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SOCIAL FEATURES OF WEB ASSISTED TOBACCO INTERVENTIONS (WATIS): CASE STUDIES

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SOCIAL FEATURES OF WEB ASSISTED TOBACCO INTERVENTIONS (WATIS): CASE STUDIES

by

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Dedication

To my father

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Thank you to my sister Ana Cecilia Boa-Ventura for never stop believing that I could do this.

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Social Features of Web Assisted Tobacco Interventions (WATIs): Two Case Studies

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Web Assisted Tobacco Interventions (WATIs) are proliferating due to their cost effectiveness and their compatibility with a fast-paced lifestyle that needs to be time and space detached. Following a general trend in web assisted interventions, WATIs are increasingly incorporating social media features. Often though, because they are added *post-facto* to a solid preexisting foundation that privileges information delivery, the social media and the informational sections are developed independently: the social component has no impact on the informational content. This forms the basis of this study, which proposes to do a detailed analysis of a WATI recommended by a panel of experts in the area of smoking cessation. An emphasis will be given to the visibility of social media features and the degree to which content from the social media component contributed by users impacts the informational component generated by content experts. This analysis will be supported by instruments for data collection especially adapted/designed for this study. This dissertation proposal is at the cusp of disciplinary boundaries as its theoretical underpinnings are in the intersections of three domains: design, health, and social media. This interdisciplinary approach is necessarily reflected in the study's conceptual

framework, which draws from constructs such as “design with intent”, tailored health interventions, and social networks for participatory culture. As a result of the detailed analysis, and the author’s own expertise in social media across other fields, a set of recommendations will be proposed for the design of WATIs with social features aiming at a greater impact of these on the evidence-based informational content.

Chapter 1: *INTRODUCTION*

1.1. BACKGROUND

Worldwide, tobacco use causes more than 5 million deaths annually, and current trends show that it will cause over 8 million deaths per year by 2030 (World Health Organization, 2013). In fact, quitting smoking is the single act that can most reduce disease burden in all its components, from human loss to social and economical impact (U.S. Surgeon General, 2010). Programs assisting smokers in their struggle to quit smoking have been developed since the negative effects of tobacco were first demonstrated through the seminal work of scientists like Wynder & Graham (1950) and Doll & Hill (1950). Furthermore, maximizing the delivery of those programs – smoking cessation interventions - can translate into more years of life saved and economic benefits than most medical interventions for smoking-related illnesses (Coleman, 2004). This may explain the conversion of formats regarding information delivery (e.g. from mailed-in self-help materials to telephone counseling). The Internet has offered yet a new platform for the delivery of these smoking cessation programs.

In the U.S., and as of May 2013, 83% of adults use the Internet, 70% have a high-speed broadband Internet connection at home, and 56% own a smart phone (Zickuhr & Smith, 2013). According to that same survey, conducted between April and May of 2013, the Pew Research Institute found that 73% of Internet users had looked online for health information during the past year. Looking for information on a disease or treatment is, in fact, the third most popular online pursuit among all those tracked by the Pew Internet Project (Pew Internet Project & California HealthCare Foundation, 2011). In 2004, 7%

(10.1 million) looked for information on quitting smoking (Fox, 2005). However, previous studies showed that most individuals looking for health information do not have a clear plan (Fox & Rainie, 2002). In the field of behavioral change, people are using the information they find on the web to become better informed (Pew Research Center, 2002), although previous research showed that the link between improved knowledge and actual behavioral change has yet to be demonstrated (Oster, 2007; Mayo Clinic Health Solutions, n.d.).

When trying to become better informed, the user is often faced with cryptic information or difficult navigation or other obstacles to the information sought after. Previous studies show that we have a low frustration tolerance in this situation: if the first few interactions with a website do not lead to the desired information, the user will leave and visit another site (Kalin, 1999; Lazar et al., 2003). This fact is only aggravated by the number of alternative websites to choose from on virtually any given topic. The popular "3 click rule" - the idea that any information sought in a website should not be more than 3 clicks away - is but one of several informal guidelines that designers follow to minimize user frustration.

In the case of addictive behaviors, of which smoking is an example, there could be compounded effects. It is plausible to think that high frustration levels experienced when navigating a non user-centered site, may interact with the addiction and in different ways according to level of dependency and stage (e.g.: the first attempt to quit versus a relapse).

Whether or not designers of smoking cessation web sites follow guidelines such as the 3-click rule to minimize user frustration, will greatly determine the effectiveness of

the Internet as a tool for smoking cessation (Cheh, Ribisl, & Wildemuth, 2003). A seminal study by Bock et al. (2004) suggested that the quality of web sites providing Health information is often more related with the usability of the site than with the actual quality of the content. This does not mean that quality of content is not important. Rather, it explains why web sites with deficient usability – regardless of the type of information provided – may lose visitors early in the process of navigation and consultation before they even get to the content (Kalin, 1999). Other previous studies showed that the retention power of a website had great impact on its ability to cause a health behavioral change (Lenert et al., 2003). That retention power has been called 'stickiness' and can be taken as an extension of the spider web metaphor - the ability of a website to attract and retain users - used in Internet Marketing by scholars such as Guenther (2004) and Khalifa (2003).

In the area of smoking cessation, an increasing number of studies are suggesting user-centered design (Houston & Ford, 2008; Taylor et al., 2010; Goldberg et al., 2011). Therefore formal Web site usability testing has been a systematic stage in the development of the website (e.g.: Fairbanks & Caplan, 2004; Grama et al., 2005).

In sum, Web Assisted Tobacco Interventions (WATIs) have been developed globally to help smokers quit, just as telephone counseling and clinical interventions have done for several decades. WATIs, however, are a more recent phenomenon, which also means that there is a shorter history of evidence-based research and of tested communication protocols ruling the exchange between smoker and health professional. Not only are WATIs less mature than other, more tested, traditional interventions for smoking cessation, they introduce a greater number of variables as a consequence of the

spectrum of design options open to those who plan and program WATIs (V. Rabius, personal communication, April 1, 2011). As a case in point, communication channels or modes that are often well defined in traditional interventions, may be mixed or hybrid in WATIs and in web-assisted interventions in general (Rains & Young, 2009). An example of this is the communication between smoker and health professional, which is asynchronous in mailed self-help materials and synchronous in telephone counseling, but that in a WATI may be both synchronous and asynchronous if the user uses, for instance, "chat rooms" and email.

1.1.1. THE STUDY THAT MOTIVATED THIS PROPOSAL

Of the randomized trials evaluating the effectiveness of Web based tobacco cessation programs, one stood out to the author as particularly intriguing, as the results were unanticipated by the researchers. In a study conducted by the American Cancer Society (Rabius et al., 2008) there were no significant differences in the cessation rates between participants assigned to interactive sites and a relatively static website – where only PDFs could be accessed. The static site was to function as a control and was, to some extent, a digital equivalent of the self-help materials that are used as controls in studies of the effectiveness of telephone counseling. Arguably, there was no real control site in this study - as a site with PDFs that a user can choose to download is in essence an interactive site. The results of this study question the impact of interactivity in WATIs. In fact, at the time of its conclusion, this study caused ACS to reconsider investing resources in a web-based intervention to supplement their proven telephone counseling program, the QuitLine.

At the time of the ACS study, an exploratory visit to the interactive sites made me think that the results, unanticipated by the research partners involved, could be due to the design of the interactive platforms: in other words, maybe in the sites labeled as 'interactive', the interactive features were not being used, or maybe they were being under-used. Informal exchanges with the researchers – email exchanges and conversations – as well as attending formal conference presentations where those results were presented - led me to conclude that WATIs were an area that would clearly benefit from the collaboration between health professionals and digital media/social media experts. As an example: for me, the fact that the static site had a URL starting with "www.cancer.org " was likely to (positively) affect the trust that those participants in the static group (who accessed the site hosted at "www.cancer.org") assigned to the content accessed, thus biasing the results. While for me this was the first possibility that came to mind to explain the unexpected results, it had not been a consideration during the design of the study. However, in the email exchanges and conversations between author and researchers, it was immediately recognized by the latter as potentially affecting the credibility factor of the static versus the interactive sites.

The point here is of course not to suggest flaws in the interpretation of data in the ACS invaluable study, but to advocate the increasing need for cross-disciplinary approaches when working on web-based platforms for behavioral change. In the present study, the significance of the problem, the literature review, and the methods will underline this cross-disciplinary approach. I believe that we need to cross domain boundaries, and have different parts of the same subject illuminated by different "spotlights", in order to see it more clearly. In this case a web-based intervention to help

smokers quit would benefit from at least three "spotlights" or concepts: design with intent, persuasive technologies, and social networks in participatory culture. Each will be a topic under the conceptual framework section and of several references in the literature review.

1.2. STATEMENT OF THE PROBLEM

Though there are far fewer evidence-based research studies evaluating WATIs than traditional interventions, the former continue to proliferate (Feil et al., 2003; Stoddard & Augustin, 2006), arguably due to compounded factors of cost effectiveness of interventions, and life styles that are better served by time and place independent health interventions. In fact, a number of previous studies addressed the possibility of tailoring Internet delivered interventions to lifestyles in the case not only of smoking cessation, but other areas of healthy behavioral change (Marcus & Forsyth, 1998).

Though usability guidelines are known by virtually any design and programming teams developing WATIs, not many of those guidelines address the social media features that are increasingly important in WATIs. This study addresses the question of whether the current usability guidelines being used in sites in the field of public health are adequate, given the increasing integration of social media features.

The methodology consisted in the selection of two WATIS - the American Legacy Foundation http://www.becomeanex.org/ and Alere (formally "Free & Clear") - http://www.alerewellbeing.com and their in-depth analysis according to instruments developed: a revised version of the HHS research-based web and usability guidelines and a typology for the characterization of WATIs in the context of the social media features they include.

1.3. OUTLINE OF THE DISSERTATION'S STRUCTURE

The overall structure of the dissertation takes the form of six chapters, including this introductory chapter. Chapter Two begins by laying out the theoretical dimensions of the research, and looks at relevant literature in the fields that this work embraces. The research questions are presented in this chapter. The third chapter is concerned with the methodology used for this study. The fourth chapter presents the findings of the research, and includes screenshots that illustrate the observations. Chapter 5 discusses the results vis-à-vis the initial hypothesis and focus group discussions undertaken during the course of this research. The final chapter is the conclusion, which draws upon the entire thesis, tying up the various theoretical and empirical strands, giving a brief summary and critique of the findings, and finally including a discussion of the implication of the findings to future research into this area.

Chapter 2: Review of the Literature and Research Questions

2.1. REVIEW OF THE LITERATURE

2.1.1 Historical background

McMillan & Chavis (1986) define 'sense of community' as the feeling of belonging, as well as the feeling that the individual and the group mutually matter, and that members' needs are met through shared group resources, history and experience. The idea of a community unrelated to physical proximity, (which is the case of a virtual community) was first suggested by urban planner Melvin Webber in 1963, through the term "community without propinquity". In 1979, Barry Wellman coined the term "community liberated," which is often considered the marker of the modern era of thinking about non-local community. Wellman surveyed the "intimate" networks (as in "the persons outside their home that you feel the closest to") of 845 adult residents of East York, Toronto. He found the networks to be prevalent, composed of both kin and non-kin, nonlocal, asymmetric and of sparse density. These results underline that primary ties are not necessarily confined to densely knit solidarity groupings and territorial units but are rather dispersed among multiple, sparingly interconnected social networks.

This is the idea behind the "community liberated" argument, which is vital for the understanding of the complex ties generated across faceless, virtual, online communities of support. However, the technological component of this debate would not be introduced before 1983, when Benedict Anderson's "Imagined Communities" described the type of local and regional consciousness that media such as newspapers promoted. A few years earlier, Mark Granovetter (1973) had published his now famous paper "The Strength of Weak Ties" where he argues that between two individuals' friendship networks, the

degree of overlap varies directly with the strength of their mutual ties. He then analyses the impact of this principle on diffusion of influence and information, mobility opportunity, and community organization. Granovetter's work is, to this day, seminal in emphasizing the cohesive power of weak ties. His concepts have been applied economically and politically, as well as in very practical areas such as the job market. A larger perspective has evolved from Granovetter's ideas: "embeddedness", the argument that all economic action, by an individual or organization, is enabled, constrained and shaped by social ties between individuals. Granovetter describes a threshold model of social behavior identifying as the threshold the point where, for an individual, net benefits begin to exceed net costs. His ideas follow the critical mass models of the seventies. An example of these are the segregation models studied by Schelling (1971) who bases the rapid shifts between apparent steady states in a neighborhood as multiple equilibria: households with different preferences for integrated neighborhoods decide whether to stay or leave a neighborhood with a certain racial composition. This idea of "tipping" would later be recalled and made very popular by Malcolm Gladwell in "The Tipping Point" (2000). On one hand the balance of social ties may quickly be made unstable by the tipping phenomenon, and on the other weak ties can cement networks.

Granovetter's research on the strength of weak ties has several important expressions in the access to health information: one is well illustrated in the realization that being part of a social network can have a negative feedback on the access to health information resources (Uehara, 1990). While membership in networks provides access to informational resources, the value of social ties depends on the nature of the network and on the strength of those ties. Therefore, a member's strong ties to a tightly knit group may

translate into limited informational resources, while a member's weak ties to the same group may result in the access to more resources (Pescosolido, 1986, 1991; Uehara, 1990). More recently, Rainie et al. looked at the size of social networks and impact on health, stressing that "the larger the network, the more health benefits" (2012:132). According to these authors this observation is two-folded: not only do larger networks provide more support, in a large network each individual is likely to be more supportive. Rainie et al. argue that this may be the result of social capital feeding social capital in a positive feedback cycle.

Howard Rheingold was arguably the first to write about the existence of online communities, defining them as "cultural aggregations that emerge when enough people bump into each other often enough in cyberspace." (Rheingold, 1993:413) Like most modern cultural critics, Rheingold positions the topic as a result of the death of traditional communities when he says that the emergence of virtual communities is "in part a response to the hunger for community that has followed the disintegration of traditional communities around the world." (418)

A few scholars have presented arguments against the formation of these virtual communities (McClellan, 1994; Calhoun, 1991). This negative position was most diffused by Calhoun's dystopia argument by which he suggests that virtual life takes over our real lives and that therefore, online communication negatively impacts off-line intercommunication (Calhoun, 1991). Furthermore, his view of the different personalities (online/offline) is concomitantly negative – he suggests that they can cause frictions in both online and offline communities, and that a true 'community' requires direct relationships between its members. In 1994, McClellan argued that virtual (or

cyberspace) communities are pseudo-communities where no true social bonding exists. Furthermore he argues that rather than providing a replacement place for the deteriorating public realm, virtual communities are promoting its decline. Lee et al. (2004) introduced the term "desocialization" by which virtual socialization is reducing interpersonal relations in standard contexts. More recently, Parsell (2008) suggested a pernicious effect of virtual communities, notable in those using social media. He argued that social networks can leverage polarization of attitudes, and increased prejudices.

In spite of this negative tone, virtual communities continue to flourish and the field of public health has been no exception to the boom of the past few years. In the so-called e-health (electronic health) field, the tight-knitting of the social fabric assumes particular importance as the well-being of a patient arguably depends on or benefits from the support of others experiencing the same health problems. Not surprisingly, e-health online aggregates flourish in a diversity of fora - from free fora that can be self-regulated and unsupervised by health professionals to sophisticated groups supported by commercial entities, nonprofits or academic institutions, often heavily monitored by health professionals.

In the case of communities on smoking cessation, the feeling of being part of a group is believed to be essential. Health professionals and practitioners often refer to this idea of being part of a community as “social support”, and several studies have examined the role of different types of social support in smoking cessation and maintenance of abstinence. Mermelstein et al. (1986) assessed the impact of two kinds of social support factors: from a partner directly related to quitting and the presence of smokers in cessation programs’ social networks. High levels of partner support were associated with

cessation and short-term maintenance of abstinence. However, the presence of smokers in cessation programs social networks was a hindrance to maintenance. So it seems that being part of a group can hinder the maintenance of abstinence. Other studies show that cessation can also be hindered: a later study (Schofield et al., 2001) suggested that in the case of young adults, smoking is a stereotypical attribute of particular social groups, which in turn have a normative influence on the group members' smoking status. This is in line with the self-categorization theory, according to which individuals conform to the norms of social groups with which they identify.

The existence of social support has long been recognized as an important variable in the maintenance of a variety of health behaviors (Carmody, 1997). Some studies in this area have looked at general aspects of social support, such as the positive impact of affiliation, nurture and social relationships and their impact on the physical and psychological well-being through all life stages (Cohen and Syme, 1985; Seeman, 1996). Other studies in this topic have looked at particular social spheres such as the impact of family relationships on healthy behaviors (Broadhead et al., 1983; House et al., 1988; Uchino et al., 1996). As an example, a family environment that imposes some structure in the form of rules, may facilitate the acquisition of coping strategies later in life (Taylor et al., 1997),

Smoking cessation is no exception to the positive aspects that the social environment exerts on healthy behaviors and most interventions include some social support element (Hajek, 1994). Clinical practice guidelines for smoking cessation interventions in the USA (Fiore et al., 2000) and the UK (Raw & McNeill, 1998) advocate the use of social support. These communities of social support can take several

forms, including community-based resources (groups that function as the AA support groups) or other groups that may be organized or at least monitored by health professionals. Hand in hand with mutual support, these networks also provide basic information on the consequences of smoking and on practical information such as how to cope with tobacco cravings. These types of intervention – telephone counseling, direct mailing and face-to-face communities of support - can be relatively expensive and consequently virtual communities are being explored as a cost-effective alternative.

The impact of the social environment can also be adverse to healthy behaviors. A family environment that offers little imposition of structure, may translate later in life as maladaptive coping strategies to manage stressful events (Taylor et al., 1997), In the field of smoking, and as mentioned earlier, the presence of smokers in the social networks of tobacco cessation programs may undermine particular stages of the quitting process, such as the maintenance of abstinence (Mermelstein et al., 1986).

As with other areas of public health, scalability of treatment interventions is an important factor for the success of smoking cessation support programs. Human and material resources are limited and public health has a broad target population. This is another reason that makes the deployment of virtual communities for smoking cessation appealing when compared to other, more traditional, approaches such as telephone, face-to-face individual, or group counseling. Web-based assistance requires an initial setup cost for production of materials but when compared to other types of intervention, duplication and scalability can be very cost-effective because the variable cost is virtually independent of the number of people it reaches. For these reasons, virtual communities for smoking cessation have been extremely attractive to both the private and public

sector, which are starting to spend millions of dollars per year developing and supporting these programs. It is important that we understand how these communities are functioning, whether the interactivity and support structures built into them are in fact being used by the clients as intended by the designers, and whether they are leading to smoking cessation. The increasing number of Internet-based assistance programs for smoking cessation makes it imperative to analyze how these programs are being delivered; there is a growing need to understand how these new online structures of support impact quit rates. In the case at hand, we want to understand why these communities did not perform as expected.

Health experts have identified indirect and in some cases involuntary negative health impacts of social media. The first and most obvious is that the participatory nature of social media implies in the health realm, the danger of dissemination of non-credible, unreliable, and potentially flawed, health information (Habel & Stryker, 2009; Kortum et al., 2008, Rainie, 2013). Examples include situations where drug companies promote the awareness of a disease or relatively unimportant treatment to spur consumer demand for a new product. In other instances, the circulation of flawed information has no hidden agendas but is no less damaging and there is evidence of potential harm due to low-quality online information (Weisbord et al., 1997). As an example, a study on the reliability of websites containing information related to home management of children' fevers (Impicciatore et al., 1997) found that the information on only four of forty-one websites closely followed the primary recommended guidelines. Yet a third type of flawed information results from the abundance of 'sensational anecdotes' on the Internet: this preference for the sensational may affect the views offered online about health issues.

Pereira and Bruera (1998) searched sites on controversial health issues such as euthanasia and medical use of marijuana and concluded that the majority offered `unbalanced views with little or poor referencing to scientific data' (1988:61). Rainie (2013) notes that the Internet and social media in particular provide "second opinions" and can therefore be sources for misinformation

Second, health experts have found a double divide when studying the topic of digital divide in the access to online health resources (Chou et al., 2009; Renahy et al., 2008) as those without Internet access are also more unlikely to have adequate health care access. Lustria et al. (2011) employed the 2007 Health Information National Trends Survey (HINTS) to explore relationships between several socio-economic variables and the use of the web-based technologies for health information seeking, personal health information management and patient-provider communication. The results do not show early evidence of a narrowing divide in eHealth technology use as a result of the narrowing divide in Internet access.

There has been little research on the comparison between nonprofit and for-profit websites for smoking cessation. In one study, users preferred to use commercial sites - that had been developed by tobacco companies - to the non-commercial – governmental, and academic - sites (Peter Selby, personal communication, October 2007). There is no data on the relative use of social media features in nonprofit and for profit sites for smoking cessation. It is plausible to think that since social media require IT teams with advanced expertise, for-profit sites may be more competitive in the job market in attracting a workforce with such an expertise. On the other hand, social media features require that the individual or team behind the site's social media features devotes time to

the animation and maintenance of fresh content. Non-profit sites may see this endeavor compromised, if their funds are more unreliable or volatile. Looking at the relative adoption of house social networks to commercial social networks by the nonprofit sector, a 2010 report rated Health and Healthcare as the area that least uses Facebook and the second to last for the least use of Twitter. That report uses the term "house social networks" as opposed to "commercial social networks" to designate those social networks built by the organization. The report does not assess if this relatively weak use of commercial social networks means a greater investment in house social networks in the field of Health. However, it does note that in the case of a nonprofit, the greater upfront investment for software and build-out may be more directly dependent on the funding and the state of the economy in general.

Studies have historically tended to show that virtual communities promote the sense of belonging (Wellman, 1999; Kummervoldal, 2002; Rainie & Wellman, 2012). More recent studies suggest that websites with social features, independently of the focus area, seem to promote a feeling of membership, of being a part of a community – and they do this more successfully than sites that do not present such features (Rainie & Wellman, 2012). Some studies suggest that the presence of social media features can lower the costs of collaboration, sharing, and production, thus suggesting new forms of interaction and problem-solving (Shirky, 2010).

It is reasonable to conclude then, that sites with social features have an impact on loneliness, by decreasing that feeling.

2.1.2. Theory relevant to the major question

Since the early 2000s, we have evidence-based strategies to use in both behavioral and pharmacological interventions that help in smoking cessation (Fiore et al., 2000). Initially conducted in face-to-face meetings individually or collectively, behavior-based smoking cessation interventions were not an exception to the wide adoption of media to reach a greater number of people and to overcome limitations of distance and time. Behavioral interventions have for long included, not only in-person counseling, but also telephone, and mailed-in self-help. Fiore et al. (2000) identified three features that are unique or enhanced in behavioral interventions: (1) problem solving skills, (2) social support, and (3) facilitating social support outside the treatment (from friends and family). More recent studies have both confirmed (Dodgen, 2005) and expanded (Lancaster & Stead, 2011) these observations. Lancaster & Stead (2011) showed that behavioral and cognitive-behavioral techniques are effective for smoking cessation. These include control of stimuli, cue exposure, the handling of contingencies, self-control techniques and coping skills, beyond the social support and problem solving skills that had already been identified by Fiore et al. (2000) and Dodgen (2005).

Studies also show that with very few exceptions tobacco users have a better chance of succeeding in quitting when they receive not only a behavioral intervention but also have access to pharmaceutical products (Cinciripini et al., 2005; Eisenberg et al., 2008). While evidence-based pharmacotherapy should be matched with individual preferences (e.g.: gum versus patch) it seems that behavioral treatment can be effective in its own right and actually substantially amplify the success of pharmacotherapy (World Health Organization, 2009). There are a few exceptions to these conclusions: Ward et al.

(2013) found that in low income countries certain pharmacological treatments may not be effective when given as an adjunct to behavioral support.

Unfortunately, most tobacco users who attempt to quit do so without receiving evidence based treatments and the success rate for unassisted quit attempts is low. Pierce et al. (2011) used the example of Californian smokers in the 90s to make the case that unassisted quit attempts jeopardize the impact of potential products. In the State of California and by the late 1990's, fewer than one in four tobacco users received any assistance when trying to quit (Pierce et al., 2011). In a study conducted in 1996, Abrams and Orleans concluded that low use of effective behavioral and pharmacology-based assistance compromises the population impact of these interventions. More recent studies, however, stress that most published papers of smoking cessation interventions are studies of assisted cessation and that very few describe unassisted cessation at the individual level. These studies emphasize that the most successful method used by most ex-smokers is unassisted cessation (Chapman & MacKenzie, 2010).

Increasing the use of effective tobacco treatments is a national health priority. According to the U.S. National Action Plan for Tobacco Cessation (2004), access to evidence-based effective behavioral and pharmacological tobacco interventions can spare millions of lives. A more recent plan of the same scale and on the same topic is the 2010 Tobacco Control Strategic Action Plan for the US Department of Health and Human Services. In this plan, combined behavioral and pharmacological interventions continue to be deemed fundamental to decrease smoking related morbidity. Furthermore, and in the area of combined behavioral and pharmacological interventions, the 2011 plan

identifies an emerging field – pharmacogenomics - that promises to harness addiction science to personalize cessation treatments.

For approximately the last 15 years, smokers have had an added service to help them quit smoking, supplementing the well established telephone counseling and pharmacological tobacco replacement, among others: the Internet. Services offering smoking cessation information and/or interventions via the Internet are called smoking cessation web sites. Approximately during the same period, the image associated with smoking has changed drastically. In the last 15-20 years, many countries have approved regulations that in various ways restrict the areas in which smoking is permitted. In the US, as of October 7, 2011, 79.6% of the U.S. population lives under a ban on smoking in "workplaces, and/or restaurants, and/or bars, by either a state, commonwealth, or local law," (American Nonsmokers' Rights Foundation, 2011) though only 48.5% live under a ban covering all workplaces as well as restaurants and bars. A smoking ban (either state or local) has been enacted for all bars and restaurants in the 60 most populated cities in the United States with the exception of Arlington, TX, Atlanta, Fort Worth, Indianapolis, Jacksonville, Memphis, Miami, Las Vegas, Nashville, New Orleans, Oklahoma City, Philadelphia, Pittsburgh, St. Louis, Tampa, Tulsa, and Virginia Beach (American Nonsmokers' Rights Foundation, 2011).

Smoking is less socially acceptable today than it was 30 years ago, when the media glamorized the act of smoking and the tobacco industry was not legally bound to disclose the pernicious effects of tobacco. In this scenario of social stigma, the anonymity that online support offers those wanting to quit may be a desirable feature. The social stigma associated with smoking, a result of the regulations and indoor bans of the last few

years, makes the anonymity associated with an Internet-based smoking cessation website a desirable type of intervention for some smokers seeking help to quit. For Bayer & Steuber (2006) the antitobacco movement has fostered the stigmatization of smokers and it is not yet clear if this social transformation is but a moralizing approach rather than a public health achievement. For those smokers who prefer anonymity when undergoing a tobacco cessation intervention, the fact that WATIs allow them to login without revealing their true identify is a great advantage over non web assisted tobacco cessation interventions (Lieschenstein et al., 2010. Hence, tobacco cessation websites may be an alternative to other services traditionally offered. Furthermore, the Internet is increasingly affordable and available 24 hours per day, which may be attractive to a new life style: one that leaves the smoker who wants to quit only little time after work to attend, for instance, personal counseling. Paradoxically, though, during the first 10 years of smoking cessation website deployment, very few studies had been conducted that did a detailed analysis of the quality of such services (Burri et al., 2006). Of those studies very few had taken a user-centric approach when evaluating the website (usability testing) (Bock, 2004) and also very few had looked at the frequency and effect of social features in smoking cessation sites (Etter, 2006). In the last 5 – 7 years studies analyzing smoking cessation sites proliferated: some cross-analyze several smoking cessation sites (Rabius et al., 2008; Civljak et al., 2010), while others compare quit rates of web only smoking cessation interventions to combined web and telephone counseling interventions (Graham et al., 2011) and yet others measure the interactivity of smoking cessation sites (Freeman, B. & Chapman, S. , 2012). Various studies have focused on the social media component

of smoking cessation sites (Selby et al., 2009; Taylor) and on the impact of Internet customization to the interventions (Matthews, 2010).

2.1.3. Usability and visibility

From the point of view of design, different levels of importance can be assigned to the features of information and social support. How visible an item is on the WATI determines how likely the user is to select it over another item. If the social media features are less visible than the informational features, they are likely to be selected last or not at all if the user has a limited time for the interaction with the WATI. In a worst case scenario, the social media features may not even be perceived as a possible choice and therefore be ignored all together. Visibility of elements on a computer screen is in turn the result of a set of factors such as their placement on the screen layout and the font size used to signal one and the other. By the same token, the ease of navigation to access either may prioritize one over the other (Katz-Haas & Truchard, 1998).

Jakob Nielsen has been one the most quoted sources regarding usability. First developed by Molish & Nielsen (1990), and later revised by Nielsen (1994), in the so called "Nielsen's ten usability heuristics", the author mentions visibility in two of them:

- visibility of a system's state, meaning that the system gives the user appropriate feedback as to its status (e.g.: selected and not selected)
- recognition rather than recall, meaning that by making objects, actions, and options visible the designer alleviates the user's memory load.

I consider another two of his heuristics – while not mentioning visibility per se - equally instrumental for this property: consistency and standards. By following

conventions, the designer minimizes the ambiguity of words, actions and situations. This affects recognition and, therefore, visibility.

For Ben Shneiderman (1998) the principles of good human-computer interaction slightly overlap Nielsen's usability heuristics. They are Simplicity, Visibility, Affordance, Consistency, Structure and Feedback.

The governmental site usability.gov incorporates today the most important updates to Nielsen's well known heuristics (Lynch & Horton, 2002; Zimmerman et al., 2001). All the guidelines published are research-Based and assigned a number between 1 and 5, reflecting the strength of the finding subjacent to each guideline. Usability.gov is the most important development in the U.S. since Nielsen's heuristics with a direct impact on the web design of health and healthcare related websites. However, there are other systems worth mentioning such as the one developed by Susan Weinschenk and Dean Barker (2000) based on usability guidelines and heuristics from various sources including Nielsen's guidelines but also those established by ,Apple and Microsoft. Weinschenk and Barker identified 20 heuristics among which the interface "fulfillment" (satisfying the user experience) and "cultural propriety" (matching the user's social customs and expectations). Other studies have resulted in usability guidelines based on case studies (e.g.: Lynch & Horton, 2002) or complete web style guides that include guidelines on usability (e.g.: Zimmerman et al., 2001).

Both the systems developed by Nielsen and Weinschenk & Barker are based on heuristics (identification of problems). However, this is not the only system available to assess a site's usability: one other popular trend in the field of usability assessment is the cognitive walkthrough (Lewis et al., 1990). Both methods - heuristics and cognitive

walkthroughs – are called “inspection methods”. They do not require to determine a site usability or to serve as the basis for guidelines and recommendations. However, as opposed to a process based on heuristics, the cognitive walkthrough assesses how users use the interface to meet their goals, as well as problems encountered as users learn to use an interface. While Nielsen’s heuristics continue to be the most widely adopted system to evaluate a site’s usability, the opponents to this system note that it uncovers many low-severity issues that aren't actual problems (false positives). On the other hand it requires multiple usability experts and may therefore be more expensive than other methods. More recently, studies in usability have focused on predictive human performance models to support guidelines (Bonnie, 2011). Arguably as a result of the restrictive nature of some of the guidelines resulting from heuristics, cognitive walk throughs and human performance models alike, some recent studies have looked at the relationship between aesthetic value and usability (Shaik & Ling, 2009; David, 2010; Coursaris et al., 2010). These studies do not confirm the idea that “what is beautiful is usable”. Other scholars, working namely in areas such as Internet marketing or 3D worlds and online games, have looked at the relationship of playfulness and usability (Coursaris et al., 2010; Oja, 2013). These dimensions that were formulated in recent studies on web usability – aesthetics, playfulness – are often included under the general term of ‘persuasion’ (Fogg, 1999, 2009; Oinas-Kukkonen & Harjumaa, 2009; Romero, 2010). The technologies that bring these dimensions forward are called ‘persuasive technologies’ and not surprisingly, the majority of the literature in this area relates to the monetization of the web (e-commerce, B2B Internet marketing, to name a few of the topics). More recently, some studies have noted a connection between logical fallacies (forms of reasoning that are cognitively

effective though logically invalid) when adopting some common persuasion strategies (Lieto & Vernero, 2013).

Donald Norman, on the other hand, stresses the importance of "affordance" as the quality of an object that allows an individual to perform an action, "the perceived and actual properties of the thing, primarily those fundamental properties that determine just how the thing could possibly be used." (Norman, 1999:8). This view differs from James Gibson's idea of affordance, which pertains to an action possibility, independent of the individual's ability to perceive the latter (Gibson, 1979). The affordance of a chair for instance is both the physicality of the flat area at around 30'' from the floor and supported by 4 (or 3 or 5…) structures – the legs. The perceived suggestion of how a chair should be used (its perceived property) is to sit. When actual and perceived properties merge, an affordance emerges as the tie between the object and the individual that is acting on the object (Norman 1999). A digital environment can have affordances for its several components: for example, the simulation of depth through the use of shadows and embossed graphics suggest the action of selecting these areas (clickable areas or buttons) and a blinking cursor in a rectangular area of defined size suggests the act of using the keyboard to input characters. If the designer follows these principles, the objects on the screen will have qualities that will draw the user to action.

2.1.4. Social networks and participatory media

Features that allow a direct, horizontal communication among members, without being necessarily sanctioned or channeled via health experts, include discussion forums, blogs, wikis and commercial social networks such as Facebook and Twitter– four expressions of participatory media. By offering several formats for communication, by

removing distance among members (and by allowing asynchronous conversation), the latest advances in communication technologies are promoting the sense of community as defined by the feeling of "belonging" to a community, or membership (Wellman & Gulia, 1999): in other words, sharing a sense of personal relatedness. Rainie's and Wellman's note the rise of "networked individualism", which radically differs from social constellations such as small knit groups (households, workgroups) and hierarchical bureaucracies. The same authors stress that one expression of this networked individualism is the degree of liberty in acting on one's own or with various segments of one's network (Rainie et al., 2012). As an example, the network contacted when seeking advice on health issues is different from the one sought for purposes of career or financial advice. As mentioned earlier, these authors emphasize the importance of the size of networks describing as an example the case of a couple looking for health advice: the larger the network, the larger the health benefits. Specifically in relation to social support, not only can each individual find more support in a larger network as he/she is more supportive in a larger network (Rainie et al., 2012).

Most of the sociological studies on virtual communities note that both off-line and online communities share a number of features including: the belief among community members that they belong to a community, the recognition of a conceptual frontier around the community that helps identify who is in and who is out, and the existence of norms that rule members' behavior within the community (Rheingold, 1993; Preece, 2000). Furthermore, both off and online communities have means – more or less explicit - for the exclusion of outsiders and for the socialization of new members to the norms of the community. As an example, the blog blackmentalhealth states that the non observance

of the site's rules may lead the organization to block posts. The rules are presented as a way to guarantee the safety and respect in the online (example: "Stay on topic. That way people looking for certain discussion content can trust that the discussion headings they see match what they will actually find on the forum.). Some authors extend the notion of community to spontaneous (and ephemeral) online aggregates (Rheingold, 1993, Stanoevska-Slabeva, 2002; Waisanen, 2010, Bernstein et al., 2012). For others, a virtual community implies more permanent ties and formal norms (Suzor, 2010). Whether an online formation can be labeled a virtual community is largely a matter of which aspects of "community" – among those identified earlier and others that may be specific to certain domains - one considers as most important.

Whether or not the term "virtual community" is used, many social scientists are looking at close-knit groups of people on the Internet and often studying them by seeing how they quantitatively differ from real close-knit groups (Kim, 2004; Wilson & Atkinson, 2005; Yee, 2006; Barnett & Culson, 2012; Bayraktar & Amca , 2012). Kim (2004) introduces the idea of "desocialization" in the real world (less interaction between individuals in the real world) when compared to the increase of virtual socialization. Wilson and Atkinson (2005) argue that the body of work prior to 2005 gives undue emphasis on experiences either online or offline, notably with youngsters; their study looks at the continuous across the "virtual-real" divide on two ethnographic case studies - "rave" and "straightedge" - and explores the impact that both realities - online and offline - have on the lived experiences and identity negotiations of youth involved on those two subcultures. Yee (2006) and Barnett & Culson (2012) looked at massively multiplayers games when comparing virtual and real world communities. Yee's study concludes that

users derive meaningful relationships, salient emotional experiences, and real-life leadership skills from Massively Multi-user online games (Yee, 2006). Barnett & Culson (2012) describe how leadership skills learned in-game can be transferred to real-world scenarios tying those skills to motivations and individual's well-being in a game situation. Bayraktar & Amca were, to my knowledge, the first to look at how virtual world activities match real-world activities. Their study also aimed at comparing virtual and real world activities across gender and age groups, and was conducted with pathological and nonpathological users of the Internet ("pathological" meaning problematic computer use, also called Internet addiction disorder). The results showed high correlations between most virtual and real world activities for men and women, and across all age groups. However, pathological users of the Internet perceived virtual world activities as more gratifying and motivating than nonpathological users.

Though the media and policy foci are often on the use of social networks by youth, the number of adult Internet users with a profile on at least one online social network site has more than quadrupled from 2005 to 2008 (Pew Internet & American Life Project's December 2008 tracking survey). Adult Internet users are the majority of the users of social networking sites. Several implications of this growth are important for studying smoking cessation programs, particularly their connection to participatory culture: the risk of tobacco-related disease and morbidity increasing with age, those statistics emphasize that adults are using (or may use) the social media features in web assisted smoking cessation programs

Social networks have been studied in relation to participatory culture and I would like to expand a little on this topic since it is central to any integration of user-generated

in authoritative content, an idea that is central to this proposal. Rheingold has expanded on his idea of the virtual village community (1993) through his concept of smart mobs (2002) as socially coordinated mobs that act intelligently through exponentially increasing network links. Later, through his McArthur Foundation funded research, he looked at the ways in which young people are using participatory media: to both create as well as consume media (Rheingold, 2007). He called upon the need for educators to introduce students to the use of participatory media in the public sphere in order to leverage a rhetoric of democratic participation. Rheingold's writings on participatory media offer invaluable concrete examples for educators to help the youth develop their public voice through blogs, wikis, and podcasts. Looking at social movement communication Stein (2009) draws on alternative media studies as the basis for a typology of communication functions that she argues are central to social movements. Her survey of a random sample of SMO websites suggest that the majority of US-based SMOs are under-utilizing the web; potential reasons include organizational objectives, organizational resources and resource sharing. In Kathleen Tyner's "Media Literacy: New Agendas in Communication" (2011) Asthana describes a cyber neighborhood where young people (mostly in India) created a participatory culture. For the author a participatory culture is one that allows refashioning of media to serve a new purpose.

Jenkins et al. (2006) stress the active involvement of teens today in participatory cultures –by joining online communities, by producing creative work in new digital forms (including modding and fan fiction), and by team working (as in Wikipedia), and by shaping media (as in blogging or podcasting). These author's McArthur Foundation

report aims at shifting the discussion about the digital divide from questions about access to technology to access to opportunities for engaging in participatory culture.

Given the incipient stage, I contend, of analysis of user generated content in the informational content delivered by WATIs, I will leave out of this literature review two concepts that are otherwise fundamental when discussing social networks and participatory culture: the concept of modding - modifying a piece to perform a function not originally intended by the designer - and of open-source licensing. The incipient stage of user generated content analysis in this area is well patented in the fact that neither of the reviews published by the Cochrane Tobacco Addiction Review Group – describes any study where such an analysis is conducted, whether as textual analysis, social network analysis, or other. Cochrane reviews are systematic reviews are internationally recognized as the highest standard in evidence-based health care. This means that if any analysis of user-generated content of WATIs has been conducted, it lacks the evidence-based approach required by this review group (Civljak et al., 2010).

2.1.5. Social support, social presence and social translucence

The importance of social support in smoking cessation has been known for decades (see, for example, Cohen et al., 1988). Healthy behavioral change seems to draw strength from two main sources in the case of smoking cessation: information and social support (West et al., 2000). Information had been seen as primary, and as the contrary example of the continuing importance of the ability to select and download PDFs shows, is still very important. However, social support is rapidly becoming more critical.

Web assisted smoking cessation interventions are evolving from purely informational – unidirectional in the transference of knowledge – to informational with

social features (Bennett, 2009; Dahl, 2010). These social features may go from an automated email system reminding the smoker of her self-imposed "quit deadline" to a video communication between two or more individuals.

In 1974, Blumler & Katz formulated the "uses and gratifications" theory arguing that media users actively choose the media source(s) that best fulfill their needs. Subjacent to this theory is the acknowledgement that users increasingly have alternate choices to satisfy their needs. Two years later, Short, Williams and Christie (1976) published their 'social presence' theory. The fundamental idea behind this theory is that a medium's social effects are caused mainly by the level of social presence that that medium affords to the users. Social presence is thus taken as the receiver's sense of awareness of the presence of a partner for interaction. For these authors, increased presence (online, to others) impacts the feeling of trust online, enables social "hand holding" when needed, promotes informal relationships, and increases sense of community, and allows for an increased interaction among participants Others have extended these ideas in other directions in Communication and Media studies. Reeves & Nass' "The Media Equation" (1999) is arguably the most well known expansion of the theory. It argues that people tend to treat computers and other media as if they were real people or real places. As a result, mediated communication does not exclude social presence, the feeling of presence of another. Quite a bit earlier, in 1988, House et al. had noted for the first time that there is theoretical basis and strong empirical evidence for a causal impact of social relationships on health. They observed that prospective studies (which control for baseline health status) consistently show increased risk of death among groups with a low number (and sometimes low quality) of social relationships.

Studying any online social dimension carries social values; of these trust and reciprocity, as well as social capital, deserve some discussion. The computational problem of trust is to ultimately to determine how much one person in the network can trust another person to whom she is not yet connected. Several studies have looked at the design of online systems of representation of trust (Fox & Rainie, 2002; Kim et al., 2005). Ebay, for instance, provides a system of trust when identifying as a percentage the ratio between number of positive feedback received by buyers and the total number of transactions of a seller. Online reputation is strongly tied to trust, especially in certain areas (for instance, e-commerce): in the previous case, if a seller has a high percentage of positive feedback from past buyers, he/ she has a good reputation and can therefore be trusted by new buyers who have had no past experience with the seller. In other spheres where trust is important, such as academic collaboration, the relationship between trust and reputation may not be as simple as there may be data carried from other systems into the online environment that affect both unequally: for instance, the professional title of a scholar. Trust and reciprocity models come from several disciplines, including game theory. Cox (2004) stresses that studies in this area implicitly assume that trust and reciprocity take place in the absence of altruism and inequality aversion. He argues that to model trust and reciprocity in online environments (notably games) trust needs to be isolated from altruism and reciprocity from altruism and inequality aversion. Other studies have looked at trust in collaborative online groups Smith (2008).

In Putnam's seminal text on social capital "Bowling alone: America's Declining Social Capital", social capital is defined by analogy with notions of physical capital and human capital—and defined as "features of social organization such as networks, norms,

and social trust that facilitate coordination and cooperation for mutual benefit" (Putnam, 1995:3). He goes on to say that networks with critical mass of social capital foster sturdy norms of reciprocity and promote social trust. These networks of civic engagement facilitate coordination and communication, resolving dilemmas of collective action. But while Putnam's text is a cautionary tale about the increasing psychological disengagement of Americans and the politics and government over this era, later texts on social capital have emphasized the online dimensions of social capital. (Phulari et al., 2010) note that its is the shared interest of online gathering of like-minded people that has hidden social capital aspects. They classify these as of bonding or bridging type and conclude that the maintenance of social capital in social network sites is difficult and of much greater difficulty than the simple creation of such sites.

In the public health literature, the three most popular approaches on the efficacy of social capital are: the 'social support' perspective (Berkman, 2000), the 'inequality' thesis (Wilkinson, 1996) and the 'political economy' approach (Lynch et al., 2000, Muntaner, 2002). Central to the perspective of social support is the idea that informal networks are central to objective and subjective welfare, while the 'inequality' approach argues that increasing economic disparities have compromised our sense of social justice and inclusion, and will ultimately lead to an increase of anxiety and of life expectancies. Finally, the 'political economy' perspective blames the social and political exclusion from material resources for the poor health outcomes. Several other theories of social capital have emerged aiming at reconciling those three perspectives (e.g.: Szreter & Woolcock, 2003), by incorporating broader readings of history, politics, as well as empirical evidence on mechanisms connecting types of state—society relations to public

health outcomes. More recent studies have looked for evidence of a link between social capital and health outcomes in more operational ways: for example, by looking at how levels of social capital assets (contact with friends, relatives, neighbors) can be good predictors of general health or mental wellbeing (Ormston, 2012).

Interestingly enough, while trust and reciprocity seem to explain the sustainability of social media enabled websites in areas such as marketing and scholarly collaboration to name a few (e.g. Kim et al., 2005), that relationship is far from clear in the case of health, as it is stressed by Abbott & Freeth (2008). These authors state that although trust and reciprocity are often identified as core components of social capital, the literature offers, at this point, little evidence that those dimensions can explain the research showing beneficial effects of social capital on health. They go on to say that although social capital, social networks, social support and health are constantly being linked, theoretically and empirically, the relationships between these terms are far from simple. As an example, measuring social capital in health communities by looking at social networks and social support often assume no ambivalence and complexity of social relationships, and we know that this is not so. The authors suggest that further research is needed in the relationship between trust and health, and between reciprocity and health but accept that social networks and social support (which they designate as the SNSS mechanism) can be a proxy for social capital. SNSS promote key elements of social capital including trust, reciprocity (as well as information-sharing and participation in local activities).

Drawing from the literature discussed above on social support (House, 1988; Abbott & Freeth, 2008) gratification theory (Blumler & Katz, 1974), and social presence

theory (Short et al., 1976), I justify next the importance that the concept of social translucence (ST) (Erikson & Kellogg, 2000) has in my proposal. ST emphasizes the need to make social information visible within the system (in this case, the smoking cessation website). Erickson & Kellogg stress translucence as a property of the physical world that supports efficient and elegant human-human communication in face-to-face situations. They suggest that digital systems can be designed so that participants and their activities are visible to one another. These "socially translucent systems" must have three characteristics - visibility, awareness, and accountability. It is these three factors that enable people to map their social experience and expertise onto the structuring of their interactions with one another. So as an alternative to the more traditional idea of transparent system of interaction, Erickson & Kellogg propose the quality of transluscence to emphasize the importance of designing systems that are proxies of human presence along 3 of its dimensions: visibility, awareness, and accountability. These 3 dimensions correspond respectively to 3 main elements in human interaction “I see you”, “I am aware of your presence” and “I am accountable for my actions in your presence”. While the term “transparency” referred to the perceived absence of the machine in the human – computer – human interaction that characterized the nineties, transluscence accentuates the human element in the many – to- many interaction that characterizes communication in the XXIst century.

Following the metaphor of a door, the authors explain why having a translucent door on a passage way avoids the unsocial act of slamming the door against someone, which can occur with an opaque door. If I see someone coming, I will open the door carefully, enabled by their visibility. On the other hand, if I am aware that there is

someone on the other side, given our social context, I will not slam the door on the other person's face, due to my awareness of them. Finally, a more nuanced characteristic is the accountability aspect. The authors define it as the fact that I know that the other individual knows that I can see him. Therefore, I will open the door slowly, or he might hold me accountable for not acting in a socially approved manner.

The same authors contend that while designers in architecture and urbanism know what promotes social interaction in a physical space since there is a physics that is consistent, this constancy is absent in the digital world. Drawing from social interaction in physical space (the two way door), visibility, awareness and accountability seem to be three principles abstract enough to be transferrable to the digital arena.

Examples of these principles on a smoking cessation website might be:

- Visibility – knowing who is online by username, photo thumbnail or even just overall number of online users;
- Awareness – knowing what is expected of me by my fellow users, such as courtesy, not being aggressive in my comments;
- Accountability –knowing that my actions have consequences: If I post constant aggressive comments -- I can be expelled from the community and denied access. The nuance between this accountability and "awareness" is more difficult to identify in a digital than in the physical world but a trust system (similar to the one promoted by eBay) is a good example. Any digital system where I know that my action has consequences promotes accountability. In the smoking cessation arena, if a member that posts erroneous health information, he will not be trusted by others. As a result, at a later moment of emotional support need (as with recent

quitters for example, where the risk of relapse is higher) that member may not found the sought support.

Erickson & Kellogg's concept of social translucence has clear roots in the social presence theory, described above, and founded in 1976 by Short, Williams and Christie. Erickson and Kellogg's concept of social translucence is yet a new expansion of this theory. It is more pertinent as a general framework for this dissertation because it suggests that the design of a digital system - used for communicational interaction among several individuals - may leverage (or not) its social quality. The design affects this by variably addressing visibility, awareness and accountability. A system where communicational partners are visible to one another, aware of each other's presence and accountable for their actions within the system, has better social quality than one without these affordances.

2.1.6. Current literature

The study that triggered this dissertation

This work was triggered by the puzzling outcome of a study conducted by the American Cancer Society (Rabius et al., 2008). In this study, 6,451 smokers who visited the section of the American Cancer Society's Internet site offering smoking cessation assistance were randomly assigned to one of six Internet smoking cessation assistance websites. Five sites offered varying degrees of interactivity and social support and one, functioning as the control group, was a static site that focused on information delivery. Quit rates were assessed through telephone follow-ups at 13 months after initial registration. The results showed no significant difference in cessation rates between participants assigned to the interactive and to the static sites.

The six websites included one, containing basic information on smoking cessation in a PDF format (static website, which served as the "control" group), and five, with interactive features such as forums and calendars. The five interactive websites were developed and were maintained by different institutions that were ACS research partners in this study. The content of the static website could not be changed by the user. The only thing the participant could do in that website was read or download the documents. In contrast, the content of the interactive websites could be changed by the user. Examples in the five websites were forum areas where users had the ability to create discussion threads and post replies and survey forms that the user could fill and submit. In reaction to the answers to the survey the site could tailor the information displayed. Finally, and in addition to the interactive features mentioned, the site could include the setup of additional channels of communication with the member: examples are the generation of automatic email messages sent to the members' email account (1) every x period of days or (2) every time there was a reply to a forum thread the user had replied to.

The five interactive websites that were part of the ACS study all had interactive features and some offered a virtual space for members to meet. However, they offered various degrees of interactivity, in terms of features made available to the user and feedback of user-generated content to the system. Notably, social media features vary drastically: only one website was mobile ready and while all 5 enabled email communication, the degree of personalization of automatic messages (e.g.: addressing or not the smoker by the first name) varied considerably.

There was no significant overall difference in cessation rates among participants assigned to the interactive or static sites. The site providing the PDF documents displays

information in a rather unidirectional way – the user accesses those documents containing information on smoking cessation but there is no reaction of the system to the user. In any of the five interactive sites, however, the display of information reacts to the user input. Alongside with information, what is being offered is the potential for "communication" as the system is reactive and therefore content flows in two ways: the system provides information to the user but registers his/her response to that information and reacts accordingly, displaying information differently according to feedback.

Other studies have compared WATIS but not across such a large sample as this one. This is also the only randomized study conducted to date, comparing quit rates of smokers following smoking cessation programs in interactive sites and those following a smoking cessation program facilitated only through a static website. Graham et al. (2012) replicated the methodology looking at only one interactive site IQUITT and at one static website. The results of that study will be shared in the next section. In conclusion, the ACS study that inspired the work behind this dissertation is still a seminal study because it was a randomized trial and because of the number of research partners (WATIs) that agreed to participate in the study. The surprising results are the similar quit rates between the group randomly assigned to the static site and to the those assigned to the interactive sites. One way of interpreting these results is that information takes precedence over social support. Hence, the static sites not enabling any type of social interaction via the site led to quit rates to the interactive sites that offered, to various degrees, web-enabled social support. One other possibility though, is that the social features of WATIs may have been underutilized by the users: a site with poor usability could explain that underutilization of the social component.

2.1.7. A review of trials comparing Internet and No internet interventions

An early review of 46 websites offering smoking cessation treatment showed that the full potential of this technology is not being realized (Bock et al., 2004). Although the information was mostly accurate, as the sites were selected among those that identified themselves as rigorously following the national guideline recommendations, only 1 in 10 "adequately" or "extensively" covered each of the key content areas. These guidelines include advice to quit, assessment of interest in quitting, assistance with quitting, and arranging follow-up. Approximately one-third (37%) provided no coverage of at least one key component. One of the areas receiving the least coverage was the offer of interactive features to give tailored assistance with a mere 11% of the sites offering these features (Bock et al., 2004).

Although the review by Bock et al. was pivotal in the beginning of WATIs, the Cochrane Collaboration review on Internet-based interventions for smoking cessation is widely recognized as the most extensive and up-to-date in this field. At the time of this dissertation the most recent Cochrane review was by Civljak et al. (2010). This review identifies 20 randomized and quasi-randomized trials with data gathered from almost 40,000 participants. The randomization refers to participants' assignment, not selection. Quasi-randomized trials According to the same collaborative of reviewers, no trial under these criteria has been published before 2004. Of the 20 trials identified since 2004 (and up to 2010, date of publication of the most recent Cochrane review at the time that this dissertation was written), only a small number of studies compare the long-term effects of Internet to a no-Internet or no intervention control and the results of these studies have been mixed. As a result, there is limited evidence of any long-term effect of smoking cessation programs using the Internet.

Among the studies of interactive Internet sites with static sites or non Internet controls, several studies have long term outcomes (Munoz 2006 Study 3;Munoz 2006 Study 4; An 2008; Brendryen 2008a; McKay 2008;Rabius 2008; Brendryen 2008b; Munoz 2009) and a few have only short-term data (Etter 2005; Strecher 2005; Swartz 2006). The Cochrane review notes that the statistical heterogeneity across these trials was too large for a pooled estimate enabling the assessment of whether sites with content tailored to the users' needs and interests are more useful than a control.

Several trials compared an Internet intervention to a non-Internet based smoking cessation intervention or to a no intervention control (Clark 2004; Japuntich 2006; Mermelstein 2006; Patten 2006; Swartz 2006;Woodruff 2007; Brendryen 2008a; Brendryen 2008b; An 2008; Swan 2010). Of these, some have targeted young adult university students (An 2008) and others were conducted with adolescents (Mermelstein 2006; Patten 2006; Woodruff 2007).

These studies, and other that I reviewed, varied greatly in a number of parameters, namely:

- recruitment of participants;
- access, during Internet intervention, to pharmacotherapy, its 3 major forms in the case of smoking cessation interventions being buproprion, varenicline (both requiring a prescription) and nicotine replacement therapy (NRT) – e.g. the patch, gum;
- access, during Internet intervention, to behavioral counseling; other forms of counseling - psychological and psychiatric - take place in smoking cessation

interventions but generally not in those that are Internet based (V. Rabius, personal communication, June 1, 2012);

- stages of assessment of smoking status (smoking or not smoking) after baseline (before intervention). These stages are often called follow-up;
- duration of interventions (Civljak et al., 2010);
- definition of abstinence (Civljak et al., 2010)

Expanding on the last parameter, follow-ups are time points when the smoking status of the participants is assessed: post-intervention - a variable time point that varies with length of the intervention - and at three, sixe and twelve months after the intervention started. However, in some studies there is not a follow up but rather a self reported smoking status from the participant.

In this brief overview I will refrain from commenting on those parameters that vary greatly and will instead focus on design of intervention and general outcomes. While omitting the conditions of recruitment, of parallel counseling and pharmacotherapy and of type of time point used in assessing the participants' smoking status, I do want to acknowledge the diversity of these parameters across the interventions reviewed.

I will briefly describe the trials comparing Internet intervention with a non-Internet based smoking cessation intervention or with a no intervention control. Clark et al. (2004) did a very low intensity intervention for smokers by offering the participants a handout with a list of 10 Internet sites related to stopping smoking with a brief description of each site. He compared the quit rates of the participants who accessed this list with the results of those who accessed printed self-help materials. An (2008) recruited college students who had reported smoking in the past 30 days; Intervention group

participants visited an online college magazine (RealU) that provided personalized smoking cessation messages and peer email support. Mermelstein 2006 evaluated the effectiveness of a web-based adjunct (NOT Plus) to the American Lung Association's Not on Tobacco program (NOT). NOT Plus included access to a web-site specially designed for teenagers, whom also received, upon site registration, proactive phone calls from the group facilitator to the participant. The trial by Patten et al. (2006) compared a home-based, Internet-delivered treatment for smoking cessation with a clinic-based brief office intervention (BOI) that consisted of four individual counseling sessions. The intervention targeted adolescents who had access to the web-site for 24 weeks. One of the few evidence-based studies involving virtual worlds was conducted by Woodruff (2007). He evaluated the effectiveness of a virtual reality world combined with motivational interviewing, which was conducted in real time by a smoking cessation counselor. Japuntich (2006) evaluated a web-based system incorporating information, support and problem-solving assistance. The participating adults were offered bupropion as pharmacotherapy and face-to-face counseling. Among the studies with an important video component, I want to stress the work by Swartz 2006: participants in his study accessed a video-based Internet site with strategies for smoking cessation, as well as motivational materials tailored to the user's race/ ethnicity, sex and age. Swan 2010 compared a proactive telephone counseling intervention, with an interactive web site based on the same program, and a combination of phone and Internet components. All interventions provided behavioral support and pharmacotherapy (varenicline). Among the studies that showed a long term effect was Brendryen's (2008a; 2008b). However, the treatment group received a highly intensive program, delivered via the Internet and the

mobile phone. It is difficult to compare these results to other studies that looked at long term effects as those were much less intensive than either of Brendryen's trials.

At the time that this dissertation was written, the most up-to-date Cochrane review of Internet-based interventions for smoking cessation, which includes the studies referred above, concluded that there is a small number of studies providing very limited evidence of long-term benefits for smoking cessation programs delivered only by the Internet when compared to no-Internet controls. However, there is some evidence that tailored Internet interventions are more effective than non-tailored interventions. As mentioned earlier in the literature review, the term tailored has a slightly different meaning in the field of e-Health when compared to general User interface design: individualized or personalized (as opposed to targeted, which means "designed for a group").

In sum, and when reviewing trials with different intensities of Internet support, there is some evidence of short-term benefits of individually tailored Internet programs compared to static web-sites or non-tailored programs (Etter et al., 2005; Strecher et al., 2005). However, one study - the one that inspired the work behind this dissertation – found no significant difference in abstinence rates between participants assigned to interactive sites and participants assigned to static sites, even though the former led to higher utilization (Rabius et al., 2008).

2.1.8. Efficacy of Web Assisted Tobacco Interventions

Assessments of the efficacy of web-based smoking cessation treatments are critical at a time when the reduced costs of this type of intervention are making many institutions historically associated with other, more traditional counseling media turn to

the Internet as a means to replace (Montana quitline) or complement (American Cancer Society) other programs offered. Against this strong economic incentive, studies are urgently needed to examine whether the lower cost WATIs are as effective.

Among the studies with disappointing results for the generalized use of the Internet to assist in smoking cessation is the study conducted by Lenert et al. (2004). They conducted a pilot study (n=49) during eight weekly modules that included on-line tools for self-monitoring, and personalized email follow-up. Participants completed only an average of two of the eight weekly modules. Thirty days after enrollment the response to follow-up was approximately half (53%), while the rate of 7-day point prevalence abstinence (ppa) was 18%. By enrollment I mean date when participant started the intervention. Follow-ups are usually done at three, six, nine or twelve months after the start of the intervention. Follow-ups may include a number of questions but a 30 days follow-up of 53% means that of all participants who were reached 30 days after the intervention started, 53% have a non smoking status. This status is usually assessed as a 'no' answer to the question "Have you used smoked, even a puff, in the last 7 days?" (North American Quitline Association, 2010). The rate of 7-day point prevalence abstinence consists of the number of participants who answered "no" to the question mentioned above. In WATIs, that question may be placed by email, in synchronous communication via a chatroom, sent to the participant via SMS or formulated in more traditional ways (such as by telephone or face–to-face in interventions including telephone or face-to-face counseling). While the 7-day (or 30-day) point prevalence of abstinence (ppa) may require biochemical validation (then requiring the screening of cotinine in the blood), so far, studies of web assisted tobacco interventions have relied

solely of self-reporting. Another measurement that will be relevant in the next paragraphs is the follow-up. This usually happens at intervals of multiples of 3 months.(3 6, and 9 months follow-ups being the most common in the trials I reviewed). A 3 month follow-up means that 3 months after the start of the intervention the user of the WATI is asked whether she has smoked the last 7 (or 30) days. In a 6 month follow up the same question is asked 6 months after the start of the intervention. Finally, 'intent-to-treat' (ITT) and 'respondent-only' are terms used to describe how to treat the number of participants who could not be reached in the follow up (3, 6, 9 ,12 months…). An intent-to-treat intervention explicitly assumes that all the non respondents are still smoking at the time of the follow-up: it is therefore an overtly conservative measurement. In contrast, in a respondent-only intervention, the non respondents are not included in the denominator when calculating the success rate (An & Betzner, 2009)

A feasibility study by Stoddard & Augustin (2006) included 538 adult smokers who were recruited by email and consisted of a brief on-line self-help intervention. Participants answered questionnaires on nicotine dependence, symptoms of depression, and when appropriate menstrual distress. Based on their answers, the participants were given access to on-line text-only self-help materials. They found a response rate to a 1 month-follow-up of 43% (which means that 1 month after the start of the intervention, 43% of the participants answered "no" to the question "Have you used smoked, even a puff, in the last 7 days?") and 7-day ppa of 3.5% (ITT analysis), which means that 7 days after the start of the intervention, 3.5% of the respondents answered no to the question "Have you used smoked, even a puff, in the last 7 days?" – in this ratio, all the participants who could not be reached were assumed to be smokers.

In a recruitment pilot study for the Quit-Smoking-Network website Feil et al. (2003) reported the results of an elaborated and technologically advanced website, which included the development of a personal quit plan, social support (both peer-to-peer and professional) through emails and discussion forums, as well as resources specifically on cessation resources. The 3-month follow-up was calculated for the first 370 clients who enrolled at the site. The response rate for this follow-up was 56%, while the 7-day ppa was identical to the one obtained by Lenert et al. (2003): 18%, by ITT analysis (Feil et al., 2003).

A type of study that can be particularly telling for designers of smoking cessation websites is the comparison of quit rates before and after the addition of a particular feature. To analyze the effect of proactive email messages added to brief online assistance (which had been the authors' first study), Lenert et al. (2004) designed a system that sent up to 13 follow-up emails referenced to the quit date giving support and facilitating links to the website resources. The 7-day ppa was assessed for participants before (n=199) and after (n=286) implementation of the proactive email feature systems showing 7.5% for the pre-design and 13.6% for the post-design at 1 month (p=0.035) (Lenert et al., 2004). This shows the effectiveness of the email messages.

Many studies are not randomized trials. The consequence is that users who are being successful in quitting are likely to go back to the site more often and use its features, therefore causing misleading results. This may well be the case of the study conducted by Cobb, Graham & Bock (2003) on the very popular Quitnet.com (a research partner in the Rabius' study). The results were further limited by the fact that only 25% of the contacted 1501 consecutive registrants responded. The 7-day ppa at 3 months was

30% among survey respondents but an ITT analysis registered only 7% (to stress what was said earlier about ITT analysis, the 75% of nonrespondents were all considered smokers in the calculation of the results). One important finding of this study was the realization that when classifying users as "high" vs. "low" users (on the basis of the median split of total time logged in) the authors found a correlation between the number of visits to the site and the use of social support/community features and abstinence. To illustrate this point: high users were likely to quit smoking more than twice as much as low users, and those who used features such as discussion boards and chats were likely to quit smoking more than three times as much as users who did not use those features. Again, the fact that this was not a randomized trial limits the generalizability of the findings, but the dose-abstinence relationship is noteworthy. In other words even though the ITT analysis is an overtly conservative analysis and even though there was no randomization, the strong correlation between time spent on the website and quit rate and between use of social features and quit rate suggest that the site and its social features promote the quitting process.

2.1.9. Randomized controlled trials of web-assisted tobacco interventions

Three of the earliest randomized controlled trials of web-assisted tobacco interventions are Schneider et al. (1990), Strecher et al. (2005) and Etter (2006). Schneider's study took place in 1990: he randomized 1,158 smokers in a 2 x 2 factorial design. The 2 variables were (1) to receive a program with personal stop smoking tips vs. a control site and (2) to have access to a forum/discussion group vs. no access. Individuals randomized to the personalized program were more likely to make 1 or more return visits. However, and in the case of the 2nd variable (access to "community"

features) there were some differences at 1 and 3 months but no significant differences by 6-months (Schneider et al., 1990). This study presents some evidence that tailored Internet interventions are more effective than non-tailored interventions

In a study by Strecher et al. (2005) interactions between patch use and Internet use were observed. In a randomized controlled trial of a web-based computer-tailored smoking cessation program as a supplement to nicotine patch therapy, 3,501 purchasers of nicotine patches were randomly assigned to a personalized (tailored) vs. untailored program. A 3-month follow-up showed the rate of continuous 10-week abstinence as being significantly higher for those that had been exposed to the tailored program (22.8%) than to those who used the untailored site (18.1%, p=0.0006) (Strecher et al., 2005).

The consequences of different levels of tailoring were analyzed by Etter (2005) who randomized 11,969 visitors - of which 74% were current smokers and 26% former smokers - between two programs in a quit smoking website (Stop-tabac.ch). The conditions were less versus more tailored programs. The tailoring process was done on the basis of the participants' answers to a questionnaire with 62 items that included smoking status, readiness to quit, history of past quit attempts, level of dependency, among others. The less tailored program had some tailoring based on a shorter questionnaire, whose focus was nicotine dependence. At the end of the questionnaires both conditions produced a printout of similar length – the "counseling letters". A follow-up was done at 2.5 months after enrollment and the number of participants then was 35% of the original study (n=4237). The 7-day ppa showed statistically significant (this is the percentage of participants who answered "no" to the question "Have you smoked at all,

even a puff, in the last n days?" where n is defined in the research design, asked 7 days after starting the intervention); however, it was very modestly higher for the more tailored program condition, compared to the less tailored program condition (10.9% vs. 9.8%). Hence, this study does not corroborate the studies by Schneider et al. (1990) that had showed a more significant impact of tailored smoking cessation programs.

The different conditions in which these studies were conducted limit the ability to generalize the findings: e.g., in the case of the study conducted by Strecher, all participants had bought nicotine patches. This is far from the typical profile of the individual looking for online help to stop smoking. One problem in this type of studies is that not much more than abstinence can be measured at 1, 3 and 6 month periods since enrollment in the program. Longer term assessments would be needed. Technology does not make it any easier to contact the members after a longer period since enrollment: often web-phone mixed contacts, they are made more difficult by participants that may have moved, no longer hold the same email address or other situations (nowadays, spam filters can be an obstacle to make any email contact for research purposes). The benefits of tailored web interventions, and of community features in particular, is still uncertain as far as longer term outcomes are concerned. Another important issue that Strecher's work brings up is the combined effect that evidence-based interventions with the use of the Internet may have. It is possible that individual tailoring combined with pharmacological advice may significantly increase the quit rates.

The studies presented here vary greatly in part because of the diversity of metrics used (e.g.: ITT versus respondent-only analysis of results, different intervals for ppa) and the non randomization of some of the studies. However, there is some evidence in two

areas that are pertinent for my dissertation work: (1) some evidence that tailored (individually personalized) smoking cessation interventions are more effective than the non tailored interventions (Lancaster, 2005; Strecher, 2009) and (2) inconclusive results on the efficacy of interactive Internet assisted interventions over non Internet assisted interventions (Japuntich, 2006; Swan, 2010) and over static sites (Rabius et al., 2008; Graham et al., 2010). The first observation suggests that user-centered design may serve the tailoring of WATIs and underlines the relevance of this work. The second consideration confirms the intriguing results of the American cancer Society randomized study that inspired this dissertation. Furthermore, the fact that the most up-to-date review of WATIs- at the time this dissertation was written- shows no evidence of greater efficacy of web assisted tobacco interventions relatively to non web assisted tobacco interventions suggests that the usability of WATIs may be hindering the tremendous potential of the web in the 2 areas considered important when quitting smoking: information and social support.

2.1.10 The Internet – could the digital divide be a problem?

In the U.S., and as of May 2013, 83% of adults use the Internet, 70% have a high-speed broadband Internet connection at home, and 56% own a smart phone (Zickuhr & Smith, 2013). According to that same survey, conducted between April and May of 2013, the Pew Research Institute found that 73% of Internet users had looked online for health information during the past year. Another important statistical data are the ratio of US citizens wanting to quit smoking – 70% of all smokers – and the number of Americans who successfully quit smoking every year – over 3 million (U.S. Department of Veteran Affairs, 2013).

Although still existing between ethnicity, age, and income groups, the "digital divide" has been steadily narrowing. The annual growth rate in the use of the Internet by individuals in low-income households (< $15,000/yr) was 25% from 1997 to 2001: in 1997, only 9.2% of those individuals used the Internet while in 2001 that used attained 25%. The use among individuals coming from high income households (>$75,000/yr) registered a lower 11% annual growth (44.5% in 1997 to 78.9% in 2001). When considering English-speaking White, Black and Hispanic, the Internet use is lower among Black households but steadily increasing among all groups (Madden, 2003). 52.9% of the rural households use the Internet, when the national average is very close: 63% (Bell et al., 2004). When looking at age groups, younger Americans have a greater use of the Internet but in any case only the age group of over 65 registers a use lower than 60%.

The increasing penetration of the Internet into these segments of the population provides a new channel for reaching typically underserved smokers with effective cessation interventions. Before WATIs, the most effective alternatives were face-to-face, print self-help materials, and telephone counseling. Face-to-face counseling is time and place dependent, and this is problematic with smokers in underserved groups. Self help materials and telephone counseling imply a certain permanence of residency and this too is threated in the case of smokers in underserved or economically challenged groups. Accessing the Internet, which is possible from public libraries, community centers and other organizations that house the underprivileged, may provide a reliable and effective smoking cessation intervention.

The increasing interactivity of modern websites is well suited for the delivery of tobacco treatment services. Previous studies had demonstrated the effectiveness of print-

based tailored self-help materials (Shiffman et al., 2001). Lancaster & Stead (2002) conducted a meta-analysis where they looked at long-term quit rates for tailored and non-tailored print materials and concluded that the weighted ratio is 6.5% for the former against 4% for the latter. Several other previous studies give evidence of the effectiveness of printed self-help tailored materials for behavioral assistance in smoking cessation (Shiffman et al., 2001). In contrast with printed self-help materials, modern websites incorporate a plethora of technologies with the aim of helping the smoker quit. A few examples are smokefree.gov, which allow the smoker to speak online with a counselor while logged in to the site; the ability to talk online with a counselor. The California Smokers' Helpline website offers a blog (NoButts) and allows the smoker to receive regular newsletters from which he/she can always opt-out. Other WATIs support newer interaction modalities such as mobile phone text messaging (Rigotti, 2012).

2.1.11. Reviews of Smoking Cessation Websites

One of the most important studies reviewing websites for smoking cessation presents conclusions that are far from conclusive on whether on-line treatments are effective. This study conducted by Cheh et al. found that content and quality of the 30 websites they reviewed were very diverse (Cheh, Ribisl, & Wildemuth, 2003). Only 33.3% of the sites, for example, explained the side effects of NRT (Nicotine Replacement Therapy). Only 30% explained which smokers should not use NRT. Only 53.3% of the sites had the content written at a level appropriate for a greater than an eighth-grade level. The authors also identify several technical aspects that have direct impact on the overall quality of the websites such as:

- the existence of search mechanism (only 40.0% had it);

- the possibility of accessing a text-only version of the website for accessibility reasons related to vision-impaired clients or clients accessing with slow connections (only 30.0% had text-only versions);
- the indication of when the website was last updated (only 17% had this indication).

Hence, there seems to be a lot of work to be done on usability, credibility, and currency. Jenssen et al. (2009) conducted a content analysis of all Web pages viewed by a random sample of adolescents aiming at describing exposure to tobacco related text and images. They concluded that adolescents are consistently exposed to tobacco content on the Internet, but not only is the volume of exposure limited as not all content is positive about tobacco. A more recent content analysis of smoking related websites focused on the nature of the patient experience and patient led content included on those sites (Mo et al., 2012). This study concluded that only one third of the smoking cessation-related websites retrieved (N=124), included some form of patient experience. Furthermore, most of the sites (returned via the use of searches based on five common smoking search terms) were commercial and about half of the sites containing patient experiences, these consisted of no more than testimonials of clients using a product or service. The authors stress the need of more research specifically addressing smokers' access and trust in the materials contained in smoking related websites. Lastly the only study that, to my knowledge, compared demographic characteristics and posting behavior from two separate eHealth social networks is the study by Mierlo et al. (2012). These researchers focused on the members who assume leadership roles by providing support, advice, and direction to other members in the online community. These were collectively categorized as

superusers for purposes of the study. These researchers concluded that despite vast differences in promotion and group management rules, both WATI attracted superusers with similar characteristics. They suggested that as superusers drive network traffic, organizations promoting or supporting WATI should dedicate resources to encourage the participation of superusers.

2.1.12 Self help and social support in health and well being

The importance of self-help and social support for contemporary debates in social policy is undeniable. Moursund offered an interesting rationale for the relationship between self-help and social support on one hand and social policy on the other when he states that "social institutions that have, in the past, helped stabilize our society . . . appear to be losing influence. … Things seem to move faster and faster, and we look desperately for something to hold onto, something to connect to" (Moursund 1997:54).

Giddens expressed the same ideas when he wrote that "not only is the pace of social change much faster than in any prior system" so is its "scope and ...profoundness" (Giddens 1991:16).

In the medical, sociological and psychological fields in the 1990s, many authors addressed the importance of social support for physical and mental health and well-being (Sarason et al., 1990). Studies in fields such as epidemiology have redefined this theme in a larger broader socio-structural framework that includes looking at the impact of the insecurities (often named "anxieties") that the need for rapid adjustments – which are the result of quick change - may produce (Bartley et al., 1998).

The research agenda of those studying social problems such as poverty and health recognize that certain aspects of psycho-social life, such as sense of control, perceived

social status, the strength of social affiliations, social support, self-esteem, among others may be responsible for specific health outcomes (Elstad 1998; Wilkinson 1996; Wilkinson et al., 1998). This can be more simply worded as: members of the society with a high degree of social participation and/or with good community relations tend to have better physical and mental health.

More recent research has looked at the web of social relationships that surround an individual, as well as the structural characteristics of that web and their impact on health. Social network analysis has enabled researchers to actually measure the degree to which an individual is integrated into a social network (which provides indications of how well the individual is integrated in society). These need not be complex: the number of friends a person has is an indication of how socially embedded that person is.

Cacioppo et al. (2000) observed that loneliness has an impact on quality of sleeping: lonely people sleep less efficiently, take longer to fall asleep, have longer rapid eye movement latency, and awake more frequently during the night than do socially embedded individuals. Still on the topic of loneliness, Baym (2010) finds that anonymity of online social support groups is beneficial to those who are lonely or anxious.

Lewis and Rook (1999) concluded that influencing and regulating social networks was associated with more health-enhancing behavior, but also with greater distress. One other stress study was conducted by Adler et al. (2000), who compared the associations between objective and subjective SES with psychological and physical variables among White women, part off whom subsequently participated in a stress study. The results suggested that at least in samples with a moderately restricted range on SES and health, psychological perceptions of social status may be contributing to the SES-health gradient.

Reis and Judd (2000) observed that affirmative social interactions— that they define as those satisfying the need for autonomy, competence, and relatedness—are related to feeling understood and appreciated.

Some studies have looked at how different levels of social integration at different stages on life can impair individual ability to acquire both social and instrumental skills we need to avoid stress and assume age-appropriate social roles (Musick, M. & Wilson, J., 2003).

Several studies conclude that social isolation increases the relative risk of mortality (Berkman and Kawachi, 2000; Pennix et al., 1997; Seeman et al., 1996).
While there is a growing field in the sociological and medical fields that is concerned with anxiety and isolation as less desirable outcomes of the fast technological change we are undergoing, there is an even greater number of health researchers – and particularly in public health – discussing how this quick change is producing new forms of social support and connection (Baym, 2000; Berkman et al., 2000; Christakis & Fowler, 2008; Salathé et al., 2013).

In sum, increasingly, recent research agendas on the correlation of SES with health and healthy behaviors are looking at variables that were part of earlier research agendas but placing more importance in the social networks surrounding the individual. The conclusions of these studies are encouraging as to the impact on healthy behaviors of individuals embedded in social networks.

These results as well as this apparent 'turn' in the research agendas must have into account the so-called 'publication bias': studies that report positive outcomes of the use of any new technologies may be promoted in detriment of those studies that warn about

their dangers or whose results suggest caution in the generalized adoption of a certain new technological trend. So although there are several studies looking at very recent technological trends and possible uses in health, such as text messaging and mobile devices in general (Chen et al., 2008; Déglise et al., 2012), it remains to be proved – and by this we mean through randomized studies conducted with control groups - whether 'virtual communities' provide the connection and social support, potentially leading to health promotion, as 'real communities' (Rheingold 1993; Wellman and Gulia 1999; Wellman and Rainie, 2013).

Ferguson (1996) noted that in the US the use of computers and especially of Internet-based resources to share experiences and thoughts, to access health and welfare information and even to question/challenge health and welfare experts, was already very well established. Self-help groups have become very familiar to the US society.

Mailing lists, forum discussions, MUDs, texting and messaging, social networks, and other forms of computer mediated communication are being used to provide social support in a variety of health (and welfare) issues. Chen et al. (2008) looked at the impact of telephone and SMS reminders for patients' scheduled visits to a health promotion center. While both showed significant results in efficacy, the SMS reminder was more cost-effective when compared with the telephone reminder. Global Positioning technologies also offer different possibilities in the field of Health. Location and other contextual information (e.g.: the user's calendar) can be used as alerts for nearby opportunities for healthy activities and local resources (Klasnja & Pratt, 2012). Although the areas where trials involving GPS have been the most used are chronic disease management, and monitoring and critical events, personal health information

management - the ability to access health information from anywhere, to have health-related information integrated with daily tools such as the calendar – can also benefit individuals to maintain healthy lifestyles (Klasnja & Pratt, 2012).

Whereas during the 1990s most social support took place in the Usenet news groups, the increasing convergence of different forms of computer-mediated communication allowed by html and other technologies is rapidly changing this landscape. As referred about, GPS and SMS are two examples of newer technologies that reconfiguring the landscape. In general the type of technologies often described as 'persuasive' can have an important impact on the current computer-mediated communication landscape, and specifically in healthcare (Chatterjee & Price, 2009). The use of the so called content management systems along with open source code and content further diversified this scenario as it is increasingly easy to create new content. The advent of Web 2.0, which content was increasing generated by users, and social networks in which all content is generated by users, have eroded the once clear distinction between experts (content producers) and users (consumers). There has been a long discussion about whether what may be called an online aggregate – a group of people more or less organized - can be called a `community'. There has been doubt since the 1990s about whether the traditional concepts of reciprocity, and common duties associated with real communities apply to virtual communities (Postman, 1993; Rheingold, 1993; Turkle, 1996; Mitra, 1997; Sharf, 1997; Watson, 1997; Burrows et al., 2000; Ridings et al., 2002; Rainie & Wellman, 2012). In recent decades many public health scholars have looked at different media and their effect on the essential message of quitting smoking. The emergent "health communication field" puts the spotlight on the

situation of communication. Cassell et al. (1998) discussed the conceptual basis of persuasion to conclude that the Internet has many of the features necessary for persuasive communication and may, to some extent, combine the positive aspects of both interpersonal and mass communication. Finally the broad reach that the Internet shares with other mass media is reason enough for health professionals to explore Internet-based interventions for health behavior change.

However it is the emphasis on interpersonal communication that explains the importance that Internet-based resources have been gaining as principles to promote healthier behaviors. White and Dorman (2001) look at the interpersonal side of Internet-based interventions and point out that there may be communication difficulties due to the lack of visual and aural cues in online support groups when compared to traditional face-to-face communication. These authors stress the opportunity for health educators to reach groups with specific messages – they emphasize that Internet-based support groups are the result of the need that patients have to know more about the health conditions they are dealing with. Several authors have conducted reviews of health-related computer-mediated support groups, linking them to existing theory of social support and computer-mediated communication research. Wright & Bell (2003) exam those networks as weak tie networks, and identifies changes in supportive communication due to characteristics of the Internet. Ackerson & Viswanath (2009) use data from Health Information National Trends Surveys (HINTS) to illustrate the role of social context in interpersonal communication and conclude that addressing the social context may be an important tool for eliminating communication inequalities notably in public health

2.1.13 On Internet-based interventions for smoking cessation

In 1986, Schneider and Tooley explored the benefits of a behavioral intervention for a smoking cessation program using an electronic bulletin board as one of its components (Schneider & Tooley, 1986). As with many other studies in the field, the lack of a control group made interpretation of the outcomes difficult. In 1990, Schneider et al. compared two smoking cessation programs. One included solely behavioral interventions while the other incorporated a discussion group (the Stop Smoking Forum) into the program. Those who had access to the Forum attained higher quit rates. Both these studies represent the majority of the type of studies on web assisted tobacco interventions conducted prior to 2004: lack of a control group limiting the interpretation of results and limited number of websites examined. According to the last Cochrane review (Civljak & al, 2010) on Tobacco interventions the first randomized and quasi-randomized studies on web assisted tobacco interventions started in 2004. To this day. only a small number of studies compared the long-term effects of Internet to a no-Internet or no intervention control and the results of these studies have been mixed. The long-term effect of smoking cessation programs using the Internet has yet to be demonstrated.

In sum:

I looked at previous and current research on virtual communities, digital divide, at early and newer research agendas on socioeconomic status and its impact on health, and at technologies from the 90s to now being used in Internet health-related environments. I looked particularly close at Internet based tobacco interventions, and summarized types of measurements and results.

In my review of the literature Internet based tobacco interventions, the Cochrane review was the most important document. The last updated Cochrane review (Civjlak et al., 2010) underlines that no randomized or quasi-randomized trials involving Internet-based interventions for smoking cessation took place before 2004. The studies conducted so far are relatively limited in nature (e.g.: no analysis of user-generated content of WATIs has been conducted). Although there are published instruments standardizing metrics in this area (e.g.: An, 2008) the lack of standardization of measurements makes it difficult to compare results across studies: as an example, the number of day time point prevalence of abstinence (ppa) varies across studies. Furthermore, the way that non respondents are treated in the follow-up for the calculation of quit rates varies drastically between the ITT (Intention-to-Treat) analysis and the Respondent-only analysis.

Since these and other aspects covered by the review of Internet assisted tobacco interventions are deeply embedded in Health, I focused my take-away for my study in this major conclusion: the benefits of Internet-based interventions for smoking cessation in long-term abstinence are inconclusive, in spite of the increasing investment of commercial, academic and governmental entities alike in their design and deployment. The deep analysis of Internet assisted tobacco interventions is therefore not only legitimate but urgent.

2.2. RESEARCH QUESTIONS

Though web and usability guidelines are known by the teams of designers developing Web Assisted Tobacco Interventions (WATIs), not many address the social media features that are increasingly important in WATIs.

- Are the current web and usability guidelines being used to evaluate WATIs adequate to assess any social media features that may be present?
- In the case of WATIs presenting native social media features or providing integration with existing social media platforms, are those features / integration salient to the user?

Chapter 3: Methodology

3.1. Overview

The focus of this study is to find out whether the existing usability guidelines approved by the HHS are adequate to the case of social media enabled WATIs. Should those guidelines fall short as far as recommendations to designers, this study proposes to identify what other guidelines could be added.

The research object is the WATI, which is intrinsically connected to design, personal experience (the programmers' and the health experts'), and even political agendas (of the entities involved). This it provides a wide range of possibilities for questions, which also helps justify the case study as the elected method, given the complexity of the research object. This researcher investigated the object of the case study in depth, using a variety of data gathering methods to produce evidence that leads to understanding the case and answers the research questions. Are the current web and usability guidelines being used to evaluate WATIs adequate to assess any social media features that may be present?

In the case of WATIs presenting native social media features or providing integration with existing social media platforms, are those features / integration salient to the user?

Study Purpose

This study will contribute to the current research literature on the impact of social media features in WATIs. Furthermore, a set of best practices will be created. I believe they may suggest, to design and expert content teams working with WATIs, that it may be worthwhile to draw from successful practices from other areas - even outside the field

of health - to find ways to maintain users and captivate new ones: in other words, to hold the attention of users and persuade them.

3.2. STUDY IMPORTANCE

Just as telephone counseling and clinical interventions for smoking cessation rely on social support in addition to information, to increase their quit rates, a WATI should also encompass a social dimension to be more effective. Design that is not "design with intent" - strategic design that's intended to influence or result in certain user behavior - may hinder the smoker's experience of that social dimension. I am proposing to conduct a 2-part study on WATIs providing at least two social features. "Social feature" is defined here as a site's attribute whereby users can communicate between each other – horizontally – or vertically with health practitioners / experts – in a 2-way communication mode.

Not many studies have systematically analyzed WATIs that include social features (Bock et al., 2004; Myneni et al., 2012). Furthermore, new regulations imposing bans on some businesses, restructuring areas for smoking and in some cases also in public areas, have reshaped the scenario of smokers' socialization. I want to suggest that along with tobacco regulation and the de-glamorization of the act of smoking, came a stigma that is arguably as important in the case of smoking, as it is in the case of other addictions (notably alcohol).

Overcoming a socially stigmatizing addiction can be facilitated by anonymity of the intervention, given that those in treatment are frequently marginalized from society (Room, 2005). The most well known anonymous groups is Alcoholic Anonymous (AA) where the idea of anonymity was first introduced by Bill Wilson in the Foreword to First

Edition of the book Alcoholics Anonymous. Since then, there has been a tradition of anonymity in recovery circles, that today include groups such as Nicotine Anonymous, Marijuana Anonymous, Gambling Anonymous and Crystal Meth Anonymous, among others. Overall, anonymity protects those in these 12 step fellowships from public scrutiny, they encourage a state of humility in the face of the disease of addiction and discourage political skirmishes around the organizations (Williams, 2013).

Like AA, Nicotine Anonymous (NicA), formed in1985, is an Alcoholic Non-Profit 12 Step Fellowship program offering group support and recovery using the 12 Steps adapted from the former. The objective is to obtain abstinence from nicotine. Several studies list NicA as a fundamental aspect of tobacco cessation programs. For instance, Ziedonis et al. (2007) note that a paradigm shift in necessary in addiction treatment programs to better address tobacco dependence, and among the necessary changes, this research group identifies starting local Nicotine Anonymous groups. There has been a dearth of research on the benefits of NicA for nicotine dependent individuals (Glasser, 2010; Lichtenstein, 1999; Martin et al., 1997; Humphreys, 2004), which may have contributed to its lack of visibility. However, some studies suggest that some heavy smokers are interested in treatments conducive to cessation that include a spiritual dimension (Gonzales et al., 2007).

It is plausible to think that historically, the ideological emphasis on individual egoism as a core problem for alcoholics may have leveraged the importance of anonymity in AA. Specifically, it is formally part of the AA principles in Step 12 of the 12 step fellowship: “Anonymity is the spiritual foundation of all our traditions, ever reminding us to place principles before personalities”.

With the development of other similar anonymous groups for the support of addiction to illegal drugs, there was arguably a parallel, pragmatic and growing need to protect program records against disclosure to, for instance, law enforcement officers. Hence, anonymity was also a vehicle for confidentiality.

Anonymity has also its roots in spirituality. Alcoholic Anonymous (2001) (referred to within the AA groups as the "Big Book") clearly invokes the need to surrender to a higher power with the statement "First of all quit playing God." Acknowledging a power greater than self and substances, is the only way to transformation. Surrendering involves self-transcendence: the addict is no longer the center of the world (Angres, 2008).

The spiritual roots of anonymity that the several 12 step fellowships have inherited from A.A. do not resonate with all addicts. Several nationwide movements exist that stress the importance of personal stories- including first and last names – in reducing shame and stigma, and extend the hope of recovery (Williams, 2013). One such example is Faces & Voices of Recovery, a national advocacy and education nonprofit that was born about a decade ago.

Anonymity can also be a research handicap. Atkins and Hawdon (2010) stressed the absence of randomized studies given the anonymous nature of these recovery groups.

Anonymity is a key attraction of the Internet. Therefore, WATIs and other similar Internet assisted interventions for the treatment of addiction can benefit from this trait of the medium.

It is therefore likely that (anonymous) WATIs will be more and more sought after, as smoking ban/restrictions and regulations proceed (Feil et al., 2003), since people will be looking for more anonymous sources of support and information.

One other advantage of offering these interventions online is a very pragmatic one and relates to scale: for some stages of the quitting process – e.g.: recent quitters – it may be difficult to find offline other smokers in the same situation at the same moment in time. This is easier when the recent smoker is part of a virtual community of smokers where some are at an early stage of quitting. Social cognition models explain how meeting individuals at the same stage of an addictive behavior can be crucial for a successful health behavior change (Armitage, 2000; Nisbet and Gick, 2008; Buonomo and Laticignola, 2013 recent).

For profit smoking cessation sites are more likely to use social features. They are also those that are likely to have the most sophisticated web design & development teams, which are essential to integrate social features in a website. This is true because they have more resources, but the trend indicates that those with the resources to implement the idea now believe social features must be added. A static site can be considered today an old paradigm for web development and an interactive site, namely one offering social features, a newer paradigm.

Restatement of the research questions (further clarification):

- How adequate are the existing parameters of usability in the case of social media enabled WATIs?
- Are the current web and usability guidelines being used to evaluate WATIs adequate to assess any social media features that may be present?

In the case of WATIs presenting native social media features or providing integration with existing social media platforms, are those features and/or integration designed in such a way as to be salient to the user?

3.3. METHOD

3.3.1. Sampling

Stage 1

Two WATIS were selected:

- The American Legacy Foundation - http://www.becomeanex.org/
- Alere (formally "Free & Clear") - http://www.alerewellbeing.com/

3.3.2. Instrumentation

Detailed analysis of the WATI according to instruments detailed below, under "Instruments":

- A revised version of the HHS research-based web and usability guidelines
- A typology for the characterization of WATIs in the context of the social media features they include.

Instruments

These three instruments were used:

- an abridged version of the HHS usability guidelines as a measurement of the sites' usability.
- a matrix reflecting the typology developed for the social media features of WATIs.

- an observation grid developed for the purposes of this study on the conformity to the revised HHS usability guidelines.

Abridged version of HHS usability guidelines

The compilation published by the U.S. Department of Health and Human Services under the title "Research-Based Web Design & Usability Guidelines" (2006) is the official codification of Federal regulations established under the Federal Register Act. With a foreword by Ben Schneiderman, this document combines some of Schneiderman's guidelines with other widely accepted usability recommendations. The second foreword is by Michael O. Leavitt, Secretary of Health and Human Services and underlines the prescriptive importance this document deserves in the medical field. I attended the event when the book was first launched during a MED health international conference in Toronto. The positive reception at the book's launch at this conference underlined its importance.

The long document identified degrees of relative importance and of strength of evidence for each guideline, from 1 to 5 for each parameter independently, with 5 representing maximum importance or maximum strength of evidence. Each guideline was evaluated for importance and for research-based evidence by a team of experts in web usability. The 'Strength of Evidence' ratings were revised for those guidelines where new research was reported. As a whole, 13 usability professionals rated each of the new and revised guidelines, assigning 'Strength of Evidence' ratings based on the amount of evidence-based research, as such:

5 – Strong Research Support

- Cumulative and compelling, supporting research-based evidence

- At least one formal, rigorous study with contextual validity
- No known conflicting research-based findings
- Expert opinion agrees with the research

4 – Moderate Research Support

- Cumulative research-based evidence
- There may or may not be conflicting research-based findings
- Expert opinion
- Tends to agree with the research, and
- A consensus seems to be building

3 – Weak Research Support

- Limited research-based evidence
- Conflicting research-based findings may exist

  and/or

- There is mixed agreement of expert opinions

2 – Strong Expert Opinion Support

- No research-based evidence
- Experts tend to agree, although there may not be a consensus
- Multiple supporting expert opinions in textbooks, style guides, etc.
- Generally accepted as a 'best practice' or reflects 'state of practice'

1 – Weak Expert Opinion Support

- No research-based evidence
- Limited or conflicting expert opinion

The preface stresses how this work of compilation and assigning strength of evidence is a rare demonstration of the direct payoff of research for practice. The 'Relative Importance' and 'Strength of Evidence' scales can therefore be used to prioritize the guidelines to implement.

The U.S. Department of Health and Human Services (HHS) initiated the compilation of Research-Based Web Design & Usability Guidelines in 2000 following a multi-step process. Those steps are detailed below:

Step 1: Creating the Initial Set of Guidelines

HHS drew the initial set of guidelines from existing Web design guidelines and published research articles, as well as from publicly available usability test reports, and from results obtained from in-house usability testing. At the end of step 1, HHS had 500 guidelines.

Step 2: Reviewing the Initial Set of Guidelines

The first team of reviewers was internal to the HHS – all had experience in Web site design, usability engineering, technical communication, software design, computer programming and/or human-computer interaction. This first internal revision led to a reduction of the first set of guidelines to 398.

Step 3: Determining the 'Relative Importance' of Each Guideline

An external team of sixteen reviewers – half web designers and half usability specialists - assigned a rating from 1 to 5 to each guideline, based on the question, 'How important is this guideline to the success of a Web site?' As a result the number of guidelines was reduced to 287.

Step 4: Determining the 'Strength of Evidence' for Each Guideline

For the 'Strength of Evidence' rating, new reviewers were recruited. This last group of eight members was composed by published researchers and peer reviewers, and experienced in experimental design. They developed the set of criteria and assigned a level of strength of evidence to each guideline.

Other steps followed, including finding graphic examples for the guidelines – to make them clearer to the user. The guidelines were not tested per se but the draft layouts of the print version were usability tested to determine the best layout for the information about the guidelines. The final number of guidelines is 209.

3.3.3. The present study

Of the 209 guidelines listed, a smaller set of guidelines was obtained through a series of additional steps, which included the following: rejection of guidelines with levels 1 and 2 of importance and in the subset thus obtained, rejection of guidelines with strength of Evidence 1, 2 or 3. I did this reduction with the aim of making it manageable for a single researcher to conduct the analysis.

Step 1:

Guidelines with levels 1 and 2 of importance were rejected. Since the levels of importance were assigned by the team of sixteen external experts on the basis of a Likert-like importance scale where the anchors are important and very important, this means that those deemed as important, as well those rated 1 scale magniture above important were rejected. Examples of rejections are:

Use of personas – rated as important (weight 1 in the Likert-like scale)

Provide Assistance to Users – rated with weight 2 in the Likert-like scale

Given that all the guidelines in this document were deemed important by the team of designers – or they would not be part of the publication - levels 3 through 5 were included, which means the 3 right most items in the Likert-like scale, 5 being the maximum anchor of 'very important'.

Step 2:

Of the guidelines retained after step 1, only the guidelines with levels 4 or 5 in strength of evidence were considered for, respectively, moderate and strong research support. This set is presented next and it therefore lists the guidelines with degree of importance 3, 4 and 5, which are simultaneously considered as having strong or moderate research support. Guidelines identified as having 'strong research support' – and for the purposes of the document - are those guidelines for which all of these criteria are true:

- Cumulative and compelling, supporting research-based evidence
- At least one formal, rigorous study with contextual validity
- No known conflicting research-based findings
- Expert opinion agrees with the research

Guidelines identified as having 'moderate research support' are those guidelines for which all of these are true:

- Cumulative research-based evidence
- There may or may not be conflicting research-based findings
- Expert opinion
- Tends to agree with the research, and
- A consensus seems to be building

As mentioned, these guidelines have web designers as main target. The guidelines have a prescriptive rather than predictive value, to the extent that they prescribe practice. Given that the objective of this study is to assess how appropriate the current guidelines are to analyze social media enabled WATIs, those guidelines that implied direct contact with the designers of the website were dropped, because the method employed here is to analyze the features of the web site, without necessarily going in to what the designers may have intended. The decision on which guidelines to be dropped was made by the researcher who has expertise in web design and usability guidelines. Two were dropped on the basis of the ambiguity of 'meaning'. All guidelines in area 18, "usability testing," were also dropped no traditional usability testing was performed in this study.

This resulted in the following final list of HHS Research-Based Web Design & Usability Guidelines with importance equal to or greater than 3 and with strength of evidence 4 or 5, and which can be observed and directly assessed from analyzing the website. The number to the left identifies the guideline. The first 2 digits document the general area to which the guideline refers (e.g.: 2 refers to 'optimizing the user experience' and e.g., 14 refers to "graphics, images and multimedia):

1:02 Establish User Requirements

3:03 Do Not Use Color Alone to Convey Information

6:02 Place Important Items Consistently

6:03 Place Important Items at Top Center

15:01 Make Action Sequences Clear

16:01 Organize Information Clearly

16:02 Facilitate Scanning

1:08 Be Easily Found in the ‘Top 30’ references from a major search engine

2:03 Standardize Task Sequences

2:04 Reduce the User’s Workload

2:05 Design For Working Memory Limitations

2:06 Minimize Page Download Time

2:09 Format Information for Reading and Printing

2:10 Provide Feedback when Users Must Wait

5:06 Ensure the Homepage Looks like a Homepage

6:04 Structure for Easy Comparison

6:07 Align Items on a Page

9:03 Use Descriptive Headings Liberally

10:03 Match Link Names with Their Destination Pages

10:05 Repeat Important Links

10:06 Use Text for Links

11:01 Use Black Text on Plain, High-Contrast Backgrounds

11:04 Ensure Visual Consistency

12:01 Order Elements to Maximize User Performance

12:02 Place Important Items at Top of the List

12:03 Format Lists to Ease Scanning

12:04 Display Related Items in Lists

14:01 Use Simple Background Images

14:02 Label Clickable Images

14:03 Ensure that Images Do Not Slow Downloads

14:05 Include Logos

14:06 Graphics Should Not Look like Banner Ads

15:02 Avoid Jargon

15:06 Use Mixed Case with Prose

15:07 Limit the Number of Words and Sentences

16:04 Group Related Elements

18:01 Use an Iterative Design Approach

2:13 Do Not Require Users to Multitask While Reading

6:09 Avoid Scroll Stoppers

6:11 Use Moderate White Space

10:09 Ensure that Embedded Links are Descriptive

11:06 Use Attention-Attracting Features when Appropriate

11:07 Use Familiar Fonts

12:05 Introduce Each List

13:09 Use Radio Buttons for Mutually Exclusive Selections

13:13 Use a Single Data Entry Method

14:10 Include Actual Data with Data Graphics

14:11 Display Monitoring Information Graphically

15:09 Use Active Voice

15:11 Make First Sentences Descriptive

16:07 Display Only Necessary Information

This is also the instrument of observation at the basis of the modified instrument of observation that was used to analyze the selected WATIs. (Refer to Appendix 1.)

Modified HHS Research-Based Web Design & Usability Guidelines:

Of the previous guidelines a number were dropped, when they were too general (example: 12:05 Introduce Each List). To focus more clearly on social media, I created several others, which were added to specifically characterize the social media environment of the WATI.

Kept guidelines from the HHS Research-Based Web Design & Usability Guidelines:

3:03 Do Not Use Color Alone to Convey Information

6:03 Place Important Items at Top Center

15:01 Make Action Sequences Clear

16:01 Organize Information Clearly

16:02 Facilitate Scanning

2:09 Format Information for Reading and Printing

2:10 Provide Feedback when Users Must Wait

6:04 Structure for Easy Comparison

6:07 Align Items on a Page

10:05 Repeat Important Links

10:06 Use Text for Links

11:04 Ensure Visual Consistency

12:01 Order Elements to Maximize User Performance

12:02 Place Important Items at Top of the List

14:01 Use Simple Background Images

14:02 Label Clickable Images

14:05 Include Logos

15:02 Avoid Jargon

15:06 Use Mixed Case with Prose

15:07 Limit the Number of Words and Sentences

66:11 Use Moderate White Space

10:09 Ensure that Embedded Links are Descriptive

11:06 Use Attention-Attracting Features when Appropriate

14:11 Display Monitoring Information Graphically

15:09 Use Active Voice

Next, I indicate the added guidelines for the current study, with the purpose of focusing on features that are exclusively related to social media. These guidelines were based on my experience with platforms that include social media features, and across multiple areas. They are based on recent literature on usability of social media, notably the RICE concept of 4 social usability principles (Giacoma, 2010; Casali, 2013) the Social User Experience (Social UX) by the Nielsen and Norman Group (Estes et al., 2009), and the CDC series of social media guidelines and best practices (Centers for Disease Control and Prevention, 2009a, 2009b, 2009c, 2009d, 2009e). They are:

- Use Attention-Attracting Features to signal social media features
- Include integration with widely accepted social media platforms (e.g. Facebook, Twitter).

- Include at least one type of real-time communication channel: this can be a Skype ID for the institution or an actual chat room feature.
- Include at least one social media feature that is monitored by someone of the community (not a health professional / practitioner for a more horizontal communication flow that gives voice to peer monitoring)
- Include at least one social media feature that is monitored by a health professional / practitioner (vertical communication flow).

The next paragraphs summarize how the mentioned authors and teams shaped the instrument developed.

Social Usability (RICE).

Four properties - Relations, Identity, Communication and Emergence of groups define the RICE framework (Giacoma, 2010; Casali, 2013) in which:

The principle of relations relates to the ease with which one finds and connects with others. It also pertains to the ease of sustaining those connections and their relevance.

The identity principle relates to the level of expression of personal identity – to what level are passions or personal distinctive traits expressed. It also refers to the level of detail of privacy management.

The principle of communication refers to the speed with which a message (1-to-1, 1-to-some, 1-to-many) reaches the other(s), and the efficiency of that communication.

The principle of Emergence of Groups ties in with the ease of group creation, aggregation and discussion around a common interest. It also related to the sustainability

and the level of activity of the groups, as well as to the degree of importance of membership.

Social User Experience - NNG

Social User Experience (or Social UX) is a term that amplifies the concept of user experience (UX) to the social realm. This term seems to have been first coined by Donald Norman in a personal email to Peter Merholz, which the latter transcribes in a 1998 interview (Merholz, 2008). The Nielsen Norman Group – which includes Jakob Nielsen and Donald Norman - is among those who advocate for the need for social UX design when social channels (social networks or social outlets of any sort) are present. They have published extensive guidelines on social usability (Estes et al., 2009) making use of screenshots to illustrate said guidelines.

Extension to social media of Research-based web design & usability Guidelines - CDC

Since the publication of the Research-based web design & usability Guidelines, the CDC has developed a number of toolkits with critical information on lessons learned, best practices, as well as on clearance and security information (Centers for Disease Control and Prevention, 2009a, 2009b, 2009c, 2009d, 2009e). Guidelines and best practices are available on separate brief PDF documents, one per social media tool: YouTube and Online Video, Facebook, Twitter, Button and Badge, Text messaging and Health e-cards. Health e-cards are communication tools that encourage healthy behavior by communicating programs, products, and information to individuals.

Revision and adaptation:

Of the 4 principles (RICE) of social usability, I selected those that I would be able to tie to each of the WATIS analyzed, simply by exploring and interacting with it: Relations and Identity. The efficiency of communication would require a different type of study, as would the emergence of groups, as these require some longitudinal follow-up of content and of groups formed. Even in these cases, however, an analysis with no formal user testing may reveal design strategies and / or caveats as to the efficacy of exchange and the ease of members' aggregation and the continuity of groups formed.

The Nielsen Norman group (NNG) published a 211 page report with 109 design guidelines supplemented with 208 screenshot illustrations. (Estes et al., 2009). As opposed to the RICE principles, these guidelines are practical, and targeted at grabbing users' attention with high-impact messages and user-centered strategies. These messages and strategies have a corporate basis: the authors abstracted tips for strategies and messages from 22 companies. The NNG work influenced me in the type of in-depth analysis I conducted, which displays many screenshots.

Finally, the CDC expansion on the research-based web design and Usability Guidelines has less of a corporate focus than NNG's social usability guidelines. Their primary target audience is the in-house IT CDC staff. As opposed to the research-based web design and Usability Guidelines, the guidelines and best practices for social media are fragmented across a number of online documents. There is one social media toolkit that incorporates the social media tools covered by the guidelines and best practices though not in great depth.

In sum, the social usability guidelines as proposed by the NNG and by the CDC - on their multiple guidelines and best practices across a number of social media outlets –

seemed to not completely respond to the needs of designers of WATIs. While the NNG's guidelines were based on an exclusively corporate set of case studies, the current CDC guidelines primarily serve the "in-house" teams of programmers and designers.

With these caveats in mind, I created the matrix included above, covering social usability aspects along those RICE principles that I think can be identified – Relations and Identity. Armed with this matrix as observation grid, I conducted a in –depth analysis where I include many screenshots that illustrate successes in some cases and diagnose problems in others, following a format very close to the work by NNG. In the way I described the social media features, I address WATIs designers' and programmers' teams of future WATIs as my target audience.

3.3.4. Sampling design and procedures

The units of analysis are the two following WATIs:

- The American Legacy Foundation - http://www.becomeanex.org/
- Alere (formally "Free & Clear") - http://www.alerewellbeing.com/

The American Legacy Foundation (ALF) is the only WATI funded by the federal government. Specifically, ALF is supported through the money resulting from the Tobacco Master Settlement Agreement (MSA), which was entered in 1998. It is an independent public health charitable organization created in 1999, with the funding that resulted from the lawsuit that forty-six states, the District of Columbia and five U.S. territories filed against the major tobacco companies. The MSA stipulated that a portion of the recovery (the proceeds being more than $200 billion over 25 years) be used to fund the ALF.

Alere is a for profit organization. It is funded by contracts to provide service to the State governments and corporations. Serving 27 States, Alere is by far the largest single provider of service. The residents of the States and employees of corporations with a contract with Alere, have free access to the service.

There are a variety of ways to select websites for a study like this, from simple – such as having experts make a list based on their best judgment - to more complex, such as using advanced software to select sites based on an array of social media features, for example. In the case of this study the aim is to understand how adequate a number of widely accepted principles of interface design are for websites promoting behavioral change.

Specifically, I am interested in those sites offering a combination of information and social support via social media. The process involves defining the feature that the researcher wants represented within the sites. This is what I tried, by developing a typology for the social media features of WATIs drawing from scholarship in social usability (Giacoma, 2010; Casali, 2013), social user experience (Estes et al., 2009) and a social media extension of the HHS usability guidelines (CDC, 2009a, 2009b, 2009c, 2009d and 2009e).

3.3.5. Ensuring construct validity, internal validity, external validity, and reliability.

From the research tools available, I carefully selected, to study this single real-life case, a set that increases the validity of the study. Careful judgment at the point of selection helped build limits around the case. To strengthen the case study and increase its validity, I am proposing to use multiple sources and techniques in the data gathering

process. Data gathered will be largely qualitative, and consist of fine or close analysis of a website.

Construct validity: The issues being studied refer to the visibility of design features leveraging delivery of information and social support. The measures chosen for this case study are, therefore, rooted in design concepts, with a specific focus on social media features enabling social support.

Internal validity: Multiple pieces of evidence in the form of design guidelines published by credible sources (e.g.: HHS usability guidelines) will be gathered from multiple sources to establish a chain of evidence and, consequently, a causal relationship between the terms expressed in the research questions and the explanations provided.

External validity: Within-case examination and literature review will help me ensure that a change of geographic area and people will still yield the same findings, thus enabling the findings to be generalizable and, hence, the study's external validity.

Reliability: The design will include proper documentation of procedures in order to ensure stability and accuracy of measurement and in turn, reliability: once the procedures are repeated they should lead to the same results.

3.3.6. Location or setting in which the study takes place

The study will take place online. I was located in Houston during the field study, which proved helpful as Rice University, the Houston Medical Center and the University of Texas School of Public Health at Houston, have resources and organize seminars that I accessed and attended for the purpose of this study.

3.3.7. Feasibility of the proposed study

Part 1

An alternative to seeking experts' recommendations would be the use of search and metasearch engines to find the most used tobacco cessation websites. I worked on the premise that the WATIs with the most social features were those developed by the most resourceful companies or in other words, by for profits. I anticipated less interest in supporting research work on the part of a for profit (.com, in terms of type of domain) than on the part of a governmental (.gov), academic (.edu) or non profit (.org) site.

Part 2

Opting for a case study as qualitative research method often deserves critical voices that see this particular research design as the exploratory phase of a multistage study or that are simply skeptical about how generalizable the outcome may be. To the researcher Robert K. Yin, the case study research method is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, in which multiple sources of evidence are used and when the boundaries between phenomenon and context are not clearly evident (Yin, 1984, p. 23). To advocate for this type of research design I note that the objective is to emphasize detailed contextual analysis of a contemporary real-life situation – a WATI and its impact on smokers who use it - and provide best practices that may be insightful for the extension of methods to other cases.

Chapter 4: Results

In order to analyze the two tobacco-cessation WATIs that I am examining, I created a scoring system, based on the criteria described above, and scored the sites. Table 1 displays the scores that the sites used in this study attained for the modified HHS Research-Based Web Design & Usability Guidelines. I describe below how I computed those scores.

4.1. Observation grid and type of scoring

I first used yes or no for my observation grid but realized it was too restrictive for situations where a feature is present or a predictive guideline seems to have been followed but not completely, or not to its full extent. So I created a broader range of possibilities: correspond to 1 – absent, 2 -- very poorly used or used with minimal impact – and 3 – used with maximum impact. An example that shows the need for this is '26. Include integration with widely accepted social media platform' (this guideline was not part of the HHS Research-Based Web Design & Usability Guidelines): while BecomeAnEx.org does contain two different types of links to Facebook, they can be confusing to the user. The one on the main content area of site connects to a 'share on Facebook' page while the second on the footer area connects to the actual Facebook page for this service. There is no distinction in icon size, color or any clarifying accompanying text distinguishing the two types of buttons. As a result, BecomeAnEx.org scored 2 for this guideline for a feature that was present but poorly used.

When I was not able to abstract whether the guideline has been observed – such as in the case of 'Provide Feedback when Users Must Wait', n.a. (not applicable) was used. For this reason, n.a. was used under this guideline, for both BecomeAnEx.org and

alerewellbeing.org as my observation did not disclose any situation where the user needed to wait for feedback.

	BecomeAnEx.org	alerewellbeing.com
Place Important Items at Top Center	2	3
Make Action Sequences Clear	2	3
Organize Information Clearly	3	3
Facilitate Scanning	2	3
Format Information for Reading and Printing	1	3
Provide Feedback when Users Must Wait	n.a.	n.a.
Structure for Easy Comparison	2	2
Align Items on a Page	3	3
Repeat Important Links	3	3
Use Text for Links	2	3
Ensure Visual Consistency	3	3

Table 1 – Abridged version of the HHS Research-Based Web Design & Usability Guidelines with only the guidelines that were kept for the instrument of observation designed for the current study.

Scores:

1 – absent, very poorly used feature or feature used with minimal impact;

2 - poorly used feature;

3 – feature used with maximum impact.

n.a. – not applicable

Order Elements to Maximize User Performance	2	3
Place Important Items at Top of the List	3	3
Use Simple Background Images	3	3
Label Clickable Images	2	3
Include Logos	3	3
Avoid Jargon	2	3
Limit the Number of Words and Sentences	2	3
Use Moderate White Space	2	3
Use Attention-Attracting Features when Appropriate	3	3
Display Monitoring Information Graphically	1	3
Use Active Voice	3	3
Include aural information	1	3
Include video information	1	2
Use Attention-Attracting Features to signal social media features	2	3
Include integration with widely accepted social media platforms	2	3
Include at least one type of real-time communication channel	1	2
Include at least one social media feature that is monitored by someone of the community	1	3
Include at least one social media feature that is monitored by a health professional / practitioner.	3	3

Table 1, cont.

Legend:

	HHS Research-Based Web Design & Usability Guidelines
	Added non social media features (Modified HHS Research-Based Web Design & Usability Guidelines)
	Added social media features on the Modified HHS Research-Based Web Design & Usability Guidelines

Table 1, cont.

4.2. IN-DEPTH ANALYSIS

4.2.1. BecomeAnEx.org

4.2.1.1. Home Page

Above the fold

'Above the fold' is an expression borrowed from print: for on-screen information, it generally means what is readily visible to the user towards the top of the page with no need for scrolling. Initially, it referred to the most popular monitor resolution but with the variety of devices and resolutions available today, it increasingly needs to be described in relation to a specific screen resolution.

On a 1920 x 1080 resolution monitor, Figure 1 shows what the user sees 'above the fold'.

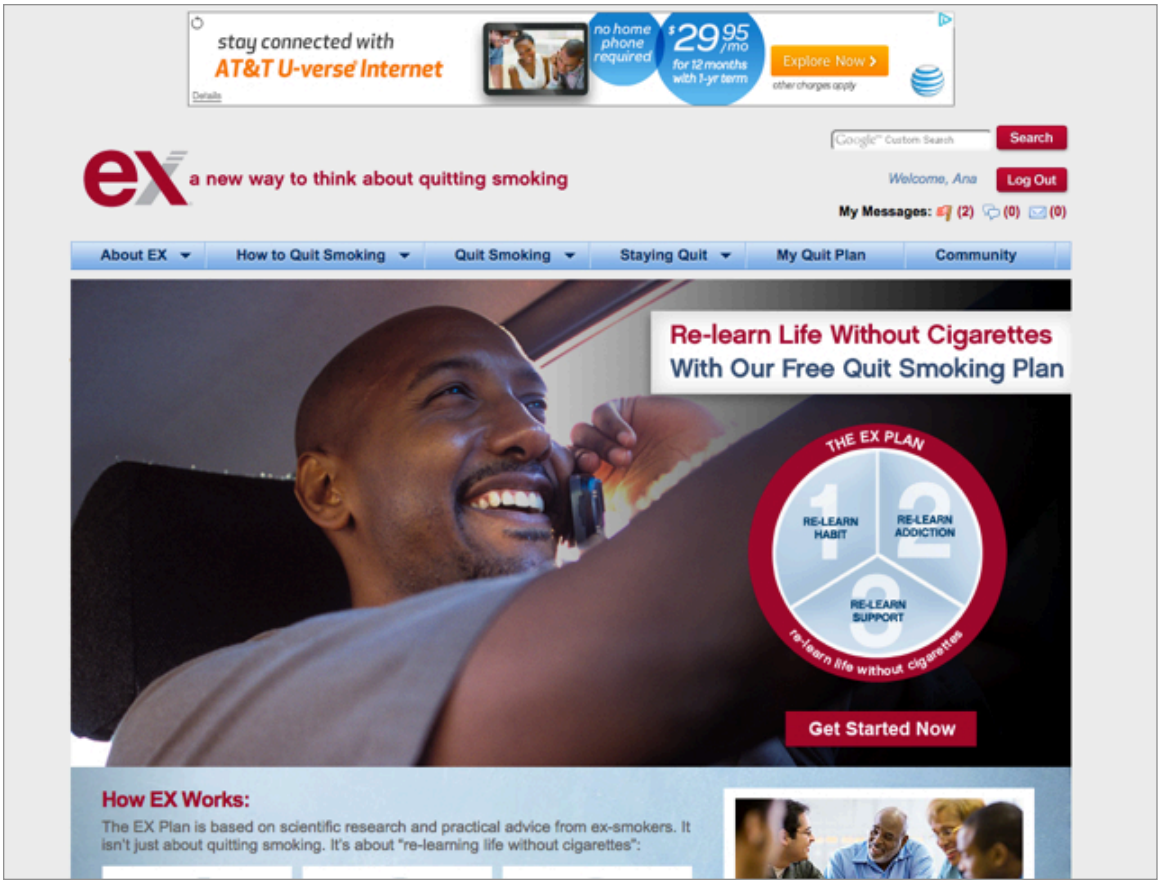

Figure 1: BecomeAnEx.org - visible elements above the fold

From top to bottom and from left to right (our natural way to read information in the Western world):

- Banner area for ads
- BecomeAnEx.org logo and motto
- Large image – this rotates among 3: (1) African American driving (Fig. 1), (2) 2 women in the 40 – 50 year range, cheering with glasses of beer, and (3) a woman in the 25 – 30 age range (this image is the one chosen for the Facebook page banner).

- Circle with the 3 steps to quit smoking
- Large button: “Get started Now”

Above the fold, a smaller image of a group of men can still be seen- multiple ethnicities, age range 30 – 50.

Below the fold

Figure 2: BecomeAnEx.org - visible elements below the fold

The steps of the ex plan are represented by 3 clickable areas -1, 2 and 3 – grouped under the title 'How Ex works' and followed by a graphic button: "Register for your free Ex Plan"

With the same level of importance (same font size), to the right the button "Visit community" underlines the small photo of men referred above.

Under this area, four buttons are displayed side to side with the same relative importance as far as occupied area and font size. They are:

- Tell A Friend About EX
- Not Ready to Register Yet?
- Visit The Community
- Get Your Free EX Plan

Below this area, there is a navigation menu between the logo (repeated) and 2 buttons connecting to popular social media platforms: Facebook and Twitter. This layout gives users two separate areas in which to access social features. In both areas, social features are given equal prominence in terms of type face and design with other features.

4.2.1.2. Media integration

The site is not particularly rich in still imagery throughout. There is an important pool of videos, though, all by experts and in formal / lecture settings and formats. No video has a personal story format, which I have seen in other platforms dealing with addictive behaviors.

Figure 3: The typical institutional format of videos on the site.

4.2.1.3. Social media features

	BecomeAnEx.org	Alerewellbeing .com
Integration with existing social media platforms		
Social Media Profile Sites	3	3
Microblogging	3	3
Smart Phones, Tablets & Notebooks	3	3
Voice Internet Protocol communication	1	1
News Categorizing, Sharing and Syndication	1	3
Visual Media Sharing	1	1
Native social media features		
Chat rooms	1	1
Proxies for online presence	1	1
Photo and video sharing	1	1
Forums	3	1
Profile pages	3	1
Blogs	3	2
Email	3	2

Table 2 – Social media features in BecomeAnEx.org and Alerewellbeing.com.

Native social media features

The Community section is a set of native social media features. Upon registration, the user is prompted with a 'Welcome to the Community!' prompt that, though too long for quick scanning and reading – guides her through the next steps to start becoming an active member in the community.

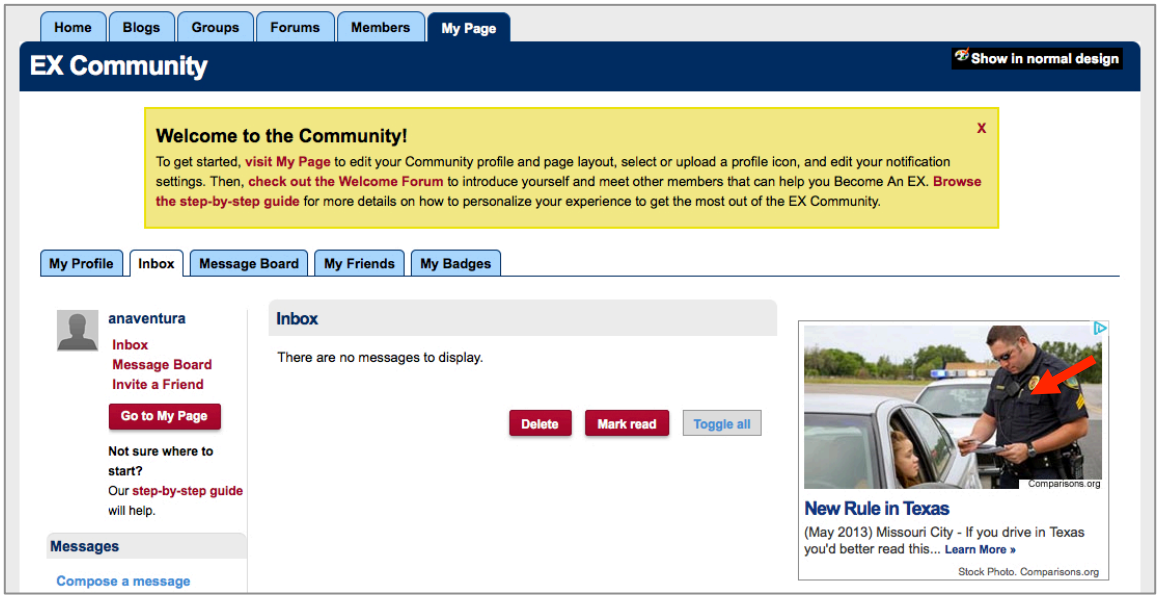

Figure 4: Welcome message upon registration and guiding steps for active participation in the community.

The forum feature is diverse and extensive with an archive and some good strategies – such as showing in the 1st place the 'Welcome! Please Introduce yourself' topic for newcomers. Questions and answers can be seen by anyone, even prior to registering. This can be interesting because it may motivate users in doubt to register; on the other hand, registered members may feel uncomfortable posting (and adding a photo to the personal profile) when anyone (member or non-member) has access to all the forum posts. Profiles can be interpreted as 'personal fronts' borrowing Goffman's terms (1990) and as such, profile photos are the visual information of those fronts. Systems with profiles showing personal photos leverage the motivation to log into the system (to see photos of other members), and to upload personal photos to the individual profile

(Kapoor et al., 2005; Meyer and Dibbern, 2012).

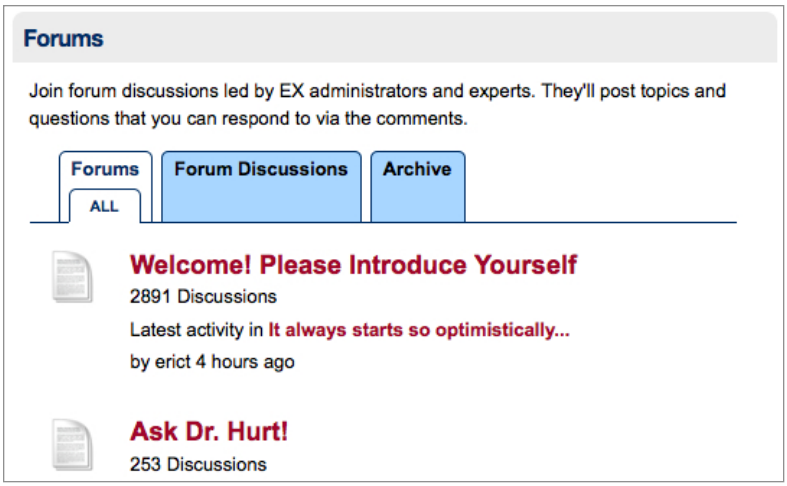

Figure 5: The Forum feature suggesting a first step of self-introduction.

Badges

Badges are one the features of the native social media environment of BecomeAnEx.org and uncommon in the WATIs that I have experienced. One sentence explanation of what badges are and how they work. Badges in online environments were made very popular by place-based platforms such as Foursquare. In the case of BecomeAnEx.org, the simple fact of adhering to the site grants the 'Ex badge'.

Figure 6: Example of a badge, earned upon commitment to quit by setting a target quit date.

The notice that the user earned a badge is her confirmation that the membership has been processed. It is sent to the email address used in the registration process.

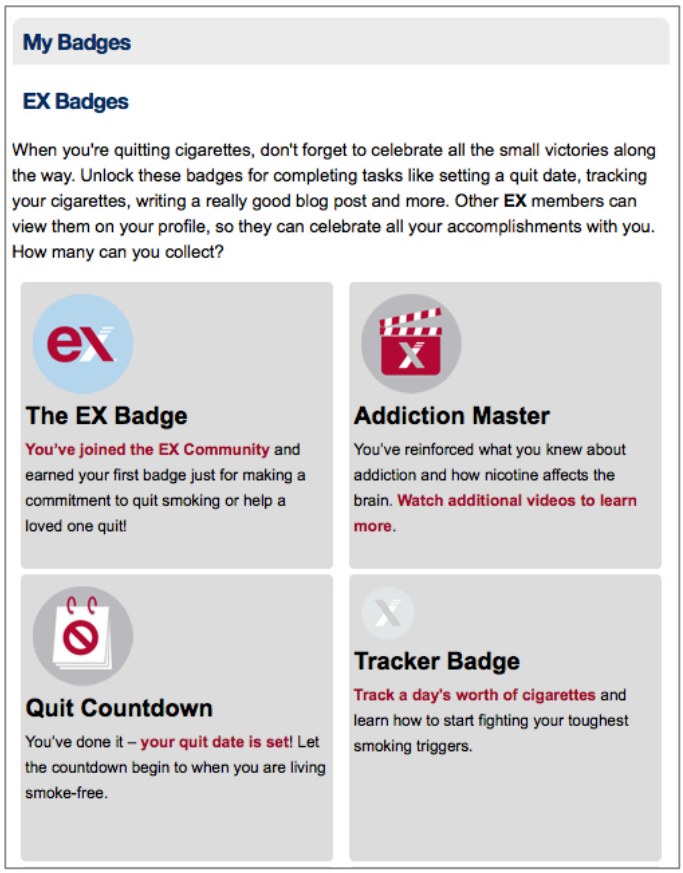

Figure 7: All the types of badges: EX, Addiction Master, Quit Countdown and Tracker.

Profile page

The Profile page is quite complete. It includes the possibility of creating a blog. As novel features in WATIs, the badges are prominently featured

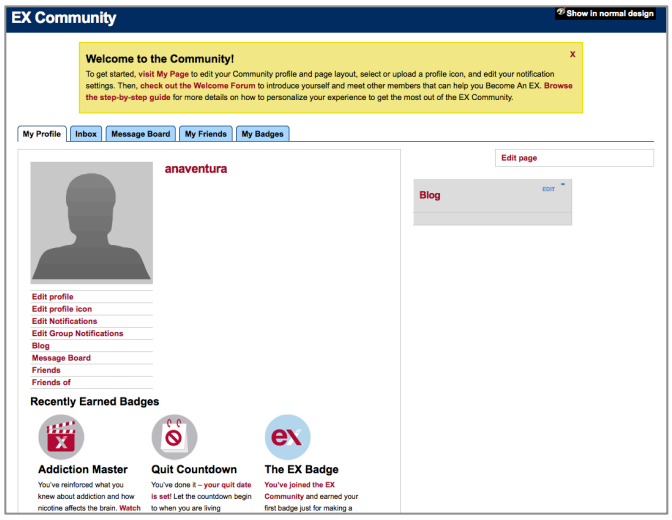

Figure 8: The profile shows the badges earned.

Integration of popular social media platforms within the native social media features

Mobile technology

Upon registration, the user can choose to have text messages sent to her mobile phone. Say more/expand, are the text messages similar to other forms of interaction, how does the depth of info compare?

Figure 9: Communication from BecomeAnEx.org can be texted if a cell phone number is provided.

Facebook

Link to Facebook page

As referred above, the image of the Facebook page is one of the rotating images on the home page. The Facebook has a standard look (minimum customization with no apps or use of third parties for personalization of sections).

Figure 10: BecomeAnEx.org Facebook page to which the user has access on the BecomeAnEx.org WATI, through one of the rotating images on the home page.

Content sharing to Facebook, Twitter and Google+

Any post can be shared via Facebook, Twitter and Google+ or be emailed to specific people outside the community.

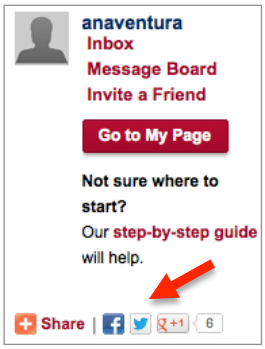

Figure 11: Under the 'Profile', the Facebook, Twitter, Google + indicate the opportunities to share content with widely accepted social media platforms.

4.2.1.4. Other design decisions

Personalization of environment

The Ex Community title bar presents a 'Show personalized design!' that toggles with a 'Show in normal design'. The exclamation point is arguably intended to draw the user to try the personalized design.

Figure 12: The user can choose between visualizing the site in normal design (selected by default) and personalized design.

However, once the user selects the personalized design option, the interface is not particularly inviting with colors shown as hexadecimal codes and no 'preview' option – just a save once, all colors have been selected for all the configurable elements.

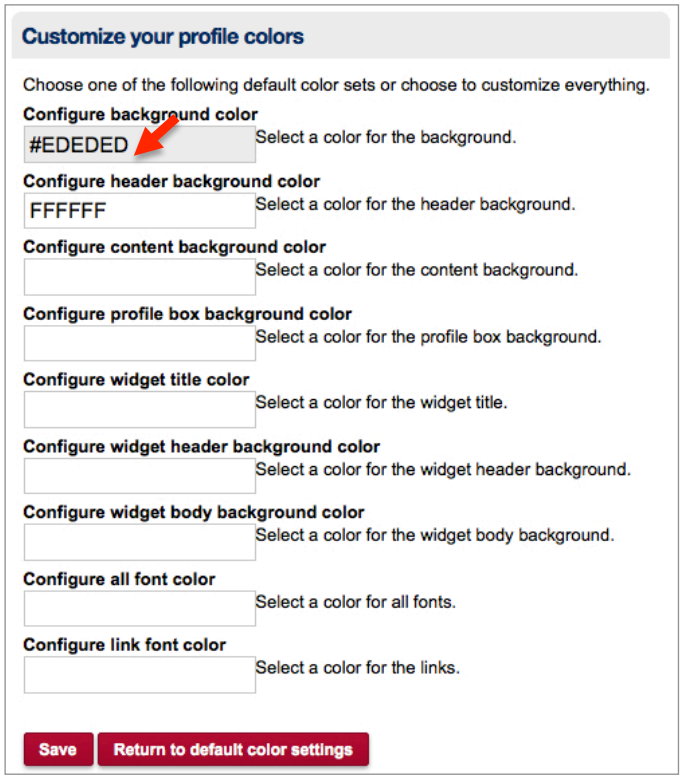

Figure 13: The colors for customization are indicated as hexadecimal codes.

4.2.1.5. Reasons for concern, insufficient maintenance and other problems:

After 15 minutes of being logged in, a server down message was displayed on the screen. It could have been coincidence but it can also be an indicator of poor site maintenance.

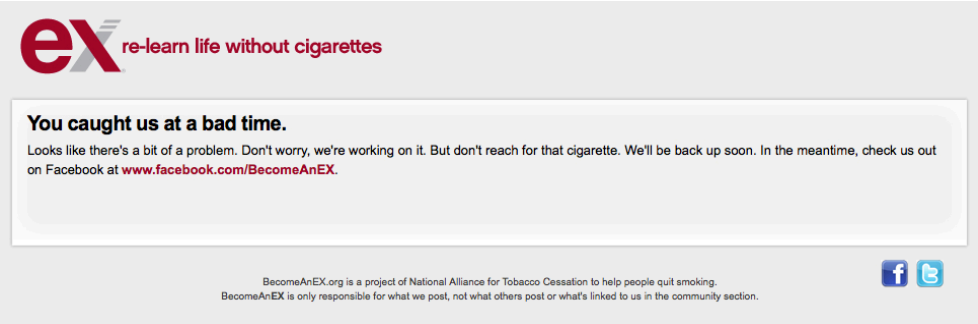

Figure 14: The server was down 15 minutes into the first exploration of the site.

There was an inconsistency between number of messages in my mailbox – from the simple fact of registering (2) – and the number of messages in the inbox (0). This leads me to believe that some emails, such as acknowledgement of registration and first badge, sent to my email address, are reflected in the number of messages in the native email system but do not show up in the native inbox. This can be confusing.

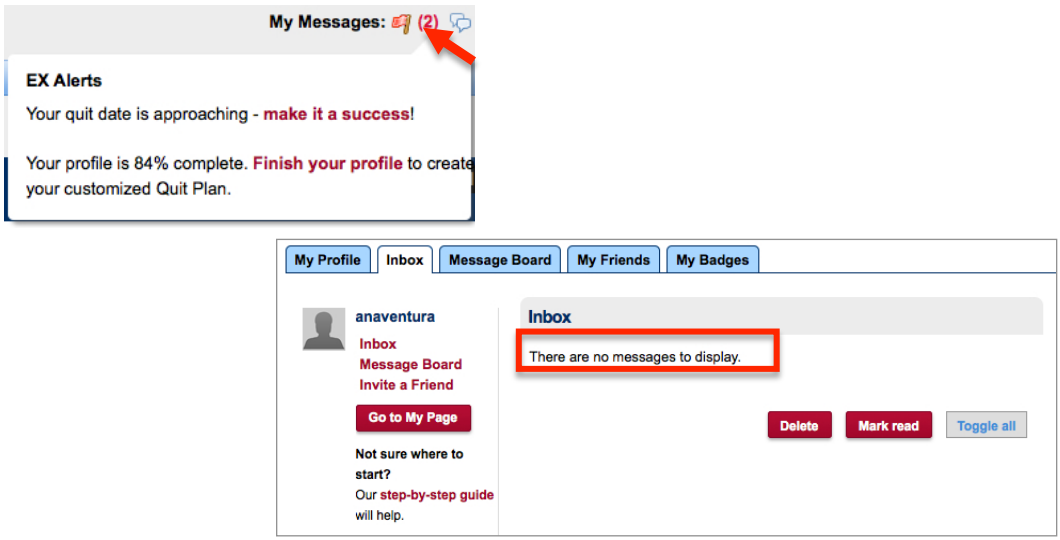

Figure 15: Inconsistency between number of emails in my regular email mailbox and the WATI's inbox.

One post by one of the members raised concerns. The posting date showed 1969. This likely means that the clock in the sender's email was not accurate but it is possible to correct that date in the system hosting the native system – in this case, a forum. The problem is not so much one of lack of accuracy but of mistrust on the part of members reading the post. Explain why>

Figure 16: Possible problem with a user's system date displays a 1969 message. This type of unsupervised errors can impact trust and system's reputation.

Arguably, the most important feature of the site is to set up a quit plan and most importantly, as research shows (Fiore et al., 2008), to set a quit date. However, the layout of the page led me to, equivocally, select the box next to "set Quit Date'. The system was unresponsive and it took me a while to realize that I should instead select the 'calendar' icon; and that once I set up my date, a checkmark would automatically appear in the check box I was trying to select. A secondary problem is that the 'calendar' icon is not the widely adopted 'calendar' icon that the user may be used to from booking a flight and other online services requiring date selection. It looks more like a 'memo' icon.

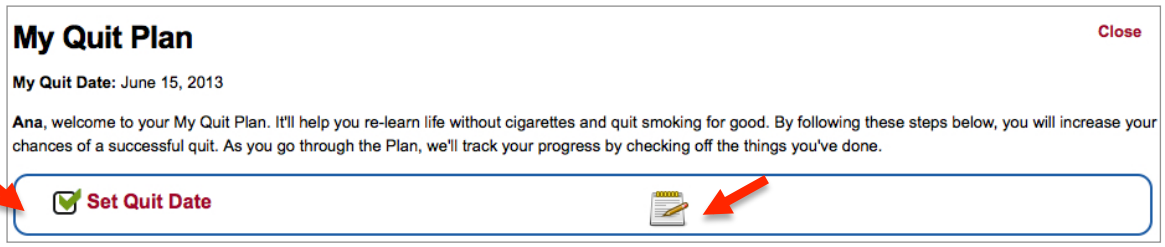

Figure 17: The feature for setting a quit date has difficult navigation.

Some studies show that setting up a quit date is one of the first steps in a successful quit plan (Fiore et at, 2008). Others suggest that there may be no impact . Quit programs are built under a number of assumptions. Any quitting program is, as the term 'program' implies, based on a concerted set of assumptions. If a quit date is one of the assumptions (as it is the case of BecomeAnEx.org), the inability to setup that quit date for design reasons – because the user mistakes the inability to click the checkmark as a system bug or because she does not recognize the calendar icon – may largely compromise the purpose of the site.

There is no registration required to see all the forum posts – including answers by non-team members and their photos. This indicates a very open community, but users may be hesitating to adhere to the community. Maybe they might have privacy concerns and opt for not registering, upon realizing that maybe any content is visible to people outside the community as group membership seems to impact level of participation in an online community (Rodgers & Chen, 2005). There could be a reverse factor – participation positively impacting the duration of membership if the user decides to register (Nimrod, 2012) but it is not clear whether and how non membership impacts participation.

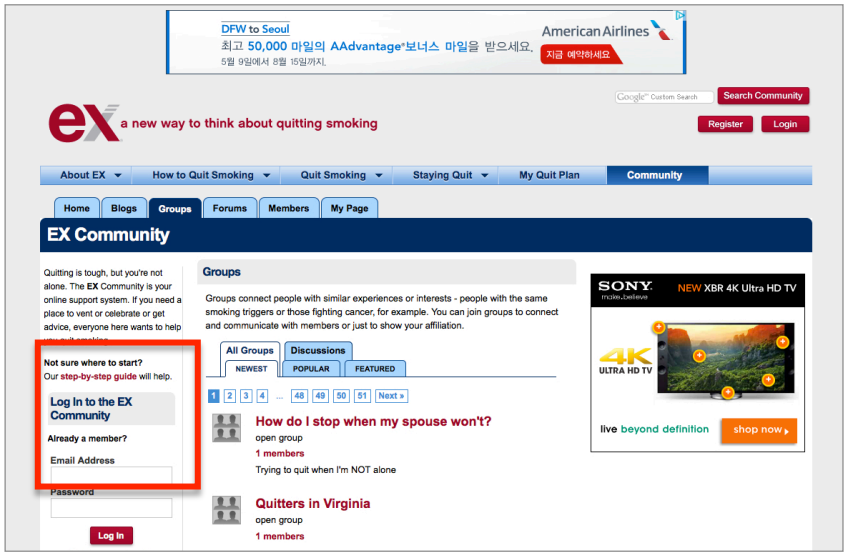

Figure 18: The ‘Groups’ section

4.2.2. AlereWellBeing.com

4.2.1.1. Home Page

Above the fold

On a 1920 x 1080 resolution monitor, figure 19 shows what the user sees 'above the fold'.

Figure 19: AlereWellBeing.com - visible elements above the fold

From top to bottom and from left to right (the natural way of reading in the Western world):

- Program's logo (I used the Texas gateway for the AlereWellBeing.com)
- "Welcome"
- On screen menu for text size
- Top menu
- Indication that quit date has not been set yet (in the case when it has not)
- Quit status (selected from a drop-down menu with two options)
- Large image placeholder – this rotates among 10: (1) Welcome video, (2) Tobacco Tracker (3) Set a Quit Date (4) The 5 Keys to quitting, (5) Quitting Plan versus Cold Turkey, (6) Nicotine Gum, (7) The Quit Guide, (8) Asking a Co-worker for Help, (9) How and Why to Pick a Quit Date and (10) Nicotine Inhaler. All of these have links to more information just under the title and to the left of the image: these links are to video (2 cases), an e-lesson (1 case), a website embedded tool (1 case, the tool being the "Tobacco tracker"), a guide in PDF format (1 case) and articles (6 cases).

To the right of the images placeholder area, there is what I will call the status panel, entitled your Quitting Plan, with a Quit Date, Medication, Urges, Environment and Support, all to be automatically filled as the user advances on the program.

Just under the images placeholder, there are the Recommended content and the Additional Resources, with smaller images, brief introductory text and access to more information: e-lessons, articles and referral section.

To the right of this area, thee is an input area for the number of cigarettes smoked 'today' and an output area for the Money spent on cigarettes since the start of the program. A link suggests the comparison between cost of cigarettes and cost of Quit medication.

No content on the main area: arguably this can be space reserved for longer content for the sections " recommended content" and "additional resources" or just for clarity of better readability. Just above the fold, the headers "Your Community" and "Success Stories" are barely visible: headers only.

To the right, "Contact a coach" is, with the links to email and start chat still visible above the fold.

Below the fold

Below the fold there are two main areas of content:

- The content relative to the headers "Your Community" and "Success Stories"
- The bottom menu

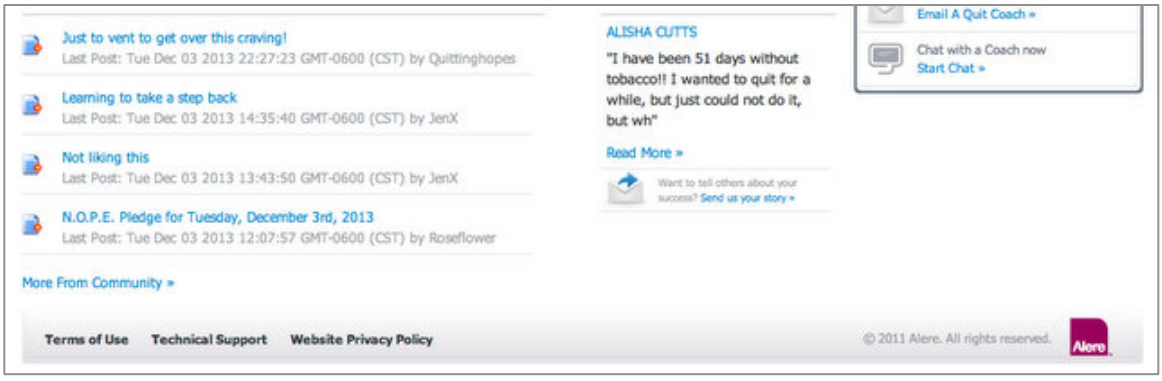

Figure 20: AlereWellBeing.com - visible elements below the fold

4.2.1.2. Media integration

The site is rich in still imagery and has a considerable number of videos throughout. It also links to a number of e-lessons – modules that have a unity of its own with embedded images and videos.

Figure 21: Example of an e-lesson with plenty of media content.

Regarding the videos that are not part of the e-lessons but rather readily available from the navigation, unlike BecomeAnEx.org, some have a personal format. However, this personal format is enacted by actors and in what are clearly staged settings (Fig. 22). The personal story format, having as source a real user (smoker) is well noticeable in the 'Success Stories' section (accessible from the home page). This will be discussed at a later point.

Figure 22: The typical actor-based / staged style of videos on the site.

4.2.1.3. Social media features

	BecomeAnEx.org	AlereWellBeing.com
Integration with existing social media platforms		
Social Media Profile Sites	3	3
Microblogging	3	3
Smart Phones, Tablets & Notebooks	3	3
Voice Internet Protocol communication	1	1
News Categorizing, Sharing and Syndication	1	3
Visual Media Sharing	1	1
Native social media features		
Chat rooms	1	1
Proxies for online presence	1	1
Photo and video sharing	1	1
Forums	3	1
Profile pages	3	1
Blogs	3	2
Email	3	2

Table 3 – Level of integration with existing social media platforms for BecomeAnEx.org and Alerewellbeing.com.

Native social media features

The Community section is a set of native social media features. Unlike BecomeAnEx.org, registration, does not prompt any 'welcome' message. Rather, there is on screen information on privacy in the 'Community' section. Also, rather than a guide through the steps to become an active member – like in the case of BecomeAnEx.org – AlereWellBeing.com displays a menu with the 3 available options: forums, blogs and groups. The menu includes a 'My Community' section that displays the posts on forums, as well as any activity in Blogs or Groups. The user's 'Profile' is not under this menu but rather on a different area of the screen (top right).

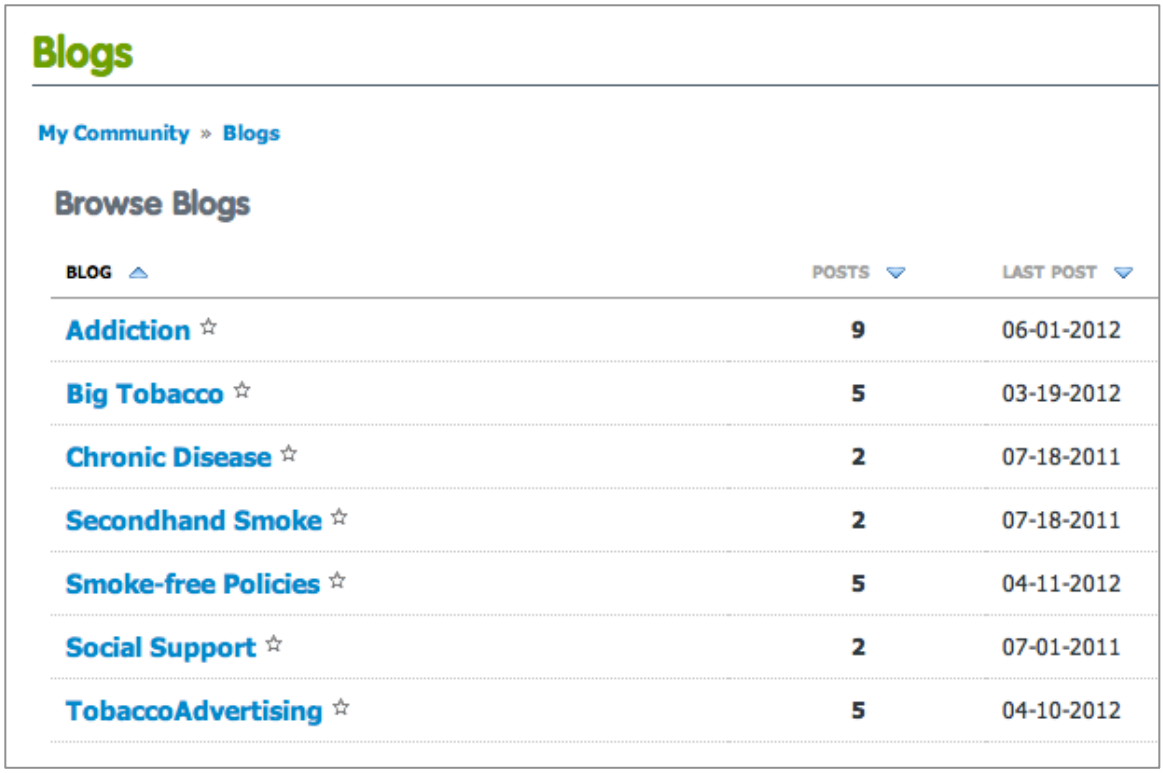

Figure 23: The blogs do not have the same visual identity as the blogs that users are likely to be familiar with.

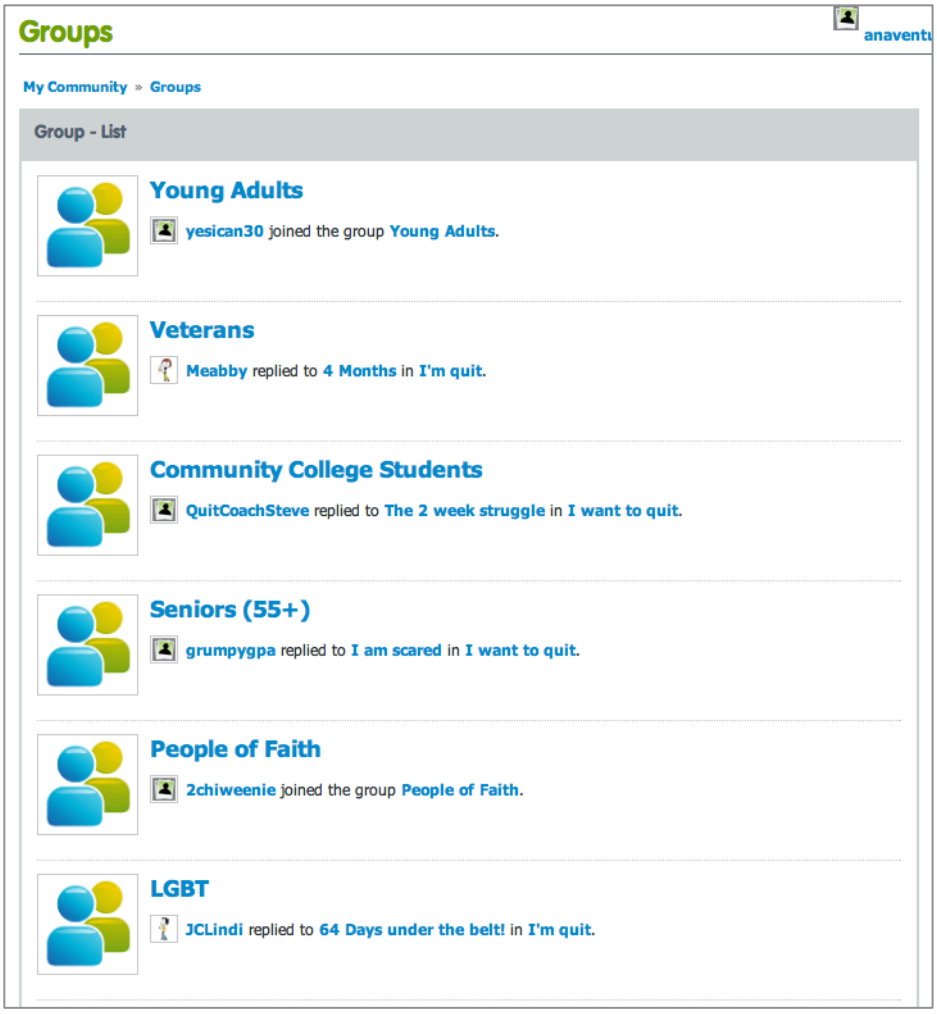

Figure 24: The 'Groups' section has no image or summary of what the group covers: simply the title and the name of the last member to reply, as well as title of post to which the member is replying.

Conversations and Favorite places

"Favorite Places" and "Conversations" are two features of the native social media environment of AlereWellBeing.com that are uncommon in the WATIs that I have

experienced, at least with the meaning they have in AlereWellBeing.com: as quick references (and direct links) to emails exchanged within the program ('Conversations') and all the posts in Forums, Blogs or Groups that the user favored ('Favorite Places' – see Fig. 25).

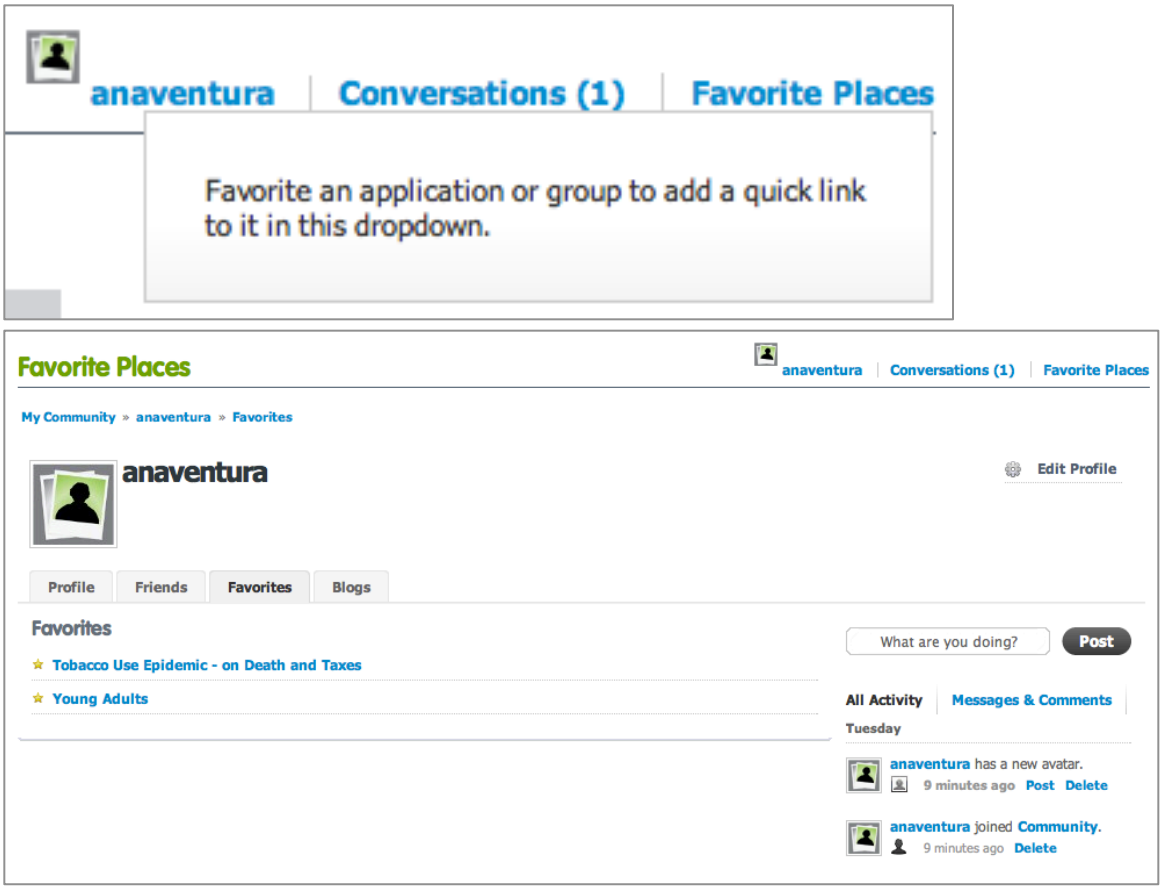

Figure 25: 'Favorite Places' makes the navigation easier by concentrating in one place the content that the user considered as favorite during one or more visits to the site.

Stories

Although the videos are stories dramatized by actors, the site has an easy way to solicit stories from the users. These are text only and require express permission for the program to use name and story on the website and other marketing materials.

Figure 26: The user can easily share a story by selecting 'Share your story' from the Home Page.

Trust and reputation

Hovering a user's name on a post he / she created or a blog entry display the total number of posts and the 'score' of that user (Fig. 27).

Figure 27: The user can easily share a story by selecting 'Share your story' from the Home Page.

Profile page

The Profile page has the usual fields for identification. The user can choose an image for the avatar or choose a file from her computer. The main difference in this case is that all the profile screens have on screen information (or clear optional access to information) on privacy (Fig. 28).

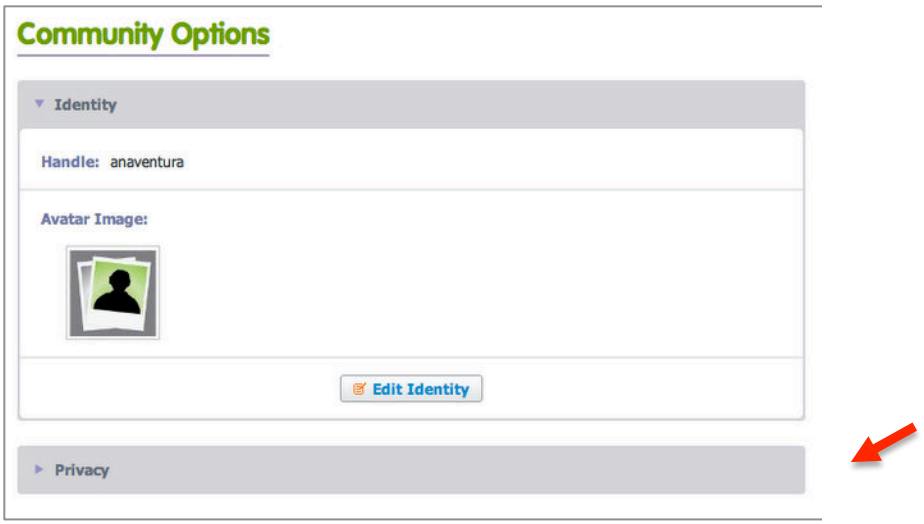

Figure 28: The information on privacy is always accessible while the user fills information on Identity under 'Profile'.

Integration of popular social media platforms within the native social media features

Mobile technology

Upon registration, the user can choose to have text messages sent to her mobile phone. Say more/expand, are the text messages similar to other forms of interaction, how does the depth of info compare?

Facebook

Link to Facebook page: As referred above, the image of the Facebook page is one of the rotating images on the home page. The Facebook has a standard look (minimum customization with no apps or use of third parties for personalization of sections).

Content sharing to Facebook, Twitter and Google+

Any post can be shared via Facebook, Twitter and Google+ or be emailed to specific people outside the community.

Setting a quit date gives the user an immediate option to share the date on his or her personal Facebook page.

In particular, the site allows the direct connection to the Facebook page for the program via one of the rotating images on the home page (Fig. 29). The "Share" link connects the user to the program's Facebook page (Fig. 30).

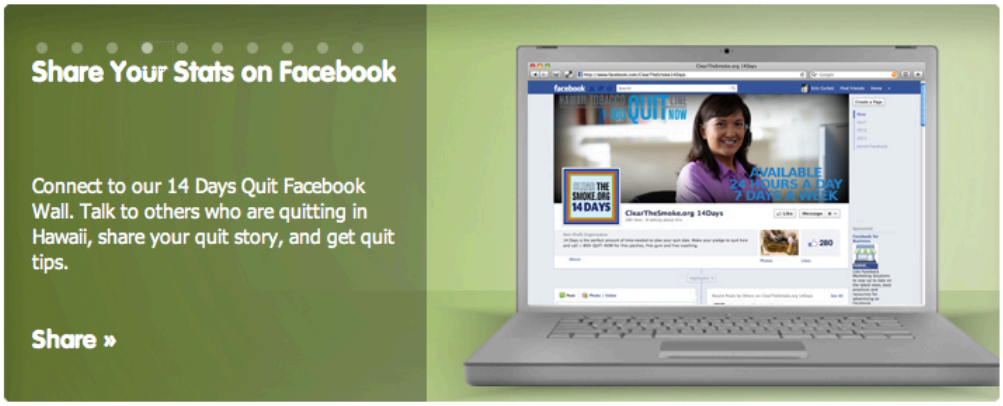

Figure 29: The user can easily share a story by selecting 'Share your story' from the Home Page.

Figure 30: The program's Facebook page

4.2.1.4. Other design decisions

Widget-like features

The right area of the screen is used in AlereWellBeing.com for stand-alone features (much like widgets in Content Management Systems) in the shape of independent discrete boxes – such as the indication of money spent on cigarettes from the start of the program or the current status. Widgets are applications (apps) embedded in the design but that are modular and make sense on their own (See Fig. 31).

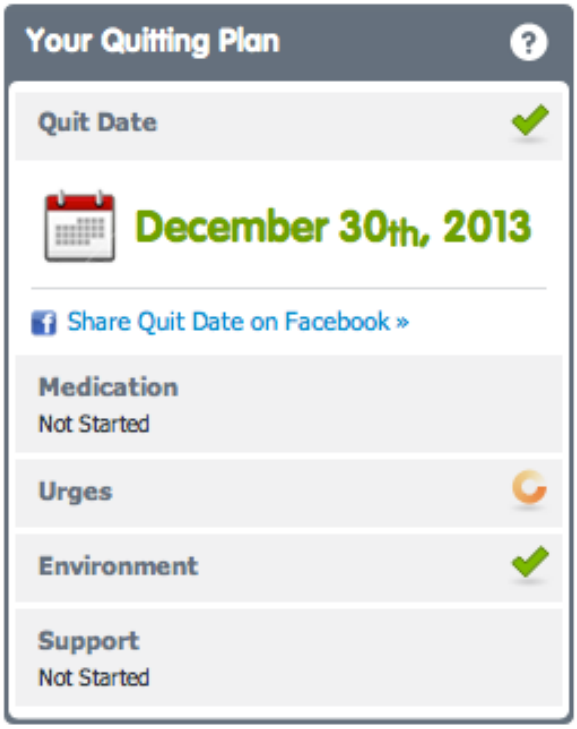

Figure 31: The 'Quitting Plan' widget.

Personalization

As opposed to BecomeAnEx.org, the personalization of environment on the basis of visual appearance is rather limited. The user can choose between 3 font sizes, and in terms of social media, an avatar can be chosen among those preset or uploaded from the computer (Fig. 32).

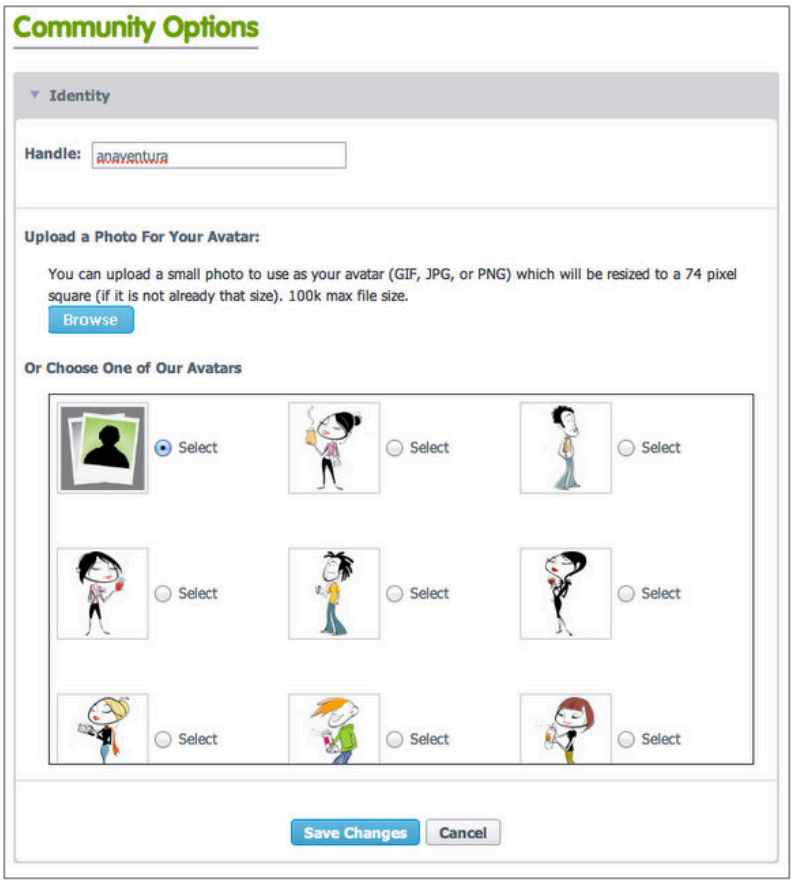

Figure 32: Choice of avatar (also possible by uploading a file) under Identity ('Profile' feature).

4.2.1.5. Reasons for concern, insufficient maintenance and other problems:

The reasons for concern are actually more relative to the poor, ambiguous, or simply wrong choice of words to name some buttons, as well as the lack of clarity of some option under the 'Community' section.

Server down time

The server was never down during my several explorations of the website.

Groups

It is not immediately clear that a reply to a post is only possible once the user has joined that particular group. Furthermore (and once the group is joined) the way to obtain the text field where to write is by clicking 'Post'. This is the same button used to actually 'post' the text, once written. The sequence should be 'Reply' (or 'Comment') and then 'Post'. What may seem like a small detail can lead to a misunderstanding and an absence of replies or comments to posts (Fig. 33).

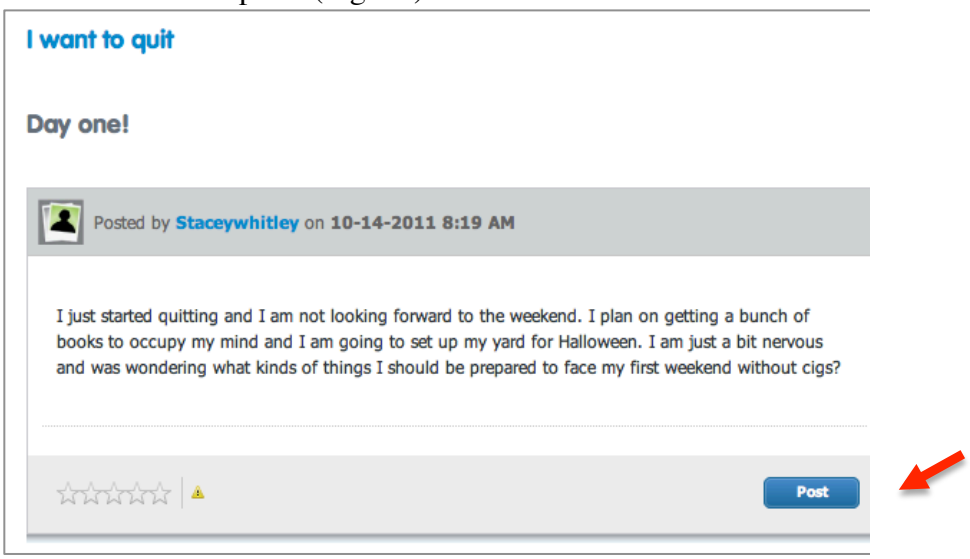

Figure 33: Incorrect labels for buttons may impact communication.

There was an inconsistency between number of emails that I received in my mailbox via the program and the number of messages in 'Conversations'. Like in the case of BecomeAnEx.org, this leads me to believe that some emails, such as acknowledgement of registration, sent to my email address, are considered of a 'different kind', when compared to automatically generated friendly reminders or follow-up emails. This may make sense from a designer's or programmer's point of view but can be confusing to the user.

Forums

In the Forums section, and by default the last post is displayed at the end of the page, forcing the user to scroll down to read it. Alternatively, it may mislead the author of the post into thinking that his post did not display on the page, given that he is used from similar systems (for instance, comments to online newspaper articles) to have the most recent post displayed, by default, on the top of the discussion thread.

The specificity of each Community sub-section may not be clear to the user. The Blogs feature is rather different from the Blogs that the user is used to read – no imagery or distinctive 'identity' (in the sense of branding, as it is characteristic in most blogs). This may be a limitation of the Content Management System used. The distinction between Blogs and Groups is not clear since they are visually very identical.

Most smoking cessation guidelines (Fiore et al., 2008) recommend smokers to set a target quit date. One rationale for this is that making intentions concrete and specific increases the probability of their completion (Gollwitzer & Sheeran, 2006). As a result, the inability to setup that quit date for design reasons – because the user mistakes the inability to click the checkmark as a system bug or because she does not recognize the calendar icon – may largely compromise the purpose of the site.

There is no registration required to see all the forum posts – including answers by non-team members and their photos. This indicates a very open community, but users may be hesitating to adhere to the community. Maybe they might have privacy concerns and opt for not registering, upon realizing that maybe any content is visible to people outside the community as group membership seems to impact level of participation in an online community (Rodgers & Chen, 2005). There could be a reverse factor – participation positively impacting the duration of membership if the user decides to

register (Nimrod, 2012) but it is not clear whether and how non membership impacts participation.

Oversight of potential in the lack of integration of some features with widely adopted social media platforms

One of the most innovative features of this WATI, when compared to others I have explored is ease with which the user can define who, in his social circle, can be of help as well as the type of support for which they can be best (Fig. 34) Although there could be permission issues, which is likely why AlereWellBeing.com did not integrate this feature with widely adopted social media platforms, it seems that had the user the option to include the email addresses and / or connect to the individuals' Facebook pages, there could be interesting possibilities to be explored.

Figure 34: Unexplored potential in a 'Social Support' feature.

Chapter 5: Discussion

I analyzed two WATIs – one developed by a governmental, nonprofit, agency – and the other by a for-profit business. The integration of widely accepted social media networks was greater in the case of the governmental site, BecomeAnEx.org. I want to suggest that any outlet – particularly a social media outlet - can cause the user to divert attention from the original path: the original, intended (or led), exploration of a website. This may be at the basis of a restricted integration of major social media platforms in the WATI. In both WATIs, this integration is restricted to little more than the link to the smoking cessation program's Facebook page and in the case of AlereWellBeing.com, the sharing of the quit date. Both allow sharing the content on major social media platforms although the governmental WATI is more informative about issues of privacy when information is shared that way.

In what I called the 'native social media features' of the WATI – those social media features designed by the WATI team to be specific to the WATI – there seem to be several problems. These caveats have a diverse basis, from the adoption of non-standard icons that can prove difficult to 'read' by the user to the display of user-generated content that may seem outdated (e.g.: See Fig. 16 - a screenshot of the case of a member's posts displaying an inaccurate date due to his local computer system). These types of problems may seem unimportant, but they can affect factors so important as readability of content and trust in the content. These basic problems of design were less prevalent in the case of the corporate WATI.

The integration of member-produced media content is lacking on both WATIs. This could be the result of privacy concerns but may also mean that the community

member is not assigned authority to produce content that may feed the WATI. This is clearer on the governmental site than on the corporate site: the videos are very institutional and produced by the organization, featuring an expert, who is identified as such. In the case of the corporate site, the home page immediately offers the opportunity to 'listen to a call' where a telephone counselor entertains a conversation with a woman attempting to quit. Informational content is still controlled by experts only – even in the case of the corporate site. However, and in the latter case, a 'voice' is provided to the smoker trying to quit by including a 'Share your Story' feature that is readily accessible from the Home page. The production of content to upload to the site and feed its content is lacking in both sites – other than in the answers given to the questions asked by experts (in both sites) in sections dedicated to interactions between users and experts, such as forums or blogs.

Chapter 6: Conclusions and opportunities for further research

Sentiment toward space, playfulness of a space, feeling of ownership of a space: all these are important driving forces that determine user behavior in that space, whether real or virtual (Arora, 2011).

Technology shapes space. In this study I argue that social media can shape how we behave in certain spaces, whether virtual or physical. If we situate this discussion in the specific case of WATIs, we can identify trends and discussions that have been emerging in the public health practice and professional communities - such as the use of digital storytelling in health related online communities (Robin, 2006) - and that are being left out from WATIs, regardless of their nonprofit or for-profit nature.

I systematically reviewed the literature on web assisted tobacco interventions and related concepts and extended the concept of usability of these sites to cover design problems for social media. I then develop a typology of usability in social media and built a conceptual framework to show how the inclusion of social usability guidelines geared to WATI teams may impact the communication.

My objective was to propose the idea that a revision of the current guidelines on social media as a theoretical lens in social media interaction design, and contribute to the reconfiguration of some taken-for-granted assumptions, and practices in the design of WATIs.

Acknowledging that there is no monolithic approach – at least at the moment of this study - to the design of a successful WATI, this study proposes the marriage of part of the extensive evidence based research in smoking cessation with the expertise of design of online communities. The framework that I hope to have established argues for

the need to rethink WATIs as spaces for information and social interaction that, like physical structures in the real world, give immediate clues to the user as to the type of interaction and mutual support they may offer.

There is enormous room for improvement on these sites in the area of social media integration. None of the sites analyzed touches on emerging trends in other online communities such as content curating. As referred above, none provides the tools – or the space- for the production of original media-rich content by members. The connection with mobile technology is rather limited – no use of QR codes for smart phones on neither case, or of tracking technologies (though this may be for privacy issues). For designers, the proposed framework can be a roadmap and provide orientation to and investigate the emergent, and shifting design of the social media sphere (Zhao et al., 2013).

Addressing the research questions, it is clear that the extent to which both WATIs incorporate some trait of social media justifies that new guidelines, especially focused on social media, be developed. The HHS Research-Based Web Design and Usability Guidelines (2006) are no longer sufficient. Unfortunately, the HHS has yet to publish an equally comprehensive, research-based compilation of social media specific guidelines. The information available at the time of this dissertation was fragmented and lacked the 'research-based' side of the previous HHS publication (2006). Another question I had formulated regarded the salience to the user of any native social media features or of those features or paths leading to the integration with existing social media platforms. Both WATIs analyzed presented problems that went from readability to concerns with privacy and with trust on content.

These aspects of salience are mostly connected to issues of usability and visibility that were reviewed in depth during the literature review. They also pertain to the concept of social translucence that was also discussed in the beginning of this dissertation, as well as the concepts of social support and social presence. The WATIs analyzed are just imperfect approximations (or proxies) to real social support. However by engaging mobile technologies and content sharing in widely accepted social media platforms, the analyzed WATIs suggest that Participatory media was yet another lens I used to review the problem at hand. My conclusion is that in the field of WATIs – or of any health related problem, for that matter – issue of privacy constrain the scale of participation. As mentioned above, the feeding of media-rich content by the end user is inexistent in the two WATIs observed.

Further research is needed in formal usability testing in the specific area of social media. As opposed to the traditional type of testing, assessing the impact of WATIs' social media features may imply more longitudinal studies where the permanence of social relationships and their impact on quit rates are assessed.

As with any framework, this study is simply a proposal of a conceptual map: one that integrated disciplines that do not always walk together – such as the study of behavioral change, design and architecture – to propose that design and health professionals work together in defining the social affordances of the WATI, so that social interaction and social support are salient affordances of its design.

Appendix 1

Description of the Iterative process for the design of Instrument 1 "Modified HHS Research-Based Web Design & Usability Guidelines"

Original HHS Research-Based Web Design & Usability Guidelines:

1:01 Provide Useful Content

1:02 Establish User Requirements

3:03 Do Not Use Color Alone to Convey Information

6:02 Place Important Items Consistently

6:03 Place Important Items at Top Center

15:01 Make Action Sequences Clear

16:01 Organize Information Clearly

16:02 Facilitate Scanning

1:08 Be Easily Found in the Top 30

2:03 Standardize Task Sequences

2:04 Reduce the User's Workload

2:05 Design For Working Memory Limitations

2:06 Minimize Page Download Time

2:09 Format Information for Reading and Printing

2:10 Provide Feedback when Users Must Wait

5:06 Ensure the Homepage Looks like a Homepage

6:04 Structure for Easy Comparison

6:07 Align Items on a Page

9:03 Use Descriptive Headings Liberally

10:03 Match Link Names with Their Destination Pages

10:05 Repeat Important Links

10:06 Use Text for Links

11:01 Use Black Text on Plain, High-Contrast Backgrounds

11:04 Ensure Visual Consistency

12:01 Order Elements to Maximize User Performance

12:02 Place Important Items at Top of the List

12:03 Format Lists to Ease Scanning

12:04 Display Related Items in Lists

14:01 Use Simple Background Images

14:02 Label Clickable Images

14:03 Ensure that Images Do Not Slow Downloads

14:04 Use Video, Animation, and Audio Meaningfully

14:05 Include Logos

14:06 Graphics Should Not Look like Banner Ads

15:02 Avoid Jargon

15:06 Use Mixed Case with Prose

15:07 Limit the Number of Words and Sentences

16:04 Group Related Elements

18:01 Use an Iterative Design Approach

2:13 Do Not Require Users to Multitask While Reading

6:09 Avoid Scroll Stoppers

6:11 Use Moderate White Space

10:09 Ensure that Embedded Links are Descriptive

11:06 Use Attention-Attracting Features when Appropriate

11:07 Use Familiar Fonts

12:05 Introduce Each List

13:09 Use Radio Buttons for Mutually Exclusive Selections

13:13 Use a Single Data Entry Method

14:10 Include Actual Data with Data Graphics

14:11 Display Monitoring Information Graphically

15:09 Use Active Voice

15:11 Make First Sentences Descriptive

16:07 Display Only Necessary Information

18:02 Solicit Test Participants' Comments

18:06 Select the Right Number of Participants

The guidelines have a prescriptive rather than predictive value, to the extent that they prescribe practice. Given that the objective of this study is to assess how appropriate the current guidelines are to analyze social media enabled WATIs, those guidelines that implied direct contact with the designers of the website were dropped. The decision on which guidelines to be dropped was made by the researcher who has expertise in web design and usability guidelines. Two were dropped on the basis of the ambiguity of

'meaning'. All guidelines in area 18 "usability testing" were also dropped. Here is the list of the 4 guidelines dropped:

1:01 Provide Useful Content

14:04 Use Video, Animation, and Audio Meaningfully

18:02 Solicit Test Participants' Comments

18:06 Select the Right Number of Participants

This resulted in the following final list of HHS Research-Based Web Design & Usability Guidelines with importance equal or great than 3 and with strength of evidence 4 or 5, and which observance – or not – can be directly assessed from analyzing the website. he number to the left identifies the guideline. The first 2 digits document the general area to which the guideline refers (e.g.: 2 refers to 'optimizing the user experience' and e.g., 14 refers to "graphics, images and multimedia):

1:02 Establish User Requirements

3:03 Do Not Use Color Alone to Convey Information

6:02 Place Important Items Consistently

6:03 Place Important Items at Top Center

15:01 Make Action Sequences Clear

16:01 Organize Information Clearly

16:02 Facilitate Scanning

1:08 Be Easily Found in the Top 30

2:03 Standardize Task Sequences

2:04 Reduce the User's Workload

2:05 Design For Working Memory Limitations

2:06 Minimize Page Download Time

2:09 Format Information for Reading and Printing

2:10 Provide Feedback when Users Must Wait

5:06 Ensure the Homepage Looks like a Homepage

6:04 Structure for Easy Comparison

6:07 Align Items on a Page

9:03 Use Descriptive Headings Liberally

10:03 Match Link Names with Their Destination Pages

10:05 Repeat Important Links

10:06 Use Text for Links

11:01 Use Black Text on Plain, High-Contrast Backgrounds

11:04 Ensure Visual Consistency

12:01 Order Elements to Maximize User Performance

12:02 Place Important Items at Top of the List

12:03 Format Lists to Ease Scanning

12:04 Display Related Items in Lists

14:01 Use Simple Background Images

14:02 Label Clickable Images

14:03 Ensure that Images Do Not Slow Downloads

14:05 Include Logos

14:06 Graphics Should Not Look like Banner Ads

15:02 Avoid Jargon

15:06 Use Mixed Case with Prose

15:07 Limit the Number of Words and Sentences

16:04 Group Related Elements

18:01 Use an Iterative Design Approach

2:13 Do Not Require Users to Multitask While Reading

6:09 Avoid Scroll Stoppers

6:11 Use Moderate White Space

10:09 Ensure that Embedded Links are Descriptive

11:06 Use Attention-Attracting Features when Appropriate

11:07 Use Familiar Fonts

12:05 Introduce Each List

13:09 Use Radio Buttons for Mutually Exclusive Selections

13:13 Use a Single Data Entry Method

14:10 Include Actual Data with Data Graphics

14:11 Display Monitoring Information Graphically

15:09 Use Active Voice

15:11 Make First Sentences Descriptive

16:07 Display Only Necessary Information

This list was further scaled down by eliminating guidelines that were partially redundant and by deciding on a number that was feasible for a in-depth analysis. Thee final list is indicated next:

3:03 Do Not Use Color Alone to Convey Information

6:03 Place Important Items at Top Center

15:01 Make Action Sequences Clear

16:01 Organize Information Clearly

16:02 Facilitate Scanning

2:09 Format Information for Reading and Printing

2:10 Provide Feedback when Users Must Wait

6:04 Structure for Easy Comparison

6:07 Align Items on a Page

10:05 Repeat Important Links

10:06 Use Text for Links

11:04 Ensure Visual Consistency

12:01 Order Elements to Maximize User Performance

12:02 Place Important Items at Top of the List

14:01 Use Simple Background Images

14:02 Label Clickable Images

14:05 Include Logos

15:02 Avoid Jargon

15:06 Use Mixed Case with Prose

15:07 Limit the Number of Words and Sentences

66:11 Use Moderate White Space

10:09 Ensure that Embedded Links are Descriptive

11:06 Use Attention-Attracting Features when Appropriate

14:11 Display Monitoring Information Graphically

15:09 Use Active Voice

Appendix 2

Integration with existing social media platforms

Social Media Profile Sites (e.g., Facebook, MySpace, LinkedIn, Ning) – These sites allow users to join, create profiles, share information, and view still and video images with a defined network of "friends."

Microblogging (e.g., Twitter, Tumblr) – A form of multimedia blogging that allows users to send - and follow - brief text updates. Microblogging also allows users to send and follow micromedia, such as photos or audio clips.

Smart Phones, Tablets & Notebooks (e.g., iPhone, Droid, Blackberry) – Mobile devices that enable users to access the Internet, send and receive e-mails and instant messages, as well as connect with online communities through broadband or Wi-Fi access. These devices can also capture audio, still and video images, and post them directly to the Internet.

Voice Internet Protocol communication (Skype, Oovoo) – This social media type includes sites and technology enabling the use of voice for real time communication, often with the ability to transmit video and file transfer.

News Categorizing, Sharing and Syndication (RSS, Digg, Reddit, del.iciou.us) – Very broadly, this social media type includes websites and technology enabling ranking of news stories and general easy sharing of information, photos and video.

Visual Media Sharing (e.g., YouTube, Vimeo, Flikr) – Social media sites that allow users to upload video and still images. These are embedded and searchable in databases and can be easily shared or embedded in websites.

Appendix 3 - Native social media features of a WATI

Chat rooms – sections of the site where logged-in users can talk and / or text in real time

Proxies for online presence – representation of the presence of others in the system, giving one a sense of the presence of others while one is logged in.

Photo and video sharing – given privacy issues, these are not frequent. They tend to be informational videos. In this type I consider only the cases where any member of the community can share a video or a still image.

Forums – section of the site where questions can be formulated and answered. In some case, only the health professionals / practitioners behind the platform may answer and any member can ask a question. Less frequently, any member can answer and only the health professionals practitioners may ask questions. In this type I consider only the cases where any member is allowed to either ask a question or answer it.

Profile pages – these are generally a 'my page' section where users may or not be encouraged to post a photo and some information about themselves. For privacy issues that encouragement is often not as strong as in other sites with native systems of profile pages.

Email – However native any email system can be to a site, it is likely to be associated with the user's usual email account. However, having email through the platform allows the user to customize frequency of emails or ,e.g., if he/ she wishes to be notified by email when someone answers a question posted on the forum, for instance.

Glossary

Web Assisted Tobacco Intervention – Tobacco industry funded interventions could fall under this term. However, and for the purposes of this research, I am restricting the term to interventions supported by evidence-based research. I do this in deference to Peter Selby and Scott McIntosh, who coined the term, and because the Public Health academic community in tobacco cessation considers suspect, interventions that are funded by a tobacco company. WATIs include, however, for-profit companies, as long as they conduct evidence-based research that informs the design of the WATI. In fact QuitNet and Free & Clear (now Alere Wellbeing), both for-profits, were among the first to publish evidence-based studies on the effectiveness of their web assisted interventions. (see Cobb, Graham & Bock, 2003, for QuitNet and McAfee et al, 2005, for Free & Clear).

Social features – In this proposal I am defining social features of a WATI as the built-in social functions offered by the website allowing for the horizontal communication at the base, as in user-to-user, and for the vertical communication between user and health expert/health practitioner, as long as the former has the ability to respond to the latter. Therefore, forums and chat rooms are examples of social features while an automated email system that only sends automatically generated messages (previously prepared by the health professionals) with no possibility of response, is not a social feature. I use the terms “social media driven WATI” and “web 2.0 driven WATI” to characterize a WATI with more than one social feature.

Tailored tobacco (smoking) cessation interventions - Public Health practitioners and professionals designate by "tailored tobacco cessation intervention", one that is customized to the individual end user – this may include customization to the smoker's particular stage in the smoking cessation process for example, and always entails that the recipient of the intervention has some way of providing feedback to the system to allow subsequent personalization. A telephone counseling session where a counselor's advice depends on the answer to a previous question (ipsative feedback) is an example of tailored material. In tailored interventions the system reacts to the user input, often under the form of ipsative feedback, and displays the optimal information. There is evidence that materials tailored to smokers result in higher quit rates than broadly targeted materials (Lairson et al, 2010). By facilitating the customization process, the Internet can be used to provide tailored smoking cessation interventions.

Targeted intervention - As opposed to a tailored intervention, a targeted intervention is customized for a particular group. The group may be based on stage of change, demographics, or other characteristics, but there is no integration of feedback from the individual end user. Mailed-in print materials aimed at specific age or gender groups are an example of targeted materials. They are less efficient than tailored ones (Lairson et al, 2010). A program that offers tailored information naturally offers different information for different users, while a program offering targeted information offers the same information for the group considered. Targeted interventions represent an earlier approach to health messaging.

Distinction between interactive and static websites - For purposes of the current study I am using a more technology-based approach to the distinction between "interactive" and "static" by including under the former any site whose content may change in reaction to the user's input and under the latter any site whose content remains the same regardless of any users' interaction with it. Examples of interactive sites are those that:

- display information A or B depending on the result of a survey that is filled in by the user;
- contain at least one section that can be changed by the end-user: for instance, a discussion forum;
- respond to the user's preferences in some way shape or form: for example, the user may request automatic emails to be sent to his/her email account;
- embed the ability to interact, e.g. respond to users.

Drawing from this definition is the fact that a virtual community is necessarily an interactive website as the content of the website can change as a result of contributions of the several members (theoretically it may not change if there is no contribution but the built-in technology offers that potential). These may take various forms such as posting to forums, adding events to a calendar, and blogs.

Usability testing – Usability testing is, as the name implies, the testing of a product by using it with the end users. This practice is arguably the most critical aspect of user-centered design. Usability expert Jakob Nielsen (1999) has argued that five users are enough to draw conclusions from usability testing. The test is usually done by asking

users to conduct specific activities and then either timing them and/ or evaluating the accuracy of the result.

Public health – By definition, public health addresses disease, and disease-produced discomfort and disability in the population. It is largely a problem of scale with funding and policy implications: when a health problem affects a large part of the population, whether it pertains to the realm of addictive behavior or not, it is considered of the public health realm. Smoking, HIV, and obesity are examples of public health related problems. Because the cost considerations are essential in the treatment of problems affecting the large population, private and public organizations have turned to virtual communities and Internet technology as a way of providing a cost-effective treatment in public health diseases.

Addictive behavior – Those members of the society who are affected by addictive behavior ultimately have no agency over the cause for addiction (Peele, 1985). The smoker may feel powerless and unable to quit but the success depends on his/her motivation to quit and on several other external factors that are to some extent under the smoker's control. In the area of public health known as addictive behavior, which includes alcohol, drug and tobacco dependencies, social support for clients is believed to be such an external factor, and one of decisive importance (Hajek, 1994). The features of virtual communities resulting from recent technological developments that facilitate cooperation among and contribution by users are seen as a way of providing social support to end the dependency.

Quit rate – A quit rate is generally measured in percentage (number of people who quit/number of people who tried). A quit rate of 40% means that 40% of the analyzed population quit smoking. It is common to measure quit rates at standard time milestones. For quitlines the recommended milestone is 7 months (NAQC, 2009).

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