Viewpoint

Applying an affordances framework to social media intervention approaches

Megan A. Moreno, MD, MSEd, MPH¹; Jonathan D’Angelo, PhD¹

¹Department of Pediatrics, University of Wisconsin, Madison, WI

Corresponding author:

Megan A. Moreno, MD, MSEd, MPH
Division Chief, General Pediatrics and Adolescent Medicine
Vice Chair of Digital Health
Professor, Department of Pediatrics, University of Wisconsin-Madison
2870 University Ave, Suite 200, Mailcode 9010
Madison, WI 53705
Email: mamoreno@pediatrics.wisc.edu
Phone: 608-263-2846
Website: www.smahrtrresearch.com

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Abbreviations
ABSTRACT

Social media interventions are a growing area of internet research, particularly for adolescent health. Researchers developing social media intervention approaches face the task of selecting a social media platform for their intervention. In this paper, we present the theoretical framework of affordances to help guide social media platform selection for intervention research. We first describe methodological approaches to incorporating common affordances into intervention design, followed by four examples of intervention design applying the affordance framework. A scientific approach for the selection of the appropriate social media platform for a given intervention is an important research priority to advance the field of internet research.

Keywords: intervention; social media; affordance; health; adolescent
INTRODUCTION

Social media interventions in the area of adolescent health are a growing area of internet research. This trend is illustrated by the growing number of systematic reviews examining social media interventions across different health topics, including chronic illness and behavioral risk. [1-3] Social media as a platform for interventions targeting adolescents has both technological benefits including ease of scalability, as well as developmental salience for the adolescent population. Over 90% of adolescents report going online every day and almost a quarter of teens report that they go online “almost constantly.”[4] Adolescents have been dubbed “digital natives” given that they have grown up with access to computers and the internet from an early age.[5] Adolescents typically maintain a “social media portfolio” by using a number of different platforms including Facebook, Instagram and tumblr.[4]

Researchers interested in social media intervention approaches are faced with the task of selecting a social media platform for their intervention. If investigators rely on familiarity with or popularity of a platform, these selection criteria lack scientific grounding and may introduce bias in study design. In this paper, we present a theoretical framework to help guide social media platform selection for intervention research. The goal of this framework is to increase the likelihood that the success of interventions hinge on replicable technological qualities, as opposed to personal preferences or other spurious considerations. We will first describe a methodological approach for incorporating common affordances into intervention design, followed by four examples of intervention design applying the affordance framework. The scientific approach for the selection of the appropriate social media platform for a given intervention is thus an important research priority to advance the field of internet research.
METHODS

Affordances are a concept often used in fields associated with design, and by those systematically studying the impact of a design of an object. As such, those considering the impact of information technology and the design of social media platforms often use the affordance framework. Affordances are often described as properties of artifacts that can be recognized by users and contribute to their function[6] or items that present an action possibility. [7] Perceived affordances can also be conceptualized as “design aspects of objects that suggest to the user how the object should be used,”[6] a simple example is that the design elements of a chair suggest to a person that the object could be used for sitting. Importantly, while an individual’s goal or desire may change, an affordance does not evolve.[8]

Given the rapid evolution of computer-mediated environments, many fields that study outcomes associated with this context have pushed researchers to utilize this framework for the sake of developing lasting and generalizable theory. Several scientific fields and disciplines have moved to discuss, or encouraged the move to discuss, technology not in terms of specific communication platforms, but rather in terms of the affordances. These fields include management science,[9] communication[10] theory, education[11] research, design research,[12] to information technology,[13] organizational research,[14] tourism and marketing research.[15] The initiative is also present in clinical research, as previous work has incorporated affordances related to utilizing social media to manage chronic disease.[16] Just as observational research benefits from enhanced clarity and meaning[17] from the affordance framework, it is likely that intervention research will as well.
There are several benefits to application of the affordance approach for intervention design. First, an affordance approach provides a scientific framework for the selection of a social media platform. With this approach, a researcher can identify the necessary functionalities of an intervention, such as key functions the platform should have or critical constructs linked to the behavioral or health-related theory that informs the intervention. These functions and constructs can then be used to match to the affordances of a social media platform. Second, this approach goes beyond selection of interventions based on popularity of platforms. Given that the popularity of platforms can change, a public perception that social media “is always changing” is a concern that scientists may encounter. With an affordance approach, a scientist can describe the affordances needed for an intervention, and thus present potential platforms that would meet these criteria rather than relying on a single platform. If a successful intervention sees decline because a platform is losing popularity or becoming obsolete, an intervention designed around affordances can identify another platform that fits (or even design one). Finally, an affordance approach takes a step beyond the “brand name” approach of selection of social media platforms, and changes the dialogue to be more closely linked to theory and technical function.

Among the many affordances described in the literature, we will focus on five affordances that apply to social media and may inform intervention design targeted at an adolescent population.

**Identity affordances**

A first category of affordances of social media are Identity Affordances. Many social media platforms provide affordances for identity development and portrayal. An example of a high-identity affordance platform is Facebook, in which users can upload a profile picture to
identify themselves, list their “likes” and share “life events.” Identity is further emphasized by
the expectation on Facebook to use one’s real name (or a version of it). In contrast, Reddit is a
low-identity social media site in which users are typically identified by a chosen username.
Further, the emphasis on Reddit is more on what content a user contributes to group
conversations rather than the personal identity of who posts.

It has been proposed that social media that require fewer Identity clues can allow users to
take on new identities within different online conversations, sometimes called generative role
taking.[18] For example, an overweight teen working to become more physically active could
create a new Twitter account called @TeenWhoLovesToRun dedicated to that identity. It is
important to note that an extreme of this generative role-taking is represented by social media
platforms in which users are anonymous, such as YikYak (now obsolete) in which users could
post with complete anonymity. An absence of identity clues can lead to users taking on roles that
are more risky, such as being aggressive, trolling or bullying others.

Platforms that allow users to develop their identity may present benefits to adolescents in
being able to explore and experiment with their identities, a critical developmental task of
adolescence. However, by enhancing one’s own identity presence on a site, the risks of being
identified by strangers may also rise. Thus, identity should be balanced with whether the site
allows for users to establish privacy settings. This may be more salient for interventions that
involve illegal or stigmatizing behaviors, such as substance use or mental health conditions. A
balance of identity development and privacy protection is essential.

Social affordances
Given the interactive nature of social media, it is no surprise that most social media platforms offer many social affordances. Social affordances include a sense of belonging to a group, such as a group focused on a particular interest, experience, social group or religion. Some social media platforms provide specific tools which allow the user to identify members of their group and enhance a feeling of belonging, such as “tagging.” Hashtags (i.e. content labeled with a # sign) are commonly used on Twitter and Instagram and can enhance belonging. When content is labeled with a hashtag, it is connected to all other content on that site that has also been labeled in that way. Thus, a hashtag can allow the creation of a community of users across different social networks who are connected by use of a particular topic or term. A positive example of belonging is teen cancer survivors who use a particular hashtag to connect to other teen survivors nationally to provide support and share similar experiences. Further, social media may promote network-informed associations, such as when Facebook suggests friends for a user based on their friends’ friends. This allows users to see how friends are connected to other people and their interests.

An important task for adolescents to learn within the social media setting is how much information to share. A previous study found that intimate disclosures shared publicly can be judged as inappropriate. Users must thus engage in audience management, by monitoring and checking what audience is receiving their messages. This can impact how much personal information a teen is willing to share within a group-based intervention, such as one using private Facebook groups. At the same time, users must also come to realize that their audience may not be exactly who they imagine it to be. Assuming an audience different than one actually finds on social media may have unique psychological or social consequences. Finally, social media allows teens to experience and participate in metavoicing. This term refers to how a
social media user who posts anything in social media is engaging in a larger context including other people’s presence, profiles, content and activities. Thus, an adolescent posting on Twitter is not merely voicing a single opinion, but contributing to content that is already in that space and connected to others.

**Cognitive affordances**

Cognitive affordances include using social media tools to expand one’s learning. Examples may include increasing awareness of global news events using Twitter, or learning a new strength training exercise on YouTube. These affordances may be particularly useful for adolescents who may not traditionally get exposed to this information offline.[6] Cognitive affordances may also include the opportunity for enhanced creativity, such as on platforms like Tumblr that allow customizable content.

Social media can also allow reallocation of cognitive resources by allowing a user to focus on one aspect of a person’s presentation at a time, versus the many cognitive cues that emerge during a face-to-face conversation with a person. Face-to-face communication requires an adolescent to be cognizant of the complex interplay of words, tone, facial expression and body language. In contrast, social media tools allow more simplified communication venues, such as Facebook messaging, which is text only against a background of personal information. This type of communication requires fewer cognitive inputs and may be easier for some teens, but it can also lead to the potential for misinterpretation of information. For example, interventions that include humor or sarcasm in messaging may be at risk for misinterpretation without voice or visual cues. As a developmental task of adolescence is learning how to develop skills in communication, these tools may both help and hinder an adolescents’ journey.
Another cognitive affordance of many social media platforms is *triggered attending*. Triggered attending involves rejoining an online conversation or responding to content when an automated alert informs the user to do so.[18] Examples include setting mobile phone alerts to trigger when specific users or friends post content. This triggered attending may be helpful to re-engage adolescents at different stages of an intervention, but also could be disruptive to adolescents who are engaged in other activities, such as homework or driving.

**Emotional affordances**

Emotional affordances include attributes of social media that can trigger or stimulate users’ emotional reactions.[6] For example, many platforms allow users to express emotion via the capacity to like or dislike content, such as the “favorite” function on Twitter, or “upvoting” or “downvoting” on Reddit.

Emotional affordances can also include *generating empathy* by seeing personal photographs or names alongside messages or news stories. It is common to see fund-raising efforts on social media that capitalize on emotional affordances by providing photos and personal stories. Research groups may seek to engage participants through sharing personal information about the researchers, or providing photos of the research team. In contrast, another affordance of social media is *comparison*. Previous studies have illustrated that by examining other people’s social media profiles users are at risk for feeling inadequate or envious.[23]

**Functional affordances**

Functional affordances are principle functions that affect how social media messages are transmitted or saved. While many of these affordances describe most social media platforms, an
understanding of these affordances may be helpful for researchers to frame the key functional design elements of the tools needed for an intervention.

Most social media platforms allow for replicability of messages, meaning that content can be re-used by others. An example is the ability to “retweet” content on Twitter. This function can allow interventions to deliver “booster” doses of intervention messages by re-sharing previous content. Social media also allows messages to be highly scalable, there are numerous examples in the popular media of social media posts going “viral” and reaching far beyond the initial intended audience. For researchers, this can be an important consideration for ensuring that control group participants are not exposed to messages specific to an intervention if these are present on public social media.

Social media is also searchable, users can find specific content or people using a variety of online means such as hashtags. Social media also provides permanence to messages by placing them in online conversations or on profiles. Even on platforms that are intended to be ephemeral, such as Snapchat, content is generally stored or could be captured and saved by others. Social media allows for unlimited composition time before posting a message, in contrast with the back and forth of a typical face-to-face conversation. However, not all users utilize this affordance with every post. Finally, social media have varying levels of the user’s ability to edit once something is posted. Some sites allow for removal or editing of content easily, Facebook allows for revising or deleting posts. However, the speed of Twitter can lead to challenges with removing or editing content once it has been retweeted by others. These functions may be important to particular intervention approaches and be incorporated as explicit tools that are relevant to a given intervention.
RESULTS

In this section we describe four brief hypothetical case studies of application of the Identity, Social, Cognitive and Emotional affordance framework to example intervention approaches. While each hypothetical intervention was designed around the requirement of one main affordance, others affordances were considered in order to ensure the functions presented by the platform met the needs of the proposed study.

Identity affordances: Application to intervention design

A social media intervention was being designed to promote physical activity among overweight adolescents. The intervention was intended to deliver positive messages to adolescents. Messages were designed to promote reflection on participants’ own skills and strengths in order to shift their view of themselves as active and fit, as well as providing prompts to engage in physical activity. The primary behavioral theory informing the intervention, which served as the root of the messages, was Self-Determination Theory.[24] Additionally, findings of identity shift,[25, 26] the notion that individuals can internalize qualities that they present online, supported this line of intervention. Thus, this intervention relied on use of a social media platform that allowed Identity Affordances.

The researchers determined that low-identity affordance platforms such as Reddit and Twitter may not be the best fit for this intervention, and considered the higher identity affordance platforms of Instagram or Facebook. The intervention was then designed to take place on Facebook and to include Facebook Badges and content that teens could incorporate into their own profiles. The rationale for the Facebook Badges approach was to allow teens to take salient intervention messages and integrate them into their own digital identities on Facebook.
Social affordances: Application to intervention design

A social media intervention was designed to promote social support among teens with depression. The intervention was designed to promote peer-to-peer support among teens with depression, as peer support has received strong evidence as an effective intervention.[27] Thus, social affordances that promote peer-to-peer communication was a priority. Further, pilot testing with teens led to the feedback that the social communication needed to be in private settings. The rationale for the platform selected was in order to utilize private groups in a platform that teens already visited.

Given that the teens already utilized Reddit, researchers decided to implement this intervention as a private group on Reddit. In addition to already being utilized by the participants, the platform had added affordances. There was no identity requirement for this platform, enabling participants to comfortably disclose more of their thoughts and feelings. The functional affordances of this message board allowed for construction of messages at a time and rate that were comfortable to the participants.

In carefully analyzing the platform according to the affordance framework, the researchers realized that Reddit offers one emotional affordance that may be less beneficial: the ability to upvote and downvote messages. However, moderators of a given message board, the position that the intervention leaders will act in, have the ability to remove the ability of board members to downvote messages. By taking this action the intervention platform was adjusted so that posts could only receive positive feedback.

Cognitive affordances: Application to intervention design
A social media intervention was designed to promote teaching of diabetes management skills among newly diagnosed adolescents. A rich media for teaching and high cognitive affordances approach was a priority for the research team. The team determined that video was the best medium to teach basic skills, as evidence suggests that video is more efficient than text based e-learning for practical or procedural skills sets.[28] Researchers worked with teens to create a private YouTube channel and new YouTube accounts for participants in the study, as Identity Affordances were not critical to the study design. The research team was able to share videos to teach diabetes management skills, and participants were able to ask questions within the YouTube channel. Participants were also invited to exercise creativity and create their own teaching content to share on the private channel.

Even if participants were not inclined to create their own content, the functional affordances of this domain offered other routes to participation. Specifically, YouTube allows for the cultivation of video lists on profiles. Hence, participants were encouraged to cultivate a list of nutrition related videos on each profile. This enabled two positive outcomes. First, participants and moderators were able to discuss the merits (or flaws) of each video in order to enhance the media and nutritional literacy of participants. Second, libraries of helpful videos were created for the participants to reference over time.

**Emotional affordances: Application to intervention design**

An intervention was designed for smoking cessation for older adolescents. The investigators wanted to share stories of older adolescents who had successfully quit to utilize Emotional Affordances in order to motivate and connect to participants. The investigators built a blog using a blogging website, and promoted content via Instagram. A critical component of how
content was shared with participants on Instagram was to use personal photos of each new blogger.

This intervention was grounded in notions of homophile, as people are more likely to adopt health advice offered by similar others.[29] Photographs were crucial for generating the emotional connection, as photographs can have greater impact on judgement of a target than textual information.[30] Hence, it was uniquely catching for participants to see a picture of someone just like them who has successfully quit smoking.

DISCUSSION

In summary, the ever-changing landscape of social media sites can lead to challenges for researchers to apply scientific scaffolding to justify selection of platforms for interventions. We present a research priority of applying an affordance framework for mindful selection of social media platforms to match intervention requirements and approaches. As indicated in these examples, thoughtful articulation of intervention outcomes and assessment of platform affordances can yield complimentary partnership that leads to health outcomes.

This thought process and framework may lead to synergy between intervention and platform. Considering the affordances of a platform can help identify potential undesirable outcomes in an intervention and offer solutions. For instance, in one example intervention above, we identified the potential negative outcomes of a downvote on Reddit and removed that option. There also exists a second potential pathway to more effective interventions: the design of an intervention that requires a set of affordances not yet present in current technology. Rather than a limitation, this represents opportunity in the area of technology. Previous computer-mediated communication research has offered suggestions to website designers in order to increase the
happiness of online daters and increase the instructional efficiency of educational technology[31] and new app developers need to be cognizant of the affordances of the products they develop. Identifying a grouping of affordances that can be beneficial, but does not yet exist, represents opportunity for new platform development.

Limitations

The affordances that we present here represent early efforts to define and apply affordances to adolescent health interventions. Conceptualization of affordances is an ongoing, iterative process across many research disciplines. Even in fields long interested in conceptualizing affordances, there is still debate around definition and boundaries of each affordance.[10] However, the fact that this debate continues is evidence of the utility of this framework. Even if not perfect, it allows for purposeful selection and engagement across a broad and ever evolving technological environment.

Conclusion

Despite these limitations, the affordances approach provides a theoretical framework for selecting intervention platforms based on specific criteria and functions. We present a research priority of applying an affordance framework for mindful selection of social media platforms to match intervention requirements and approaches. As indicated in these examples, thoughtful articulation of intervention outcomes and assessment of platform affordances can yield complimentary partnership that leads to health outcomes.
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Conflicts of Interest

The authors have no personal financial interests related to the subject matters discussed in the manuscript and no conflicts of interest to report.
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