of which have functions that far exceed the technical requirements for CellF-Monitoring.

The second source can be the school. The school can purchase a cell phone specifically for CellF-Monitoring. Prepaid, no contract cell phones can be purchased from most major retail stores. For example, a cell phone and a 1-month text message card with 1,000 text messages can be purchased for about US\$40.00. The text message cards would be the only reoccurring expense, which can be purchased separately as needed.

CellF-Monitoring: Setting Up the Technology

We understand that Twitter is still a relatively new concept in educational settings and, as such, teachers and parents might have questions about how student data can be kept confidential despite the use of such a public forum. To maintain confidentiality of the data collected from CellF-Monitoring and protect the privacy of student personal Twitter accounts, the set-up procedure includes creating teacher and student Twitter accounts for the sole purpose of the intervention. Unless you provide the student who is CellF-Monitoring the login information for the accounts, you will be the only person who will have access to both accounts—even if the student is using a personally owned cell phone. In addition, by making each of the accounts private and having each account only follow the other, tweets that the student posts on a personal Twitter account will not show up on either of the CellF-Monitoring Twitter account timelines. Put in simpler terms, if the student has a personal Twitter account, that account will be completely independent of the accounts you will create for the intervention. You will not have access to the student's personal Twitter

accounts or any of the student's personal tweets as a result of the following set-up procedure.

The set-up phase does take a bit of time and a healthy understanding of social networking. If you are new to social networking, try familiarizing yourself with the general principles of Twitter before proceeding.

- Step 1: Create a teacher Twitter (TT) account.
 1. Go to the Twitter website (www.twitter.com).
 2. Follow the prompts to create a new user account.
 3. Click on the box that reads *Protect my Tweets* under account settings (see Figure 1).
- Step 2: Create a student Twitter (ST) account.
 1. Go to the Twitter website (www.twitter.com).
 2. Follow the prompts to create a new user account.
 3. Click on the box that reads *Protect my Tweets* under account settings (see Figure 1).
 4. Enable the mobile feature for the ST account (see Figure 2). You will need access to the student's cell phone to complete this process.
- Step 3: Link the TT and ST accounts.
 1. Log in to the TT account and conduct a search for the user ID that you created for the ST account (see Figure 3).
 2. Once you have found the ST account, click the *Follow* link to send a follow request to the ST account.
 3. Log in to the ST account and accept the follow request from the TT account by clicking *Accept*.
 4. Click *Follow* on the next screen.
 5. Click on the TT account username and click on the phone icon to receive text message cues from the TT account on the cell phone (see Figure 4).
 6. Search for and find the user ID that you created for the TT account.
 7. Click *Follow* to send a follow request to the TT account.
 8. Log in to the TT account and accept the follow request from the ST account.

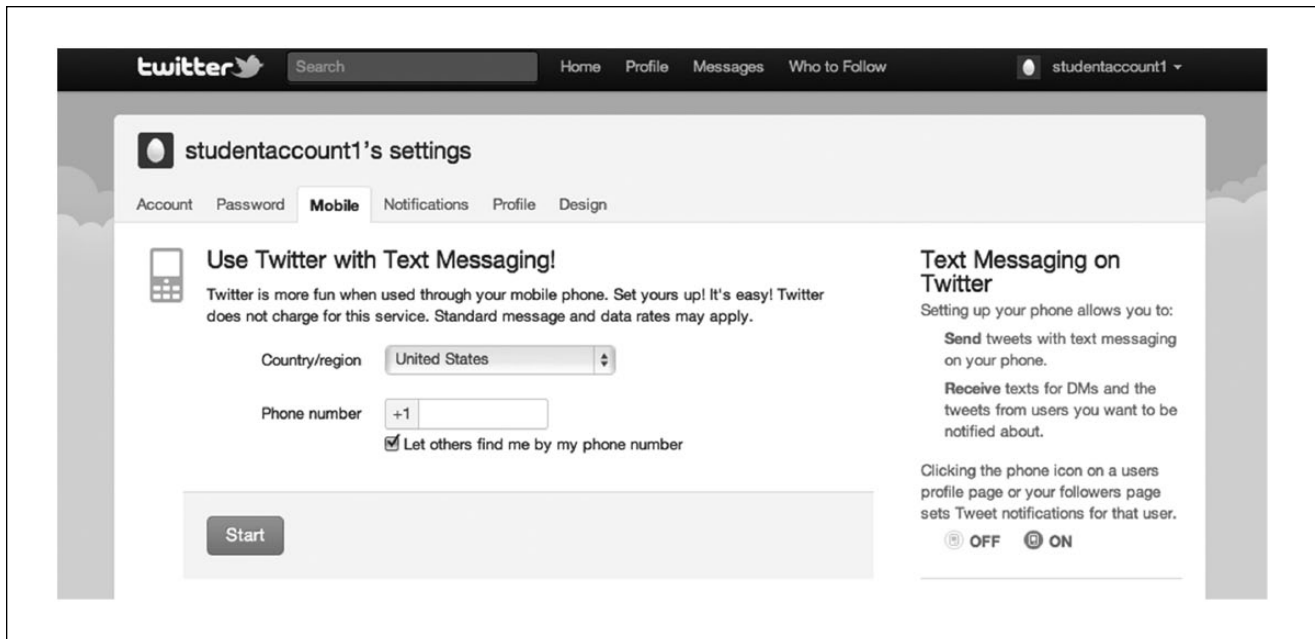


Figure 2. Activating the mobile settings for the Twitter account.

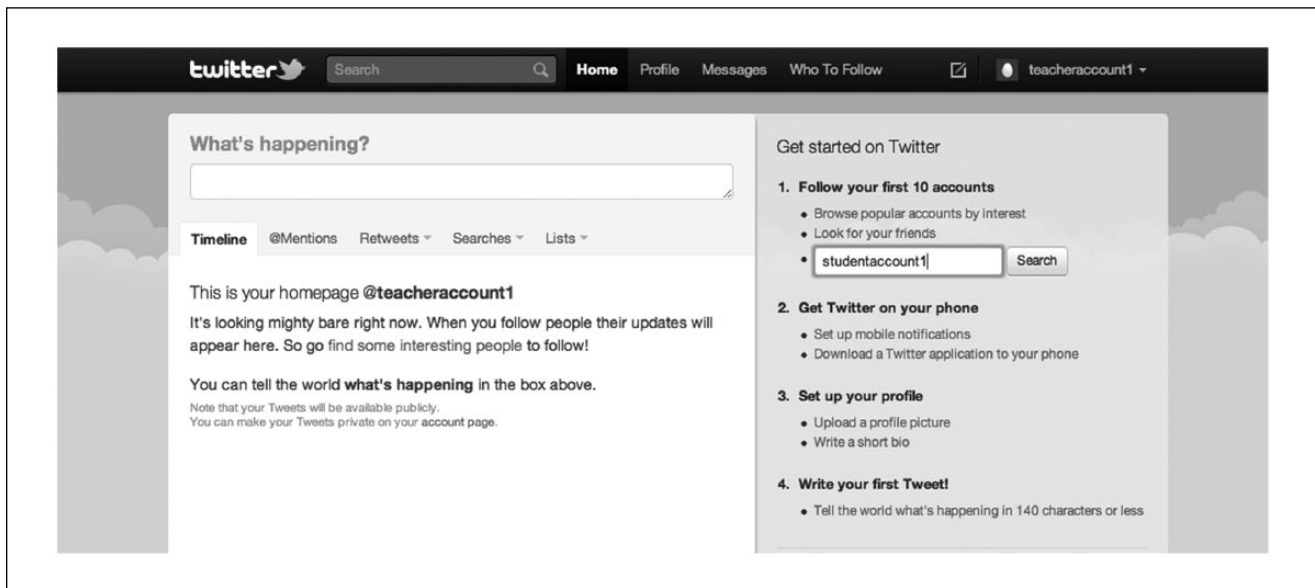


Figure 3. Searching for the student account.

- Step 4: Create a teacher HootSuite (TH) account.
 1. Go to the HootSuite website (www.hootsuite.com).
 2. Follow the prompts to create a new user account.
- Step 5: Link your Twitter and HootSuite accounts.
 1. Log in to the TH account.
 2. Click Settings, Social Networks, and Add Social Network.
 3. Locate and click on *Twitter* from the list of social networks.
 4. Click Connect with Twitter.
 5. Follow the instructions for linking the TT account.
 6. Repeat the steps to add the ST account.
- Step 6: Create and schedule text message cues.

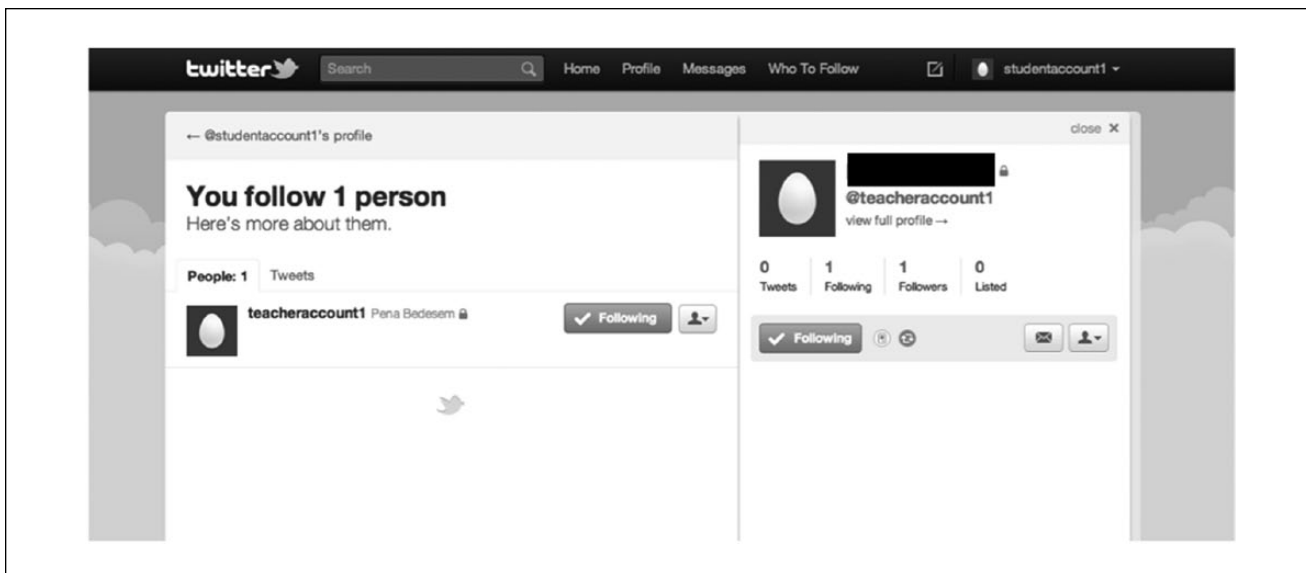


Figure 4. Activate mobile alerts.

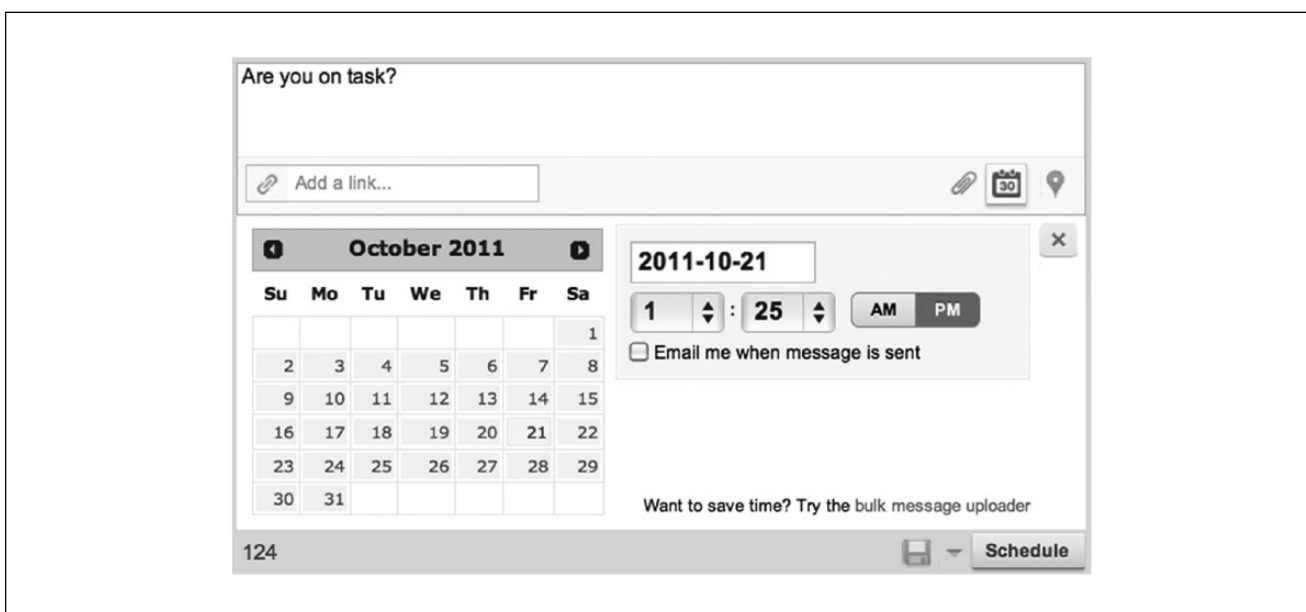


Figure 5. Create text message cue.

You will create and schedule all text message cues through the TH account. You will have to alternate the text message cues and the student's replies because Twitter does not allow users to send the same message twice in a row. So for example, if you are sending text message cues that asks the student if he is on task, the first text message cue could say "Are you on task?" the second message could say "Now are you on task?" and the third could again say "Are you on task?" and so on. To compose and schedule the text message cues

1. Log in to the TH account.
2. Click on the *Compose Message* box and type in the text message cue.
3. Click the calendar icon to the right of the message box to select the date and time you want the text message cue to be sent to the student's cell phone.
4. Click *Schedule* (see Figure 5).
5. Repeat these steps for each text message cue.

Three Steps to CellF-Monitoring Training Checklist	
Step 1: Introduce Target Behavior	
<input type="checkbox"/>	Identify the target behavior
<input type="checkbox"/>	Define the target behavior
<input type="checkbox"/>	Demonstrate examples and nonexamples of the target behavior
<input type="checkbox"/>	Provide an example of why the target behavior is important
<input type="checkbox"/>	Have the student brainstorm 2-4 additional reasons the target behavior is important
Step 2: Introduce CellF-Monitoring Procedure	
<input type="checkbox"/>	Define the purpose of each component of the self-monitoring procedure
	<ul style="list-style-type: none"> • Cue • Assess • Record
<input type="checkbox"/>	Explain how the cell phone is used in the CellF-Monitoring procedure
	<ul style="list-style-type: none"> • Text Message Cue • Text Message Reply to Record
<input type="checkbox"/>	Explain Cell Phone Rules
Step 3: Provide Practice	
<input type="checkbox"/>	Model the entire CellF-Monitoring procedure
<input type="checkbox"/>	Allow students to 'play' with the cell phone
	<ul style="list-style-type: none"> • Turn the cell phone off/on • Put the cell phone on vibrate mode • Access text message inbox • Open and read an unread text message cue • Reply to a text message cue
<input type="checkbox"/>	Allow students to practice the entire CellF-Monitoring procedure
	<ul style="list-style-type: none"> • Guided practice • Independent practice

Figure 6. Checklist for CellF-Monitoring training.

CellF-Monitoring: Student Training

Once the technology is set up, conduct a student CellF-Monitoring training session to teach the student about self-monitoring, the CellF-Monitoring intervention, and rules for using the cell phone in the classroom. The CellF-Monitoring training session can be organized into three steps: (a) Step 1: Introduce Target Behavior, (b) Step 2: Introduce CellF-Monitoring, and (c) Step 3: Provide Practice. A checklist (see Figure 6) is provided below:

- Step 1: Introduce target behavior.

Begin with identifying a target behavior that is educationally relevant and is meaningful to the student. Operationally define the target behavior in measurable terms that the

student understands. Ask the student to discriminate between examples and nonexamples of the target behavior through role-play. Give the student an opportunity to see and act out examples and nonexamples of the target behavior.

- Step 2: Introduce CellF-Monitoring.

Next, introduce the CellF-Monitoring intervention by defining and explaining the purpose of self-monitoring. Then, introduce the CellF-Monitoring intervention in detail and be sure to include very specific parameters for when and how to use the cell phone to CellF-Monitor. For example, inform the student that he can only use the cell phone for the CellF-Monitoring intervention. Finally, model the entire CellF-Monitoring intervention, including the use of the cell phone, through role-play.

- Step 3: Provide practice.

Finally, provide an opportunity for the student to practice the entire CellF-Monitoring intervention. Allow the student to become familiar with the intervention cell phone by turning the cell phone on/off, accessing the text message function, opening unread text messages, and responding to text messages with “1,” “0,” “Yes,” and “No.”

Discussion

The CellF-Monitoring intervention is predicated on positive findings from previous research on self-monitoring in the education, and health and medical fields. CellF-Monitoring utilizes a cell phone, which might be a barrier for its implementation. Although there is a push to incorporate technology into instruction, the use of cell phones in the classroom is still considered an emerging technology by some educational stakeholders. As such, teachers and administrators are likely to have several concerns with regard to implementing an intervention that uses cell phones.

Given that nearly 69% of schools still have a policy that bans the use of cell phones (CommonSense Media, 2009), your first concern is likely to be that you won't be allowed to implement CellF-Monitoring. In this situation, you might consider approaching your administrator as a teacher that is advocating the use of a research-based intervention for students with disabilities rather than a teacher who is fighting school policy. Meet with your administrator and begin by introducing self-monitoring as a research-based intervention with a long-standing history of effectiveness with students with various disabilities, across educational settings, and across behaviors. Highlight that by teaching students to take a more active role in managing their own behavior, you will have more time to focus on academic instruction. Then describe the traditional procedures and how they are no longer appropriate for contemporary educational settings. Finally, present CellF-Monitoring as the solution—an innovative way to incorporate an effective, research-based intervention. Let your administrator know that you have one student in particular that you believe will benefit from CellF-Monitoring and you would like to give it a try. Hopefully your administrator will be responsive to the needs of students with disabilities and the fact that you are advocating for the use of a research-based intervention implemented in a progressive way.

Another concern you might have is that the cell phone will become a distraction to the student who is CellF-Monitoring and possibly to other students in the class as well. While we cannot guarantee that the cell phone will not be a distraction, we believe that cell phones have become so commonplace in society that students would not think twice about a cell phone being used in the classroom. This might also be true if you are in a school that encourages the use of

technology and has various mobile devices (e.g., tablet, iPad, iPod Touch) available for teacher and student use. If you are in a school that encourages the use of technology but does not have the financial resources to provide mobile devices, consider instituting a “Bring Your Own Device (BYOD)” when students can bring their own device, including a cell phone, to class on a particular day. On that day, heavily incorporate these devices in meaningful, educationally relevant ways. As a consequence of BYOD, the novelty of using a cell phone in class might wear off and eliminate the potential of the cell phone becoming a distraction for the student who is CellF-Monitoring. In addition, students might become so used to using and seeing others use mobile devices that they might not even notice a student using a cell phone to CellF-Monitor.

CellF-Monitoring is a valuable intervention that teaches students how to take a more active role in managing their behavior and gives teachers more time to dedicate toward instruction. For students with behavior challenges or a need to self-monitor their behavior, using cell phones and text messages might increase their willingness to embrace this intervention and continue to use it across academic settings, and possibly even outside of school. As with any intervention, we suggest that teachers approach CellF-Monitoring with caution and optimism.

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