
AC 2011-1308: SOCIAL MEDIA LITERACY: INTEGRATING ONLINE IDENTITY MANAGEMENT INTO ENGINEERING AND TECHNOLOGY EDUCATION

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Social Media Literacy: Integrating Online Identity Management into Engineering and Technology Education

According to a survey of 275 U.S. recruiters and human resource (HR) professionals commissioned by Microsoft Corporation, 70% of respondents have rejected job candidates based on information found online. However, only 7% of the 335 U.S. consumers who participated in this research believed online data affected their job search¹. This discrepancy is at the root of a major problem likely to affect the current student generation. Finding employment in the engineering and technology fields is difficult enough: A declining economy and increasing foreign competition already threaten U.S. students' chances of employment. A negative online reputation can be another source of risk – but one that is within students' reach to manage. This paper establishes the need for teaching social media literacy at the college level, as part of preparing students for entering the job market. It discusses the impact of online information on employment, and presents original research data collected from technology and engineering undergraduate students about their online identity management practices. The paper argues for the need to teach students social media literacy and proposes a specific plan for online identity management that can be easily integrated into undergraduate curricula.

The use of online information during employment screening

Information available online about an individual, whether of a personal or professional nature, and whether posted by the individual or the individual's contacts, is subject to review as part of hiring processes. Seventy-five percent of U.S. recruiters and HR professionals who participated in the study commissioned by Microsoft reported that their companies have policies in place that require hiring personnel to research applicants online. Close to 90% of recruiters and HR professionals believed it is appropriate to consider both personal and professional information as part of the employment screening process. Sixty-three percent of recruiter respondents check social networking sites, and 59% check job applicants' video and photo sharing sites. The overwhelming majority of U.S. recruiters (94%) expect that the use of online information in hiring decisions will increase over the next five years. How prepared are our students to compete for employment in this kind of marketplace?

Young adults' online identity management attitudes and practices

Some studies about “digital natives” suggest that the current undergraduate student generation is much more comfortable with the Internet and does not care as much about privacy as older adults². Other research, however, has found that youth are just as concerned about privacy as older adults, but they lack information about privacy rights and regulations. A survey of 1,000 respondents representative of the U.S. population found that it is this lack of knowledge, rather than lack of concern, that accounts for the risky online behaviors of young adults (ages 18-24)³. Similarly, Debatin et al. found that “while a majority of Facebook users report having an understanding of privacy settings and make use of their privacy settings, it is also apparent... that they may have a skewed sense of what that exactly entails” (p. 100)⁴. Livingstone also found that even youth who professed technical skills had a hard time understanding and using the privacy settings on

social networking sites⁵. These findings not only explain the results of other large surveys, but also make a solid argument for the need to help young adults acquire the knowledge they need to be safe online.

Another explanation for young adults' risky online behaviors is the way they think about the Internet and privacy in general. Many young people think of the Internet as their own personal space where they interact with their peers, and fail to recognize that the information meant for peer groups, as well as conversations among peers, are available to many other, unintended audiences⁶. Similarly, a large study of 7,000 American college students found that passwords, social security and credit card numbers were included in the respondents' notion of online privacy, but postings on social networking sites such as Facebook were not a matter of concern⁷. Obviously, young adults' concept of Internet privacy is quite different from that of the older adults who make important decisions about college students' futures. An important part of social media literacy is to raise college students' awareness about online contexts and audiences, and about how information they post online for peers may be misinterpreted by a different, unintended audience.

However, lack of knowledge and awareness about managing one's online information does not translate into lack of concern. Young adults are just as likely as older adults to be concerned about online privacy, and take some steps to manage their online reputation. A Pew Internet and American Life Project survey found that 44% of young adults have taken steps to limit information available about them online, 71% have changed their privacy settings on social networking sites, and 41% have removed their names from photos. Only 2%, however, reported using search engines to monitor online content about themselves on a regular basis. The same study found that Millennials (ages 18-32) have more information available about themselves online than any other age group⁸. The availability of large quantities of online information, coupled with lack of knowledge and awareness, compounds the problem of online identity management for young adults. Young adults seem so comfortable with computers and the Internet that we have deemed them "digital natives." This may be why older adults and educators neglect to include topics such as Internet and social media literacy in their curricula. The myth of the digital native has done more harm than good to the Millennial generation: It has increased older adults' expectations about students' baseline knowledge levels, and has resulted in failure to educate students about topics that may greatly affect their futures. It is time to base our curricula on research, rather than myth. The research reviewed so far shows that students need our help when it comes to social media, and social media literacy should be included in undergraduate college education. However, none of the previous research has addressed the specific case of engineering and technology students. It is possible, that given their advanced technical skills, engineering and technology students are savvier than the average U.S. population in their age group. We conducted original research to inquire specifically into engineering and technology students' levels of awareness about online identity management, and their current practices for managing online reputation.

Methods

In order to gain a more nuanced understanding of the specific social media literacy education needs of engineering and technology students, we conducted 15 in-depth interviews. We recruited a criterion sample of mostly undergraduate technology and engineering students through targeted email invitations and flyers posted in technology and engineering buildings. We offered a one in five chance to win \$20 as an incentive for participation. The sample consisted of three undergraduate technology students, 11 undergraduate engineering students, and one graduate student. Table 1 presents the sample's demographics.

Table 1: Demographics

Major		Gender	
Engineering	11	Male	11
Technology	3	Female	4
Other	1		
		Age	18-20, m=19
Year in School		Ethnicity/Race	
Freshman	5	White	9
Sophomore	6	Asian	3
Junior	1	African	1
Senior	2	Other	2
Graduate	1		

The interviews consisted of nine open-ended questions about students' awareness and behaviors related to online identity management. The interviews took anywhere from six to 25 minutes to complete and averaged 12 minutes. The semi-structured interview schedule included suggested probes; however, the interviewers asked other probes or questions on the same topics, as needed. The recorded interview sessions were transcribed by a professional transcription service, resulting in about 100 pages of text. We performed qualitative thematic analysis^{9,10} on this data set. We read the transcripts several times until common patterns began to emerge, and recorded the frequency of each pattern. We then performed a second analysis of these patterns and grouped them into four major themes, as follows: social media usage patterns, awareness of the need to manage online reputation, strategies students use to manage their online identity, and students' education about this topic.

Results

The four major themes and their associated patterns are presented here, beginning with background information about students' social media usage and awareness levels, continuing with the actions students report taking to manage their online reputation, and leading to students' perceptions of the need to include social media literacy in higher education.

Social media usage patterns

To obtain information about social media usage patterns we asked the broad question, “How do you use the Internet and social media?” In addition to the use of email and Internet for schoolwork, we found that the predominant use of social media was for communicating with family and friends, as reported by 13 out of the 15 students. We learned that Facebook is the preferred social media site for 11 of the 15 students. As some research participants stated: “Well I definitely use it [the Internet] a lot for Facebook;” “I used to be somewhat addicted to Facebook and so recently I decided to break that habit so I’m going to monitor the time I spend on it but I still have it open constantly.” However, very few students create content on other social media sites such as YouTube, Twitter, or blogs. Two interviewees stated they had created Twitter accounts but did not actively use them. Three students said that they read some blogs, but no student reported maintaining their own blog.

Awareness of the need to manage online reputation

We asked research participants whether they were aware that information found about them online could affect their job search. Most students (12 out of the 15) were not aware that the majority of hiring managers use job applicants’ online personal information as part of hiring decisions. Results show that students are not aware of the potential damaging effects that their online personal information may have on future employment. Also, students do not know how to remove negative information posted about them online. Only two of the 15 students’ answers indicated some awareness of human resource departments’ practice of rejecting candidates based on online content. Sadly, this awareness stems from students witnessing friends experience rejection by a hiring manager because of online personal content.

Strategies students use to manage their online identity

Overall, students report making a conscious effort to ensure online content represents them well. Twelve of the 15 research participants reported being conscious of their online reputation. However, the actual strategies they use to manage online identity vary widely. We identified several strategies which fall into two major categories: Some students try to hide or protect their personal content, while others feel there is no reason to do so.

The most frequently reported strategies for protecting personal content are using Facebook privacy settings to restrict access and limiting the availability of contact information – reported by six participants each. However, students may have different understandings of what it means to limit contact information, as these statements illustrate: “I don’t put any personal information on [Facebook] or I guess I do, maybe... My phone number is there.” And “I have my phone number; I don’t put my address on there, just my city.” Another strategy in this category is to carefully select Facebook friends. Only two students reported this strategy. Finally, one student stated she changed the spelling of her name on Facebook as a way to control her visibility.

When asked whether they search regularly for information about themselves online, eight students responded “no.” Four students said they used Google occasionally to search for their name, and two did so “just for fun.” One student reported searching his name two

weeks before a job interview. Job interviews seem to be a good incentive for students to consider their online presence. A few other students reported going through online content right before an interview.

The second major category of online identity management strategies reflects the belief that students have no reason to hide or protect their personal content. This belief is fairly uncommon, with less than half of the research participants sharing it. Those who share this belief explain: “There is nothing that I have that I feel like I need to hide from anyone.” Others feel the need to be visible and self-promote, or put it simply - “I don’t care.”

Education about online identity management

We asked students about their perceptions for the need to include social media literacy as part of formal education. Of the 15 students we interviewed, all except one felt there is a need for social media literacy and online identity management education.

Students feel that without social media literacy they are unintentionally decreasing their chances of employment. When asked what education would be the most effective, students mentioned including during college orientation instruction on proper online postings (suggested by eight interviewees) and on managing online identity. Only two students had received previous social media literacy education in high school. One student had received a 15-minute briefing as an introduction to a technology class and the other student had received counseling from the school’s student advisor. Both students reported that this knowledge proved to be invaluable once they started college. They felt better prepared to manage a growing network of friends and the personal information they posted online.

Discussion and interpretation

Overall, our findings are consistent with previous research: Students express concern about managing their online image, yet the strategies they use to do so are hardly adequate. The interview findings show that students’ primary approach to managing online reputation is to restrict the availability of personal content. However, students do not seem to be aware that as soon as they join a workplace, their coworkers and supervisors will become their Facebook “friends.” This pattern is consistent with previous research conducted with employees of a large, multinational software company. Younger employees used Facebook as if they were still in college, even though they had professional contacts among their Facebook “friends.”¹¹ DiMicco and Millen draw attention to the fact that: “As the user composition of Facebook becomes more diverse, it will become more challenging for individuals to manage their personal identity within a website originally designed for the college years, but increasingly open to the post-college and professional years” (p. 384)¹¹. It is our goal to prepare students for facing this challenge.

Successful online identity management requires more than limiting access to personal content. The students we interviewed were largely unaware of the desirability of actively creating professional content and posting it online in order to craft a professional identity.

Their level of social media literacy was limited to avoiding negative consequences and did not include proactive strategies. We offer a different approach to social media literacy that focuses on proactive strategies for crafting a professional online identity.

Social media literacy for online identity management

Social media literacy for online identity management implies the ability to carefully manage one's online presence to craft a professional online identity. We take a two-pronged approach to social media literacy: One facet of social media literacy includes awareness of online contexts and unintended audiences; the second part of our approach concerns best-practices for managing online information about oneself.

One major difference that social media has introduced in our society is the merging of contexts and audiences. Social media support interpersonal communication, which can be of a personal nature, but this interpersonal communication takes place on a public platform that provides a mass audience for the interpersonal dialogue¹². The convergence of interpersonal and mass communication channels makes it much more difficult than before to target messages to particular audiences. Because of the public nature of social media, a message intended for a specific audience (peers) can be easily available to other unintended audiences (for example, HR professionals). Taken out of context, the message is likely to be misinterpreted and misjudged, which can lead to negative consequences. An important part of social media literacy is to raise awareness about the dynamics of social media. The interpersonal nature of social media communication can be misleading and makes it easy to forget, even for more mature users, that messages are available to a wide, often unintended, audience.

Teenagers see the Internet as their private space used to “hang out” with peers⁶, and this behavior carries on as they become young adults and college students. As a result, most information available online about college students is of a personal nature. In college, it is time for them to learn how to create a more complex online identity by managing the nature and amount of **personal** information available online and by consciously creating a **professional** online presence. Filtering, deleting, and hiding potentially inappropriate personal information is only the first step of social media literacy for online identity management. In addition to managing personal information, we recommend students take the following steps to create and manage a professional online identity:

1. Create professional online content
2. Optimize professional content for social media
3. Develop and maintain a professional online network
4. Maintain and monitor online presence

The overall strategy that underlies all our recommendations is that of increasing, rather than reducing, online visibility. In this day and age, as the adage goes, “Google is your resume.” The expression “Google resume” refers to the information that appears in the first pages of a Google search. This information is becoming just as important, if not more important, than the traditional resume. Unlike a traditional resume, a Google resume takes time to build, and is hard to change. Therefore, students should be aware

early on in their college careers about the importance of their Google resume, and learn tactics they can use to improve it. The practices we recommend here are all intended to improve a student's visibility in online searches, and to increase the probability of search results featuring professional content. In effect, we aim to teach students how to be proactive about marketing themselves online.

The remainder of the paper expands on the four major steps for creating and maintaining a professional online identity. We show how students can use free social media sites to ensure their online identity will serve them well once they begin seeking employment. We list several tactics under each step, in increasing order of difficulty and time commitment. We understand that not all students will adopt all the strategies we advocate, so we keep the more advanced ones at the end of each step.

1. Create professional online content

Once students are aware that recruiters and potential employers will search for information about them online, they need to proceed to create online content that speaks to their professional skills, and is easy to find. To accomplish this goal, we recommend that students engage in the following strategies:

1.1 Create and maintain a public profile on LinkedIn. With over 90 million members worldwide¹³, LinkedIn is the most popular platform for professional networking, and, according to a 2010 survey of 600 recruiting and HR professionals, it is the preferred social network for researching potential hires¹⁴. We recommend that students create a complete profile that showcases their knowledge and skills, make it public, and use LinkedIn's option to shorten and customize their profile's URL. To encourage traffic to their profile, they should include this URL in their email signatures. Once students create a LinkedIn profile, they should initiate the process of developing professional LinkedIn connections with pre-existing contacts: academic professors, college peers, and previous or current employers¹⁵. Such connections will offer students the opportunity to maintain a professional network that extends beyond their close circle of friends and takes advantage of the strength of weak ties^{16,17}. As students request these new connections, they should replace LinkedIn's default invitation with a friendly, personal message that indicates the nature of the relationship¹⁸. Students should also take proactive measures to strengthen their professional accreditation by utilizing LinkedIn recommendations¹⁹. Through this feature, they can request brief endorsements from members of their professional network. The advantage of LinkedIn recommendations is that they can be displayed on one's public profile.

1.2 Create a Google profile. In order for students' professional Web presence to be readily accessible by HR managers and future employers, it must be highly visible among online search engine results. Currently, Google is by far the most popular search engine; therefore, we focus our search engine optimization recommendations on this particular service. We recommend that students create a Google profile page, which offers them the opportunity to manage the way they appear in Google's search results²⁰. A Google profile is a public Web page that enables users to list information about themselves and to link to other online content. Students can take advantage of

Google profiles and project a professional online image by listing biographical information, work experience, photos and carefully selected links to their other online content. In order to ensure a consistent online image, we recommend that students utilize information from their LinkedIn profile to complete their Google profile page.

1.3 Create and maintain an online portfolio. Although this may not be applicable to all majors, for students who have work to display, we advise that they create an online portfolio showcasing their best projects. Online portfolios have been shown to help significantly in a job search²¹. If students have knowledge of HTML and CSS, they can create a simple, yet effective, static website that displays such projects. The site can be a useful tool to highlight their knowledge and skills, while drawing attention to their LinkedIn profile, Twitter account, or blog via interactive social media buttons. As students develop their portfolio website, we recommend that they choose a URL which includes their full name (e.g., www.sallysmith.com or www.sallysmithpurduestudent.com). In addition, the website should incorporate descriptive meta tags that indicate the nature of the site and specifics about the student (e.g., “sally smith portfolio,” “Purdue University,” “computer engineering”). Together, these features will improve the chances of an Internet search engine’s discovery of the online portfolio²². For students who lack Web development skills, a variety of website templates and detailed tutorials are available online. In addition, services such as WordPress, Google Sites, Carbonmade, Prevue and many others offer easy methods for creating online portfolios without prior knowledge of Web design.

1.4 Create and maintain a professional Twitter account. Because of the message brevity, Twitter is very easy to update frequently, even for busy college students. The frequent updates increase the chances of a student’s Twitter stream showing up in online searches²³. It is important that the content of the Twitter stream be informative and professional. We advise students to post links to interesting readings, discuss what they are learning and thinking about, and share their unique point of view. Previous research shows that people who use Twitter professionally appreciate these types of updates, but dislike mundane status messages involving the legendary lunch²⁴. Students can use Twitter to establish expertise in a field of study or industry sector, which employers may use as an indicator for determining hiring potential²⁵.

1.5 Create and maintain a professional blog. We recognize that blogging is a considerable time investment and only recommend it for students who can make a long-term commitment to posting regularly. A blog is a wonderful avenue for showing potential employers how one thinks, what one knows, and what one is learning. Blogging enables students to provide a more in-depth picture of their professional persona than an online profile or resume. A good blog requires authenticity and passion²⁶, so we advise students to first find their area of interest, and then write about it. Some students fear that they are not authorities in their subject areas, and have nothing interesting to share. However, simply blogging reactions to class readings and comments on issues related to their future professions has helped students in their job searches²⁷.

2. Optimize online content for social media

Creating online content that represents students well professionally is a first step in managing online identity, but this content needs to be easy to find and share online. Search engine optimization (SEO) refers to techniques for increasing the probability of content to be ranked high in search engine results²⁸. We included some SEO tips with the strategies in the first section. On the other hand, social media optimization (SMO) refers to making content easy to find and share with social media²⁹. To this end, we recommend the following strategies:

- 2.1 **Make content easy to link to.** Each piece of content should have its own unique URL (permalink) so that it is easy to link to. Although Flash-based galleries are commonly used for displaying images in online portfolios, we recommend against them, because they make it difficult, or sometimes impossible, to link to an individual item in the gallery. Instead, content can be hosted on one of many social media platforms (flickr for images, YouTube for videos, scribd for documents, slideshare for slides) that make it easy to link to an individual piece of content. Content travels easier if it is easy to link to, and this increases the chances of it gaining more popularity, or being forwarded to the right person.
- 2.2 **Cross-link online content and profiles.** We recommend students cross-link their online profiles, so that if one person reaches one piece of content, he or she can easily navigate to the student's other sites. Students should plan a cross-linking strategy so that every piece of content leads a viewer to their preferred online location³⁰. Let us assume that a student would like employers to see her LinkedIn profile. The LinkedIn profile should then be linked from her Twitter bio, the About page of her blog, as well as any profile she may have on other sites.
- 2.3 **Enable RSS feeds and sharing options.** Many social media sites have options for the further sharing of content on other platforms, or for generating RSS feeds. We recommend that these options be enabled, to facilitate content sharing. If copyright is a concern, the sharing options can be customized accordingly. We recommend that students become familiar with Creative Commons³¹ and specify sharing preferences for content, if necessary.

3. Develop and maintain a professional online network

One of the biggest advantages afforded by social media is the ability to maintain existing relationships and build new ones³². College students need little, if any, advice about maintaining personal relationships using sites such as Facebook. However, building a professional network online may not come just as easy. First, students need to understand the cultures and social norms that have emerged around specific social media tools²⁴. For instance, most Facebook users prefer to connect with their friends and relatives and may not accept connect requests from people they have not met in real life. LinkedIn recommends that people only connect with persons they know, but some LinkedIn users accept all connections. The culture of Twitter has made it acceptable to connect with people one has not met, and may not have a chance to otherwise meet. Keeping in mind

these norms of social media usage, we recommend the following strategies for students who wish to create and maintain professional networks online:

- 3.1 Create a personal learning network on Twitter.** An online personal learning network offers students an opportunity to learn valuable information that they can apply to classroom academic studies³³. Many people who use Twitter professionally find a lot of value in the information other people post, and try to provide value in return by posting interesting links²⁴. Students can identify people on Twitter whom they can learn from, and then follow them. “Who do I follow?” and “How do I find people to follow?” are two frequently asked questions about getting started on Twitter. We advise students to keep this criterion in mind when deciding whom to follow: Do they feel they have something to learn from this person? Information in the bio, as well as the stream of previous messages (tweets) and links, can provide answers to this question. Twitter search can help students identify individuals in their fields of interest³⁴. Twitter lists compiled by interesting users, or lists where an interesting user is indexed, can lead to other, similar users to follow. A Twitter personal learning network will extend students’ education far beyond the classroom, enable them to stay current with the most recent trends in their fields, and even provide a starting point for a career by helping students socialize into a profession³⁵.
- 3.2 Read professional blogs and comment on them.** Another good strategy for building professional relationships is to read blogs and post comments. We advise students to identify blogs on topics they are professionally interested in, and read them on a regular basis. An RSS feed reader such as Google Reader can help them keep track of several blogs. Imagine a student identifies a blog written by members of a company he hopes to work for. The student follows the blog consistently and makes interesting, meaningful comments on several posts. By engaging in this type of mediated conversation, the student begins to build a relationship with potential future colleagues³⁶. This relationship may open a door to a job interview, or provide common ground for conversations during a job interview.
- 3.3 Join professional discussion groups online.** There are several professional, interest-based groups online, many of them on LinkedIn and Facebook. While we understand that student culture may lean against using Facebook professionally and respect that, LinkedIn groups are still a valuable networking opportunity. We advise students to either ask interesting questions that stimulate discussion, or to contribute meaningful answers, supported if not by experience, then by citations from their class readings. We caution students against attempting to “crowd-source” assignments. Unfortunately, too many students seem to think professional discussion groups can provide material for class papers. This is not the case, nor is it a wise relationship-building strategy. But informed, interesting contribution to online discussions on professional topics can be an excellent way to build meaningful professional relationships.

4. Maintain and monitor online presence

The previous strategies need to be long term, sustained efforts. They require continuous participation. Close monitoring of content can help students fine-tune and manage online identity. We present a couple of simple strategies for continuous online monitoring.

4.1. Monitor online content. Students can use Google Alerts to track online content.

Google Alerts will notify a user whenever new content that includes specific keywords, such as a user's name, is posted online³⁷. For example, if a student is mentioned in an online university newspaper, or tagged in a public Facebook photo album, she will receive an email alert. These alerts enable students to manage their online identity by maintaining constant awareness of any information posted about them online. Students can then decide if it is necessary to take action against a particular piece of content, such as asking a friend to remove a photograph from a Facebook album.

4.2. Monitor online traffic. Students who create an online portfolio or blog should make use of Google Analytics to track data about website traffic. With this tool, they can: a) see the number of site visitors and their geographic distribution; b) track the effectiveness of social media cross-links to bring visitors to the site; and c) identify keywords that bring visitors to the site. Students can use these insights to increase and maintain website traffic by tweaking the online portfolio's content and meta tags³⁸.

To sum up, our approach to social media literacy includes three main educational goals. First, we help students understand that social media blurs contexts and audiences. Second, we facilitate students' transition from purely social to professional uses of social media. Third, we propose specific strategies students can use to not only filter personal online content, but also create and promote professional online identities. We follow the recommendations of previous researchers and propose positive, constructive strategies for online identity management, rather than using scare tactics that do not work with youth³⁹.

The approach to social media literacy we propose can be easily included in undergraduate technology and engineering curricula. The approach can be introduced in one class session, with additional mentoring offered as needed. If time and resources allow, students can be coached through the proposed strategies over the course of a semester. Educators should keep in mind that it takes a long time for Google to "forget" information posted online, and that it takes time to see the results of the social media approach proposed here. The senior year of college is a time when students are motivated to change their online behavior, but ideally, social media literacy for online identity management should be taught early, before damage is done, and while enough time is available to invest in building both a positive online identity and a professional network.

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