

INTEGRATING ONLINE IDENTITY MANAGEMENT TOOLS IN A COMPLETE SOCIAL MEDIA LITERACY CURRICULUM FOR ENGINEERING AND TECHNOLOGY STUDENTS

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The management of one's online identity - defined as the sum of information available about a person online - is becoming very important for engineering and technology students entering a competitive job market. In an age when employers review Google search results, LinkedIn and Facebook activity, in addition to the traditional resume [1], students need to be able to craft professional online identities that represent their skills and personalities accurately while serving their career goals. However, with the abundance of social media accounts, online information, and the complexity of the social phenomenon of being exposed to multiple, often unintended, audiences at once, online identity management can become a full-time job. In fact, the marketplace has responded to this problem as new companies have emerged that offer online identity management services for an often steep fee [2]. Managing one's online identity is an integral part of social media literacy. All students who are looking for employment may be subject to social screening on social networking sites, not only those who can afford to hire online reputation managers. It is the purpose of this research to help engineering and technology educators empower students, so they can all be able to manage their online information.

Previous research has proposed integrating social media literacy into the undergraduate engineering and technology curricula, and has outlined a four-step online identity management plan for students [3]. The current paper builds upon previous work and facilitates the online identity management process by reviewing, analyzing and categorizing the wide spectrum of available online tools for identity management.

In addition to the major social networking sites such as Facebook, Twitter and LinkedIn, a myriad of other online tools have emerged in recent years that purport to help individuals manage their online information and activity on multiple social media services. These online tools offer features such as hosting online profiles, aggregating activity from multiple social networking sites, providing analytics about activity on social networking sites, or enabling users to manage privacy settings on multiple social networking sites. In this paper, we identify any website that provides features that can help individuals manage their online identities as an online identity management tool.

The purpose of this paper is to identify, review and analyze the landscape of existing online identity management tools. We set out to provide an analysis of what kinds of features these tools provide, and aim to create a classification of online identity tools. We do so in order to make online identity management easier for students and for the educators who include online identity management in their curricula. Since online identity management is a complex activity, it is useful to employ tools that can make the work easier. However, with so many available online tools and services, it becomes difficult to keep abreast of these innovations. While we do not endorse or advertise any specific website or tool, we aim to provide an understanding of these tools in order to enable educators to make recommendations to students for practical ways of managing online identity.

Another reason for analyzing existing online identity management tools is to conduct market analysis and determine whether there is a need

for additional tools that would serve the specific needs of engineering and technology students.

Last but not least, we integrate the findings of this paper in the four-step online identity management process proposed by previous research [3] in order to provide practical ways of implementing existing principles.

Online identity management is a complex and difficult social phenomenon

Mass media coverage of human resource practices that include social screening has brought the topic of online identity management to the forefront of public attention. The arguments for the need to manage one's social networking activity carefully, especially when entering the job market, are loud, clear and convincing. Less clear, however, are the reasons why managing online identity is so difficult that it needs to be addressed as part of formal education. This section explains the complex social dynamics created by social media that have placed individuals in a completely new communication situation that historically, culturally and evolutionarily they are not equipped to manage.

In this paper, we propose a definition of social media informed by McAfee's discussion [4] of enterprise 2.0: Social media are online communication platforms that simultaneously enable both interpersonal and public communication. This definition, explained in more detail below, captures the fundamental reasons why social media have created a social situation that is difficult and complex to manage.

The definition offered here conceptualizes social media as communication platforms, as opposed to channels. This distinction, discussed by McAfee [4] captures the open and public nature of social media communication. A platform differs from a channel in at least two important ways: It does not provide the privacy or directionality associated with communication channels (examples of which would be the radio

and the telephone). The telephone, for example, provides both privacy and directionality in the sense that the speaker is able to control the audience for the message (provided the service works as expected and the line is not tapped). Mass communication channels, of course, do not provide privacy, but for the most part they permit a certain extent of message and audience control by virtue of being unidirectional (one source communicates with a large, even if undefined, audience). A communication platform, however, enables multidirectional communication. Communication can flow in multiple directions among multiple sources, and is, for the most part, public - in the sense that even if the nature of the exchange is interpersonal (e.g. a conversation between two individuals), it takes place on a public platform that allows the public to both witness the exchange and participate in it. This convergence of communication modes [5] has created a social situation where any individual with open Internet access has a public communication platform. While this can be (and is) empowering, it also creates major difficulties stemming from the fact that it has become very difficult to control what audiences receive which messages - a most unnatural situation from a socio-psychological perspective, as explained next.

The ability to control what audiences receive which messages and to adapt communication style and content to a specific audience is an integral part of not only impression management [6], but also the development of the self [7, 8]. Social theorists and psychologists argue that an individual's very sense of self emerges in interaction with others and that different facets of the complex human self become activated in the presence of different audiences. For example, a well-adjusted individual changes both communication style and content when sharing a Thanksgiving meal with family as opposed to participating in a work meeting. Self-presentation research has shown that not only the audience, but also setting, context, time of day, and available props (clothing, tools - such as computers, or the expensive china) play

important roles in impression management [6]. The sense of time, context, and setting are lost in online communication because they are not shared between the participants to a given interaction.

Human psychology requires that as individuals we imagine the intended audience for a specific message, often visualizing their reaction, as we compose a message. Offline, time and space offer convenient barriers for separating different audiences. Online, these barriers disappear. "Facebook helps you connect and share with the people in your life," reads the popular service's self-description on its homepage. By bringing together the people who sit around the Thanksgiving table *and* the people who sit around the boardroom table, Facebook, as the most popular example of social networking sites, creates an unnatural social context. It is unnatural for human beings, to imagine and anticipate multiple audiences at the same time. Most problems with Facebook communication happen either because people simply forget about the other audiences that they did not intend the message for, or because their message is misunderstood by an unintended audience. Unfortunately, these types of problems have lead to job loss for several individuals.

The solution seems simple: Separate online audiences and control what audiences receive which messages. In practice, however, this is made difficult by social network interface design that makes audience segmentation cumbersome, by algorithms that make it difficult to predict who sees what information, by a CEO who believes the age of privacy is over [9], and by social pressure from existing contacts. Another solution, which has worked on the Internet for a while, is that of preserving anonymity by posting information identified with only a user name. This age of anonymity on the Internet is over, however. In fact, anonymity is against the terms of service of major social networking sites such as Facebook and Google+ and defeats the very purpose of using LinkedIn. Besides, anonymous postings cannot help an individual present a professional

image to potential employers who look for it online.

College students entering the job market are faced with the challenge of managing multiple inter-connected audiences for probably the first time in their lives. As the number of their social groups increase from college friends to potential employers and workplace colleagues, they have to consider whether they are ready to "friend" their boss on Facebook [10]. So they experience this complex and difficult social phenomenon acutely and for the first time in their lives. Without the benefit of experience, and being the subject of evaluation in a very competitive job market, they are placed in a vulnerable position. This is why social media literacy can be very helpful if integrated into their professional development.

In short, this section explains why managing online identity in the age of anonymous social media is a difficult challenge that most college students are not equipped to deal with - yet they are at a point in their lives when they are most vulnerable to the problems stemming from the complex social situation presented by social media use. The solutions to these problems are not easy. Therefore, in addition to existing arguments about the need to integrate social media literacy in engineering and technology curricula, it becomes necessary to understand the available tools that can assist with online identity management. In order to do so, this paper addresses the following research question: What are the major types of features and capabilities of existing online tools for online identity management?

Methods

We conducted a content analysis of all the online identity management tools we could identify through comprehensive searches as explained in the Results section. Content analysis is a research method that enables the quantification of content types and characteristics of various types of texts [11]. In content analysis, text is defined broadly and

may be verbal, visual, or multimedia discourse - such as newspaper articles, advertisements, movies, websites, etc. Content analysis requires the application of a coding scheme onto the selected materials. The coding scheme contains the major categories that are to be identified and counted in the materials. In this case, the coding scheme emerged after repeated reviews of the materials. A team of researchers reviewed the online identity management tools individually and identified the common and recurring features of these online tools. Through group discussion, the team reached agreement about the list of categories to be coded. All the categories, as shown in the Results section, are features or capabilities of the online tool, such as: "it enables connecting to two or more social media accounts," "it provides analytics on content posted," or "it includes a section for posting information about the user/s bio." These features are all manifest variables. As opposed to latent variables, which require the coder to interpret the meaning of the text before coding, manifest variables are structural characteristics of the text [12]. Manifest variables are thus much easier to code and less prone to coder error. The two coders who conducted the content analysis were closely involved in the development of the coding scheme and therefore had a solid understanding of the codes, which further contributes to reducing coding error. The remaining major source of coding error is the possibility that, due to the amount of information on the website, the coders may not have noticed the availability of a certain feature. The coders spent a lot of time familiarizing themselves with each tool before beginning the analysis, in order to reduce the probability of this particular error.

Results

A total number of 51 websites were identified during the months of July-September 2012 as online tools that can help with the management of online identity. The tools were identified through different search strategies that included not only a general Internet search, but also review of magazine articles that list and discuss

tools for online identity management such as [13, 14]. We looked for online tools that enable the creation of online resumes and profiles, tools that advertise themselves as reputation management, and tools that enable the management of multiple social media accounts. We excluded, however, generic blog and website-hosting services such as Wordpress and Google sites, because we were looking to narrow down our list to online tools and services that address the issue of online identity (or reputation) management specifically. For the same reason, we excluded the major social networking sites such as Facebook or Twitter. We also excluded tools that are meant to help organizations with reputation management (public relations, marketing) in order to focus on tools for individual use. Upon exhausting these search strategies, we input the name of each tool on the list into CrunchBase.com. CrunchBase is a service that provides a company profile along with a list of competitors. We looked at the list of competitors for each of the identified tools in order to ensure they were already on our list. If they were not, we added them. By using a diverse set of search strategies we are confident that we identified the relevant online tools that can help individuals with their online identity management.

After finalizing the list of tools, the research team reviewed each website several times and produced a coding scheme containing the major features that emerged from the data. At this time, it became apparent that some of the tools were no longer available online or they did not quite fit the criteria. This reduced the final number of analyzed tools to 41. Two independent coders analyzed each of the 41 tools and recorded the presence or absence of each feature in the coding scheme. We used the entire sample to calculate inter-coder reliability using Cohen's kappa, a measure that takes into account the possibility of chance agreement [12]. We obtained a Cohen kappa value of .875, which indicates almost perfect agreement and is highly acceptable in content analysis research [15.] This value provides evidence that the

coding scheme was well understood and applied consistently by the coders.

Table 1 lists the percentage and number of tools that offer each feature we coded for. To organize the discussion of the results, we group

the features into four major categories: 1) features related to the management of multiple social media accounts; 2) features related to reports of activity analytics; 3) features related to the creation of online profiles; and 4) features related to search engine optimization.

Coding category	% of tools	# of tools
Features related to the management of multiple social media accounts		
Connects to 2 or more social media accounts.	51%	21
Displays user's own content from 2 or more social media accounts on one page.	29%	12
Displays user's contacts' content from 2 or more social media accounts on one page.	20%	8
Allows user to customize privacy settings for each social network it connects to separately.	15%	6
Allows user to post content to each social network it connects to separately.	27%	11
Sorts social media contacts into groups.	15%	6
Features related to activity analytics		
Reports analytics about user's social graph.	27%	11
Reports influence analytics.	37%	15
Reports content analytics on user's own posts.	20%	8
Features related to the creation of online profiles		
Has an "about me" section for user's own biography.	41%	17
Has a section for professional information (such as resume).	20%	8
Has options for displaying multimedia.	39%	16
No web development knowledge required to operate tool.	100%	41
Enables user to include links to other online profiles or accounts.	49%	20
Has a messaging or networking function.	39%	16
Enables user to get a customized URL for the profile page.	20%	8
Reports some type of traffic analytics.	27%	11
Features related to search engine optimization		
Sends notifications when new information about user appears on the Web.	24%	10
Clearly shows what others see when they search for the user.	22%	9
Has a mechanism for hiding/removing unwanted content and associated search results.	37%	15
Provides information about search engine optimization.	39%	16
Offers tools for search engine optimization.	39%	16

Table 1. Results: Percentage of tools in each coding category.

Features related to the management of multiple social media accounts

One major group of features that emerged from the review of online tools for identity management is related to the management of multiple social media accounts from one interface. These tools can connect to two or more social media accounts and have various combinations of capabilities in terms of allowing users to post to one or more social media accounts or to view content others post on one or more social media accounts. If well executed, these kinds of tools, that aggregate social media activity, can become centralized dashboards for managing online activity. The ability to control privacy setting from one place, and to sort contacts into groups in order to control what audiences receive which messages are some of the most useful features of these tools. However, as the results show, they are also some of the least common features.

Examples of tools with features that enable the management of multiple social media accounts are Hootsuite and Alternion. Hootsuite enables users to connect to social media accounts, such as Twitter, Facebook and LinkedIn, and manage these accounts through a social media dashboard. According to Hootsuite's self description, this dashboard offers users the chance to listen to a variety of social media chatter, engage with users from any connected social network and to even measure one's social media influence. Similarly, Alternion characterizes itself as a social media hub, where users can connect multiple social media networks via one digital interface and easily manage an online identity through targeted social media posts. Other tools that can aggregate social media activity from multiple accounts are: Rebelmouse, Connect.social (both free to use) and SocialBro, which requires a subscription fee.

Features related to reports of activity analytics

Analytics reports can provide snapshot automated analyses of a user's online activity, social graph, and/or influence. These tools are useful for online identity management because they reflect back to the individual a synopsis of their online activity. For example, tools that analyze content posted online over a period of time can show the user the main topics they tend to share online. A student, for example, may notice that the proportion of posts complaining about classes and professors is much higher than the posts that discuss interesting professional topics. Overall, this cumulative online activity can convey to potential employers the impression that this person has a negative attitude. In fact, a survey commissioned by Microsoft found that posting too many complaints about professors and employers was one of the reasons why human resource managers rejected job candidates [16]. We found that 27% of tools in our sample offered this feature. Tools that analyze a user's social graph can provide useful reminders of the types of audiences one is connected to online. Tools that analyze online influence, such as Klout, are increasingly being used as checks to ensure that a person has online credibility on topics they claim expertise in.

Some of the most popular/notable social media activity analytics tools are Sprout Social, Crowdbooster, and PeerIndex. Sprout Social and Crowdbooster (both require a paid subscription) offer a robust suite of social media analytics tools that can offer individuals deep insights into their social media graph. Additionally, these tools offer users the opportunity to stay on top of their online identity through monitoring and managing social media mentions and messages. While lacking the robust suite of analytics tools, PeerIndex enables users to clearly see how others view their online identity. This is particularly useful for individuals who want to create, promote and maintain a specific public

image that aligns with career aspirations or professional goals.

Features related to the creation of online profiles

Another major category of features that emerged from the review of online tools for identity management were those related to the creation of comprehensive online profiles that can serve as a person's online homepage. The advantage of such profiles is that, if carefully crafted and maintained, they can show up higher in search results than other online content that might be unsuitable for a professional audience. These online profiles play an important role in personal search engine optimization (SEO) - the art and technique of influencing search engine results so that desired information is found easily and undesirable information is "buried" lower in the list of search results [17]. We found that all the online tools we identified are easy to use and do not require Web programming knowledge. While many (41%) tools provide the option to write an "about" section or biography, only 20% help users structure a professional resume. Some of these tools (27%) also provided some information about traffic analytics. Traffic analytics help a user identify how many viewers access their online profile. Some tools even provide location or affiliation information of the viewers, extracted from their IP addresses, and the search keywords that were used to find the profile.

Some typical tools that illustrate this category of features are: About.me, Magnt, and Seelio. About.me and Magnt offer users the ability to quickly and easily create a one-page personal profile that contains a picture, a biographical section, and links to other social media profiles. Seelio helps students promote their academic work by allowing users to create an interactive online profile that allows visitors (such as human resource managers or job recruiters) to see portfolios, resumes or projects.

Features related to search engine optimization

Search engine optimization features, either under the form of informational materials or tools were present in 39% of reviewed tools, respectively. A useful feature is that of monitoring online content and alerting the user when information containing certain keywords is posted. We found that 24% of reviewed tools offered this feature that can help individuals identify content posted about them by others.

Some typical tools that illustrate this category of features are: BrandYourself and Google Alerts. BrandYourself teaches users how to build a strong online presence through developing search engine optimized links and web-based profiles. Furthermore, it clearly shows users their search engine profile, i.e., what people see when someone Googles their name. Then, if their search engine profile is absent or contains negative content, BrandYourself offers suggestions and methods for improving or boosting an online search engine identity. Google Alerts enables users to set up email notifications for specific keywords. These updates offer individuals the opportunity to keep a constant eye on their online identity and to attempt to remove or promote negative or positive web-based content associated with their name.

Discussion

To address the research question, "What are the major types of features and capabilities of existing online tools for online identity management?" this paper presents the results of a content analysis of 41 tools. The most common groups of features of tools for the management of online identity that emerged from repeated reviews of the tools were: 1) features related to the management of multiple social media accounts; 2) features related to reports of activity analytics; 3) features related to the creation of online profiles; and 4) features related to search engine optimization. The results help engineering and technology students

and educators understand the landscape of available tools for online identity management. We also present a detailed count of feature availability in the body of reviewed tools.

These online tools can be used by integrating them with the four-step process of online identity management proposed by earlier research [3]. The four steps in this process are: 1) creating professional online content; 2) optimizing content for social media; 3) developing and maintaining a professional online network; 4) maintaining and monitoring online presence. Table 2 shows which of the four categories of features identified in online identity management tools can be used for each of the four steps in the online identity management process.

The analysis of the landscape of online identity management tools also presents an opportunity to identify unmet needs in this marketplace. For example, only 15% of the reviewed tools provided the feature to sort contacts into groups. This means that the main difficulty related to the management of online

identity, as explained in the literature review, is still not adequately addressed by available tools. It is still difficult for social media users to separate audiences into groups and to control what audiences receive which messages.

Also, relatively few (20%) of the reviewed tools provide analytics about a user's own content posted online. Comprehensive and reliable analytics can be very useful, as they can serve as an online mirror that allows users to see how their overall online content speaks about themselves. A service that combines an online mirror powered by analytics with advice on how to improve online presence might be useful for engineering and technology students.

While several online tools exist for creating personal profiles, only 20% provide specific fields for resume entries. Even though 39% provide options for including multimedia, it is not clear whether these are powerful enough for the needs of engineering and technology students and whether they can support the file types an engineering or technology student might want to include in an online portfolio.

Step in online identity management process	Feature category of online identity management tools
1) creating professional online content	<ul style="list-style-type: none"> • features related to the creation of online profiles • features related to reports of activity analytics
2) optimizing content for social media	<ul style="list-style-type: none"> • features related to the creation of online profiles
3) developing and maintaining a professional online network	<ul style="list-style-type: none"> • features related to the management of multiple social media accounts • features related to reports of activity analytics
4) maintaining and monitoring online presence	<ul style="list-style-type: none"> • features related to search engine optimization
Table 2. Mapping of tool features onto online identity management process steps.	

Further, more detailed analysis can explore the integration of engineering online portfolios with popular, easy-to-use social media sites that can increase the visibility of online portfolios.

Quite a few sites provide information and tools for search engine optimization. The only challenge remains making engineering and technology students aware of their existence and utility.

Conclusion

Overall, this research captured a snapshot of the landscape of available tools for online identity management. It analyzed existing tools in order to identify and categorize the major features they offer and offered suggestions for integrating these tools into existing plans for online identity management.

Several limitations must be taken into consideration. First, it is possible that not all available tools were captured and analyzed. Second, the market is very dynamic. From the time we first started collecting tools until the time of the content analysis, several services had become inactive, thus reducing the initial number of 51 identified tools to 41 tools that we analyzed. Many other services may have emerged in the months after the analysis was conducted. Even though it is impossible to capture more than a snapshot of this dynamic landscape, we hope that the analysis was able to identify the major types of features that these kinds of tools offer. Third, just like any other content analysis, our analysis may be subject to coding errors, and the counts may not be completely accurate. Fourth, we only reviewed tools that are available in the English language. It is possible that other tools exist that provide interesting features that we were not able to analyze due to language limitations. Fifth, the feature categorization emerged qualitatively from reviews and observations of the data set. Quantitative analyses are needed to explore whether existing tools can be grouped into major categories depending on the combinations of features they offer. Sixth, we recognize that

creating an active nonymous social media presence is a threat to privacy and that students need to mitigate privacy and other risks with professional benefits.

Further work is needed to explore the possibility of creating or customizing tools that would serve the specific needs of engineering and technology students and educators. An online hub might be needed, that indexes and categorizes available resources and provides educational materials that can serve our student population.

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