ABSTRACT

Most undergraduate students arrive on campus fluent in electronic communication methods and social media (SM). This cultural or communication shift presents both opportunities and challenges in pedagogy. Social media allows users to share and network with geographically diverse individuals and has the potential for engaging students both inside and outside of the classroom. Used inappropriately, SM may be a disruption and distraction to a classroom environment and academic progress. With so many undergraduates using SM, and the potential for engaging students with SM, a survey was conducted to assess student SM utilization and preferences. The survey was administered to >300 undergraduates enrolled in turf science over 2 consecutive years. The results supported the hypothesis that a very high percent, >95%, of students are using electronic technologies and SM to communicate. Students indicated that the SM application they used most was Facebook, but the number using Twitter was rising. Their primary reason for using SM was, “To keep in touch with family and friends” and students were increasingly accessing SM on mobile devices. Although most students are using electronic communication methods, the majority indicated they still “prefer” to communicate with friends and family face-to-face or in person. These results have direct implications on learning environments and provide insight for educators attempting to engage their students, perhaps by incorporating SM into their instructional techniques and content delivery.

Impact Statement  In this era of rapid advances in electronic technology, the methods by which current undergraduate students, communicate, share and learn continues to evolve rapidly. Students regularly use social media platforms like Twitter (a micro-blogging application) on their mobile devices to communicate and share information and experiences. This study assessed how undergraduates were using technology with a focus on learning. This information can help instructors better connect with their students and enhance the learner-center classroom environments.

The number of methods for individuals to electronically communicate and share continues to rise rapidly. Now more than ever, all generations of our population have access to electronic mail (email), text messaging, instant messaging, image sharing, mobile technology, and social media (SM) platforms or applications. With electronic communication being so prevalent, it is no surprise that the vast majority of undergraduate students arrive on campus fluent in electronic communication and SM networking technologies. This has presented both opportunities and challenges for pedagogy. In 2004, technology expert Tim O’Reilly presented a widely referenced lecture regarding what was at the time a new form of behavior related to working with the World Wide Web that was branded ‘Web 2.0’ (O’Reilly, 2005). Web 2.0 is driven by user-generated content (e.g., text, images, audio, video, etc.) in the form of blogs, wikis, podcasts, and other web-based programs. With the arrival of Web 2.0, the World Wide Web has been transformed from a repository of static information to a place of ever-expanding dynamic user-generated content.

Social Media Use in Education

At the heart of Web 2.0 are SM networks, which can be defined as a collection of internet-based websites, services, and practices that support active participation, sharing, collaboration, and community-building. The popularity of SM networks is largely due to the fact that their purpose is to promote ongoing communal connections and interactivity with geographically dispersed family, friends, and colleagues. In fact, SM users can interact, engage, and actively participate with other users solely through a web presence and perhaps never even meet in person. The power of SM lies in its interactivity and its strength to amplify the reach of any content (Osterrieder, 2013). It is no surprise therefore that the arrival of SM has created considerable enthusiasm in education (Bennett et al., 2012). Educators have

Core Ideas

• University students are increasingly using electronic means for their primary communication methods.
• University faculty must be aware of these communication methods if they want to continue to promote “learner-centered” environments.
• Although students spend a large amount of time on electronic social media they do not feel isolated.
been interested in SM because it offers the potential to create active, community-based learning environments, and additional opportunities to engage and motivate students (Ellison et al., 2007; Hughes, 2009; Moran et al., 2011). The possibility of integrating these applications into teaching and learning has the potential to trigger significant educational innovations by enabling new forms of interactive and collaborative learning (Schroeder et al., 2010). Several forms of SM have been adopted and used to enhance learning with wikis, blogs, and SM networking being increasingly the most popular forms of SM (Kieslinger, 2009). This intersection of a desire to promote active learning and the wide prevalence of SM networks has generated the reality of living, teaching, and learning in an A3 (anytime, anywhere, anybody) world (Rubens et al., 2011).

Social media presents many opportunities for both formal and informal learning and interactivity. Engaging students using SM applications may help instructors establish and foster discussion and creative thought both inside and out of the traditional classroom. Further, communicating and contributing to a course via SM may be helpful for those students intimidated or too shy to discuss things verbally in a classroom. Thus, SM creates a virtual place where all students have the opportunity to learn, contribute, and network. Several prior studies have been published regarding SM and education and some authors have provided recommendations on how SM can be used to facilitate learning (Ebner et al., 2010; Schroeder et al., 2010; Junco et al., 2011; Junco and Cotten, 2012). For example, Schroeder et al. (2010) evaluated the strengths, weaknesses, opportunities, and threats of diverse SM platforms and provided use recommendations for specific SM applications for teaching and learning. Ebner et al., (2010) evaluated the use of microblogs, like Twitter, and concluded that this technology can support and facilitate classroom learning, but more importantly suggested that it is a viable method and technology to promote informal learning beyond the classroom.

Not all SM applications lend themselves to facilitation of student learning and comprehension. Some are best suited for simply sharing content, whereas others are solely networking tools. The ultimate goal for most students attending college is to earn their degree, gain meaningful employment, and enjoy a satisfying career. The potential for students to engage and use SM sites such as LinkedIn to network and establish a professional presence, which ultimately results in employment, is another way SM may assist in higher education. To date, however, it is uncertain how much students are engaging these types of SM opportunities. Further, we as educators should be mindful and aware of responsible SM use and help students navigate these new methods for communication and sharing. It is conceivable that students may need SM skills for future career advancement or that employers may be requesting these skills (Dohn, 2009).

**Concerns Regarding Students and Social Media Use**

Incorporating the use of mobile technology and SM into learning is not without numerous potential downsides. Student utilization of SM or text messaging while in lecture is a common complaint among many instructors, and to date most instructors feel that it is disruptive to the traditional classroom environment. There are concerns and reports that having this technology readily present in the classroom is a strong distraction resulting in student’s inability to focus on the content being presented (Fried, 2008; Rosen et al., 2011; Junco, 2012b; Junco and Cotten, 2012; Rosen et al., 2013). Additionally, both parents and students have expressed concern with the amount of time some students are spending on electronic communication or SM as it may be detracting from learning (Bugaj, 2006). The primary concern is that for students solely engaging in electronic communication, that this behavior may be detracting from their current and future ability to effectively express themselves in person (O’Keeffe and Clarke, 2011).

With so much time communicating electronically it is possible that some students may be missing lessons in real-life social skills and will be unable to connect with others in “real-life.” In fact, this behavior was well described in the book Alone Together where the author describes the apparent strong interpersonal needs by modern young people for their “robot companions”/mobile technology (Turkle, 2012). These missed verbal and social skills/cues could put these students at a disadvantage when having to interact in face-to-face settings for scholarships, during job interviews, and other important career advancing opportunities.

**Adoption of Social Media by Educators**

Attempting to determine how much educators and instructors are using SM for learning has been difficult. In a recent survey of college agriculture instructors and their use of SM, it was reported that the majority of those respondents (61.3%) have used SM in class (Settle et al., 2011). The survey reported that the most used technologies were online forums and video sharing, with the least used being microblogs. Interestingly, most instructors responded that they preferred not to use SM to deliver instructional information. The authors stated that it was difficult to discern why instructors preferred not to use SM, but offered possible reasons including instructor discomfort with technology, unfamiliarity with the specific SM technologies, or SM not being able to provide what the instructor needed for specific information being taught. Mirvis et al. (1991) reported that the efficacy of implementing new educational interventions, especially those using technology like SM, were contingent upon a variety of factors including context, choice of technology, methods for implementation, and how the particular platforms intersect with a student’s technology expertise or familiarity. In short, adopting a new technology to facilitate learning takes effort and many instructors may not be able or willing to exert the effort to learn how to incorporate SM into education or are simply intimidated by the technology.

Ultimately SM networks and web-based communication are not going to vanish. In fact it is highly likely that incoming students will continue to adopt and incorporate current and yet undeveloped technologies to promote student–instructor and student–student interaction. If our goal as educators is to have engaged learners and foster an active learning environment, then instructors need to be aware of the best methods to connect with students. Incorporating SM into the classroom is another tool that educators can use to help facilitate learning; however, many questions remain. For example, with the availability of so many SM applications, it is difficult for an instructor to determine which application they should spend their time learning to use. In many instances educators are not certain exactly which SM applications students are using, and if they are using SM, to what extent are they using these technologies? Further, the shift in what is acceptable classroom behavior is...
administered to 36 students enrolled in an introductory turf management course at Purdue University. Descriptive statistics for the survey responses (n = 154 and 169 for 2011 and 2012, respectively) such as frequency of response and simple means, were used to interpret the information collected.

RESULTS AND DISCUSSION

Demographics and General Use Questions

The majority of the students participating in this survey were male (87 and 71% for 2011 and 2012, respectively), in the 18 to 22 year old age group (74 and 70% for 2011 and 2012, respectively) and in the first 3 years (59 and 72% for 2011 and 2012, respectively) of their academic studies (Table 1). The majority (64 and 60% for 2011 and 2012, respectively) responded that they prefer to communicate with their family and friends in person (Table 2). One difference between the two survey years was the decrease from 33 to 12% in student preference for having a verbal conversation, and an increased preference for using email/text message or SM to communicate with friends and family, from 24 to 32% and 9 to 11%, respectively. This potential shift in communication preference may add to the concerns by some that individuals in this current generation of students are at risk for developing poor interpersonal communication skills due to a lack of face-to-face communication (O’Keeffe and Clarke, 2011; Turkle, 2012).

When presented a list of the most common SM or networking applications and asked to indicate which they use, a very large majority use some form of SM as indicated by the very small number responding that they are not using any SM, at 6 and 4% for 2011 and 2012, respectively (Table 3).

Table 1. Demographics of the students participating in the social media survey.

<table>
<thead>
<tr>
<th>Survey year</th>
<th>Gender</th>
<th>Age (years)</th>
<th>Year in school</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>18–20</td>
</tr>
<tr>
<td>2011</td>
<td>87</td>
<td>13</td>
<td>30</td>
</tr>
<tr>
<td>2012</td>
<td>76</td>
<td>24</td>
<td>41</td>
</tr>
</tbody>
</table>

† Values were rounded to the nearest whole percentage, the number of respondents were 154 and 169 for the 2011 and 2012 survey years, respectively.

Table 2. Student responses to the question, “What is your preferred choice of communicating with friends and family?”

<table>
<thead>
<tr>
<th>Survey year</th>
<th>Response option†</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>In person</td>
<td>64</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>By phone (a verbal conversation)</td>
<td>33</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Email or text messaging</td>
<td>24</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Social media/networking (Facebook, Twitter, MySpace, etc.)</td>
<td>9</td>
<td>11</td>
</tr>
</tbody>
</table>

† Participants were able to select multiple purposes for each social media type; therefore, totals do not all accumulate to 100%.

Table 3. Student responses to the question, “Which social media/networking technologies do you use? (Check all that apply).”

<table>
<thead>
<tr>
<th>Survey year</th>
<th>Response option†</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I don’t use any social media</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Social networking (MySpace, Facebook, Twitter, etc.)</td>
<td>91</td>
<td>96</td>
</tr>
<tr>
<td></td>
<td>Blogs (Blogspot, WordPress, TypePad, Blogger, etc.)</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Wikis</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Social bookmarking (Delicious, Digg, etc.)</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Media sharing (Flickr, YouTube, SmugMug, etc.)</td>
<td>28</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>Livecasting (Stickjam, Justin.tv, etc.)</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Virtual worlds (SecondLife, WOW, The Sims Online, etc.)</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Online gaming</td>
<td>20</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

† Participants were able to select multiple purposes for each social media type; therefore, totals do not all accumulate to 100%.

unclear and it would be helpful to understand what undergraduate perceive to be socially acceptable mobile and web technology and SM use behavior.

With the explosion of SM use among college students, and the desire by many educators to incorporate SM into their courses, the overarching goal of this survey was to gather data regarding undergraduate SM use, preferences, and behaviors. The purpose of gathering the data was to determine if there were ways that educators could better engage students and encourage an active learning environment outside of the traditional brick and mortar classroom. Our specific objectives were (1) determine the level of SM adoption among a geographically diverse cross-section of undergraduate students enrolled in turf science programs—specifically, we were interested in which SM applications were being utilized, how much, and how were they being accessed, and (2) determine these students’ attitudes about the presence of SM in their academic lives.

MATERIALS AND METHODS

A survey instrument was developed in late 2010 by the authors based on the prevalence and popularity of various electronic communication technologies, devices, and SM networks being used at the time. The survey was designed with basic categorical responses like “yes” or “no” and in some cases a modified Likert scale to gauge student attitudes and preferences regarding SM. The survey contained three general sections: student demographics, general SM questions and use preferences, and attitudes toward SM use in their academic lives.

The paper-based survey was administered to populations of students enrolled in turf science programs or taking an introductory turf science course. The majority of the surveys were taken by students participating in a national competition at the Golf Course Superintendents Association of America (GCSAA) Collegiate Turf Quiz Bowl competition in 2011 and 2012. This population was selected because it represented a geographically diverse group of students from many universities located in the United States and Canada. From these competitions there were 154 completed responses collected in 2011 and 133 in 2012. In 2012 the survey was also
Social networking applications such as MySpace, Facebook, and Twitter were the most popular use category with 91 and 96%, respectively, responding that they used them. This was followed by media sharing applications such as Flickr and YouTube with 28 and 44% use, respectively. The third most popular category was online gaming with 20 and 15% use, respectively. These results speak to the fact that although there may be a shift in the way this demographic of students are communicating, from verbal to electronic, they are using technology more often to communicate and share with friends and family.

Among the primary SM networking applications, students indicated that their primary choice was Facebook (85 and 81% for 2011 and 2012, respectively) followed by Twitter with 3 and 16% in 2011 and 2012, respectively (Table 4). This response is consistent with earlier reports (Hargittai, 2008). That of the SM choices given, they use and prefer Facebook, other than Twitter, that is mortality students gravitate toward an application that their friends use and hence where their “community” exists.

The fact that >90% of these students are using Facebook nearly daily (Table 5). By contrast, all other communication tools (Twitter, blogs, etc.) were being used significantly less and for some SM applications like Ning, not at all. Why some people choose specific SM applications is unclear, but likely students gravitate toward an application that their friends use and hence where their “community” exists. The fact that >90% of these students are using Facebook is consistent with prior reports (Junco, 2012a; Dahlstrom, 2012). In fact, undergraduate students appear to be late 2010, MySpace was extremely popular, but by the time the second survey was administered in 2012, MySpace had lost popularity and been basically abandoned by the public and shut down. MySpace was one of the most adopted SM applications and competed directly with Facebook for users. MySpace was popular because it allowed for music and video sharing, and also allowed users the ability to customize their homepage. The problem with this feature was that it often resulted in very long page load times and ultimately user frustration (Jones, 2011). Furthermore, compared with Facebook, MySpace was slow providing a mobile device version. It appears that today’s users are interested in simplicity, speed, and mobility more than customization.

Although a very large number of the students indicated that of the SM choices given, they use and prefer Facebook, but as observed with the demise in MySpace, user preferences change rapidly. In informal surveys, it has been reported that students are not fond of the idea of being online in a place that their parents/grandparents “hang-out” (Van Groove, 2013). They are seeking their own places and flocking to newer SM applications such as Instagram and SnapChat, which allow for photo sharing along with microblogging or texting. Interestingly, Facebook purchased Instagram just prior to the Facebook public stock offering. Educators need to be aware of which applications are popular if they want to remain engaged with students using SM.

When asked about electronic communication and SM usage behaviors, using the response options never, rarely, occasionally, monthly, weekly, and daily, the results showed that students are using email/text and Facebook nearly daily (Table 5). By contrast, all other communication tools (Twitter, blogs, etc.) were being used significantly less and for some SM applications like Ning, not at all. Why some people choose specific SM applications is unclear, but likely students gravitate toward an application that their friends use and hence where their "community" exists. The fact that >90% of these students are using Facebook is consistent with prior reports (Junco, 2012a; Dahlstrom, 2012). In fact, undergraduate students appear to be
spending considerable time daily on Facebook, approximately 1 hour and 40 minutes, and this time may be having negative effects on their grades (Junco, 2012a; Junco and Cotten, 2012).

As a follow-up question, students were surveyed about whether they were using electronic communication or specific SM applications (email, text messaging, Facebook, Twitter, or LinkedIn) to communicate for personal, business/professional, or both reasons. All respondents are using text messages and email to communicate for both personal and business reasons (Table 6). This result is not surprising, since these communication methods are well-established and widely prevalent in current culture. The majority in each year, roughly 70%, are using Facebook primarily for personal communication. For Twitter, in 2011 76% were not using this SM application and thus utilization for any type of communication was low. In 2012, however, the utilization had increased and 40% were using it for personal communication compared with 8% for business communication. Very few students in both years were using LinkedIn; 89% and 76% indicated that they were not using this form of SM.

The majority, 69%, of students in 2011 indicated that they were accessing SM using a laptop or desktop computer (Table 7). By 2012, however, there was a substantial increase, from 28 to 48%, in those accessing SM with mobile phones. This increase in the use of mobile phones is further evidence of the evolution of teaching and learning in the A3 (anytime, anywhere, anybody) world, where students can access and contribute on the go. It is likely that if this survey were administered again today this percentage of students accessing electronic communication and SM from hand-held mobile devices would increase considerably more.

When provided five answers, and asked to indicate all the reasons for the question, "Why do you use SM?" (check all that apply), the two answers that had the largest percentage of responses were: "To keep in touch with family and friends," as 88 and 96% in 2011 and 2012, respectively, and "To share photos, videos, music, etc." 53 and 71% in 2011 and 2012, respectively (Table 8). Interestingly, the percentages of responses for all five potential answers increased from 2011 to 2012, including the one with the smallest percentage of responses "To promote a business or cause." When asked to indicate the "primary" reason they use SM, the overwhelming answer in both years was "To keep in touch with family and friends," 82 and 86% for 2011 and 2012, respectively (Table 9).

### Table 8. Student responses to the question "Why do you use social media? (Check all that apply)".

<table>
<thead>
<tr>
<th>Question</th>
<th>2011 percentage of respondents (%)†</th>
<th>2012 percentage of respondents (%)†</th>
</tr>
</thead>
<tbody>
<tr>
<td>To keep in touch with family and friends</td>
<td>88</td>
<td>96</td>
</tr>
<tr>
<td>To make professional and business contacts</td>
<td>32</td>
<td>40</td>
</tr>
<tr>
<td>To share photos, videos, music, etc.</td>
<td>53</td>
<td>71</td>
</tr>
<tr>
<td>To discover new music, films, books, or other entertainment</td>
<td>31</td>
<td>42</td>
</tr>
<tr>
<td>To promote a business or cause</td>
<td>16</td>
<td>28</td>
</tr>
</tbody>
</table>

† Participants were able to select multiple purposes for each social media type; therefore, totals do not all total to 100%. The number of respondents were 154 and 169 for the 2011 and 2012 survey years, respectively.

### Table 9. Student responses to the question, "What is the primary reason you use social media?"

<table>
<thead>
<tr>
<th>Question</th>
<th>2011 percentage of respondents (%)†</th>
<th>2012 percentage of respondents (%)†</th>
</tr>
</thead>
<tbody>
<tr>
<td>To keep in touch with family and friends</td>
<td>82</td>
<td>86</td>
</tr>
<tr>
<td>To make professional and business contacts</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>To share photos, videos, music, etc.</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>To discover new music, films, books, or other entertainment</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>To promote a business or cause</td>
<td>3</td>
<td>8</td>
</tr>
</tbody>
</table>

† The number of respondents were 154 and 169 for the 2011 and 2012 survey years, respectively.

### Student Responses to Questions Regarding the Use of Social Media in Academic Settings

Students were asked to respond to three questions related to their use of SM for academic purposes, their productivity with SM as part of their academic life, and whether they felt using SM in class or lecture was disrespectful or distracting. Although blogs are touted as a popular form of engaging SM for educational purposes, only about 50% of students indicated they were reading online blogs in 2011 and this number decreased in 2012 to 36% (Table 10). Only a small number, 12 to 23% in 2011 and 2012, respectively, had either created a personal blog or one for class. Nearly all students are watching online videos on YouTube (>95%). The number who had made a YouTube video for personal reasons or class doubled from roughly 20% in 2011 to 40% in 2012. This increase is likely consistent with instructor familiarity with YouTube.
and adoption of creating a YouTube video as a class assignment. In Facebook it is possible to create a “Facebook Fan” page to bring attention to a specific organization, purpose, or cause. A low percentage, 18 and 23% in 2011 and 2012, respectively, had created a Facebook Fan page. As mentioned earlier, students appear to be spending a lot of time on Facebook, but very few are using this SM networking tool to promote an organization or cause.

In response to the question, “Overall I think I get more, about the same, or less (choose one) academic work done with mobile technology and SM as part of my life,” the majority of students responded that they get about the same amount of work done, 63 and 58% for 2011 and 2012, respectively (Table 11). Interestingly, a substantial number of students, 22 and 34% in 2011 and 2012, respectively, answered that they think they get less work done. This information is helpful but in some ways flawed, or has the potential to be misinterpreted because this group of students is relatively young. Further they have a relatively short personal history from which to view their academic productivity and the effects of SM in their lives.

Although there are some issues with students being distracted form academic work by SM, there can be some benefit of having SM in students’ lives (Junco and Cotten, 2012). At the time this survey was administered the public use of quick response micro-blogging SM applications like Twitter or the combination media sharing, microblog, Instagram, was rather limited. Further, little research has reported the effect of Twitter and student engagement, unlike the numerous studies with Facebook. The results of these studies have been mixed with some showing a positive impact (Heiberger and Harper, 2008) and others reporting a negative impact on student grades (Junco, 2012b). For example, Junco (2012b) found that although time spent on Facebook was positively correlated with time spent on co-curricular activities, it was negatively related to scores on a scale designed to measure student engagement. Although the results of this survey reported that fewer students were using Twitter compared with Facebook and this would indicate instructors should embrace Facebook as the SM of choice, Junco et al. (2011) suggest that the microblogging application Twitter also has the ability to be educationally relevant. In their study they compared two groups of students either using or not using Twitter and showed that the Twitter using group had increased engagement and higher overall semester grade point averages (GPAs).

One valid concern regarding the use of electronic communication in traditional classes is that unless an instructor bans the use of laptops, mobile technology, mobile phones, and so forth during lecture (which some have done), it is not uncommon to see students periodically or quite frequently accessing their mobile devices during lecture or presentations (Fried, 2008). For some instructors and students this can be highly disruptive. With this potential change in classroom behavior and challenging lecture environment, one final two-part question was asked to gauge the students’ attitudes toward using mobile devices or accessing SM during lecture presentations. In response to the question, “I find the use of mobile/cell phones and or accessing SM during a general presentations/lectures disrespectful,” 75 and 81% indicated yes, in 2011 and 2012, respectively (Table 12). When asked the follow-up question about whether they found the use of mobile phones or SM during class lectures distracting, 61 and 54%, respectively, indicated that it was a distraction. The use of mobile technology in all facets of our society is blurring the lines about what is and is not appropriate conduct. The results of this study indicate that many students find regular use of mobile technology or SM during a presentation disrespectful and distracting. In addition, now more than ever everyone is having to process tremendous amounts of information. Humans are not able to process all of this information and may turn to engaging in multitasking as an information management strategy (Bowman et al., 2010). This multitasking may be having negative consequences for students. For example, Junco and Cotten (2012) reported a negative correlation between the use of Facebook or texting while doing schoolwork, which were also negatively associated with overall college GPA.

Although there are some potential negatives associated with incorporating SM in the classroom, it is our opinion that there is strong potential to effectively incorporate SM. By incorporating SM it can encourage co-operative learning across students studying similar content at several institutions and also access to geographically diverse panels of experts. Further, by helping students to learn how to properly use SM in the classroom they may be more inclined to share and network in the future with SM industry-specific SM applications. One example is the dynamic mobile SM application “TurfPath” (www.turfpath.com), which allows for user-generated content from anyone who has a mobile device to report, update, or comment on turf pests throughout the world. This example of continued learning and sharing for a specific commodity, turf, is but one example

Table 11. Student responses to the question, “Overall I think I get more, about the same, or less (select one) work done academically with mobile technology and social media as part of my life.”

<table>
<thead>
<tr>
<th>Survey year</th>
<th>More</th>
<th>About the same</th>
<th>Less</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>15</td>
<td>63</td>
<td>22</td>
</tr>
<tr>
<td>2012</td>
<td>8</td>
<td>58</td>
<td>34</td>
</tr>
</tbody>
</table>

† The number of respondents were 154 and 169 for the 2011 and 2012 survey years, respectively.

Table 12. Student responses to questions related to the use of mobile technology/social media (SM) during presentations and or classroom lectures.

<table>
<thead>
<tr>
<th>Question</th>
<th>2011 Yes</th>
<th>2011 No</th>
<th>2012 Yes</th>
<th>2012 No</th>
</tr>
</thead>
<tbody>
<tr>
<td>I find the use of mobile/cell phones and/or accessing SM during general presentations or lectures disrespectful</td>
<td>75</td>
<td>25</td>
<td>81</td>
<td>19</td>
</tr>
<tr>
<td>I find the use of mobile/cell phones and/or accessing SM during a class lecture distracting</td>
<td>61</td>
<td>39</td>
<td>54</td>
<td>46</td>
</tr>
</tbody>
</table>

† The number of respondents were 154 and 169 for the 2011 and 2012 survey years, respectively.
of continued learning without walls. In addition, several
new applications specifically for the “Green Industry” have
recently been developed. These include a suite of apps
under the umbrella of the “Purdue Plant Doctor” (https://
www.purdueplantdoctor.com) and include The Tree Doctor,
Perennial Flower Doctor, and Annual Flower Doctor. These
applications are specifically intended to be accessed using
mobile devices and puts expert content right in the palm of
the user’s hand. Social media applications will continue to
evolve and as our population continues to embrace newer
SM technologies like Instagram, SnapChat, and Reddit, it
is important for teachers and parents to stay aware of the
implications of student use of these technologies and how it
may affect them academically and socially.

Finally, during the 2 years that this survey was admin-
istered, the responses indicate that very few students are
using LinkedIn. It has been hypothesized that many stu-
dents are not thinking about networking until after or just
before graduation. They feel like they do not have enough
contacts to add to their profiles as most have limited to no
work experience. This may be a missed opportunity because
alumni like to connect with their alma mater and also enjoy
recruiting from those institutions and programs with which
they are most familiar.

SUMMARY AND IMPLICATIONS

The results of this survey indicate that a very high per-
centage of undergraduate students in turf science are using
electronic technologies and SM to communicate. At the
time that this survey was administered, the SM network
with the highest utilization was Facebook and their primary
reason was to keep in touch with family and friends. One
of the least used was LinkedIn, which has a high potential
for expanding their professional network and may assist in
acquiring internships or post-graduate employment. Further,
students are increasingly communicating via email, text
messaging, or SM and increasingly accessing all of these
communication methods using mobile devices. These results
reinforce the fact that SM utilization is not a passing fad.

Although a previous study reported that a large por-
tion of instructors in agriculture would prefer not to use
SM in the classroom (Settle et al., 2011), it is a preferred
method of communication among contemporary under-
graduate students. If educators want to promote an active
learning environment and incorporate all possible methods
for engaging this newest generation of students, educa-
tors need to at least have some level of familiarity with SM.
There appears to be a strong potential for SM to promote
collaborative learning, networking, and sharing outside the
traditional classroom. Additionally, educators should encour-
ge students to expand their professional networks using
SM applications like LinkedIn. One of the stated outcomes
for graduates from the College of Agriculture at Purdue
University is that they will be “life-long learners.” Engaging
students in appropriate SM behaviors and encouraging them
to network and share ideas/content appropriately is one
way educators can foster this behavior. Further, while adopt-
ing SM can be another technology learning curve and may
still carry the stigma of being a “frivolous time-wasting”
activity by some faculty colleagues (Rowlands et al, 2011),
its use is not generally any more of a burden than learn-
ing traditional email communication and is another valuable
tool instructors can use to continue to engage their stu-
dents both inside and outside of the classroom, even in the

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