The Facebook Influence Model:
A Concept Mapping Approach

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Abstract

Facebook is a popular social media Web site that has been hypothesized to exert potential influence over users' attitudes, intentions, or behaviors. The purpose of this study was to develop a conceptual framework to explain influential aspects of Facebook. This mixed methods study applied concept mapping methodology, a validated five-step method to visually represent complex topics. The five steps comprise preparation, brainstorming, sort and rank, analysis, and interpretation. College student participants were identified using purposeful sampling. The 80 participants had a mean age of 20.5 years, and included 36% males. A total of 169 statements were generated during brainstorming, and sorted into between 6 and 22 groups. The final concept map included 13 clusters. Interpretation data led to grouping of clusters into four final domains, including connection, comparison, identification, and Facebook as an experience. The Facebook Influence Concept Map illustrates key constructs that contribute to influence, incorporating perspectives of older adolescent Facebook users. While Facebook provides a novel lens through which to consider behavioral influence, it can best be considered in the context of existing behavioral theory. The concept map may be used toward development of potential future intervention efforts.

Introduction

SOCIAL NETWORKING SITES (SNSs) provide users with an interactive multimedia experience, including the ability to create a personal profile, communicate with other profile owners, and link profiles via "friending." These sites are immensely popular, particularly among young adults, as they allow them access to peer information, a venue for self-expression, a means of communication and feedback, as well as a social network.[1–4] The vast majority of U.S. college students report maintaining a social networking site (SNS) profile.[5–9] The most popular SNS is Facebook (www.facebook.com), which currently boasts more than 130 million U.S. users and 17 billion total yearly visits.[10] Facebook's continued adaptability and popularity may be linked to its ability to combine functions from other sites such as photo sharing, e-mail communication, and event planning. In addition, Facebook users are now increasingly able to link their Facebook profile to access other Web sites and directly share information from these external Web sites with members of their social network. Facebook use has been associated with a high arousal state and positive affective state, which may also contribute to its popularity among users.[11]

Given its pervasive popularity and users' frequent access, Facebook has arisen as a potential source of influence on attitudes and behaviors. Numerous previous studies have examined traditional media representations of behaviors such as tobacco and alcohol use, and found consistent positive associations with initiation of these behaviors among the adolescent population.[12–17] Fewer studies have examined social media. One study found that adolescents feel that alcohol displays on SNSs are influential and valid representations of alcohol use.[18] Limited research has examined influences on young adults. One recent study illustrated that college students perceive that Facebook displays have the power to impact their peers' attitudes and behaviors negatively.[19] It has been argued that Facebook may have greater influence than traditional media, as Facebook combines the power of interpersonal persuasion with the reach of mass media.[20] Facebook has been described as "the most significant advance in persuasion since the radio was invented in the 1890s" and initiated a new form of persuasion labeled "mass interpersonal persuasion."[20]

It is important to consider Facebook as a source of influence, particularly given the types of behaviors that are commonly displayed on Facebook. Previous work found that young adults frequently display references to health risk behaviors, including

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alcohol abuse, substance use, and risky sexual behavior. Further, references to health risk behaviors are displayed in similar patterns among adolescents' online "friend" groups.[4,9,21–29] A few studies indicated positive associations between displayed health risk behaviors and self-reported intention or engagement in the displayed behavior.[30,31] A necessary next step to advance the field of social media research is to place these findings within appropriate conceptual frameworks.

Thus, the purpose of this paper is to introduce a conceptual framework to describe aspects of Facebook that are influential to young adult users. Previous work has illustrated various gratifications offered by Facebook, including entertainment and recognition.[32] Other studies have described the importance of trust and social interaction playing critical roles in users' continued intention to use Facebook.[33] This prior work has greatly advanced our understanding of ways in which young adults use social media and potential gratifications derived from it. However, the perspective of how social media may be perceived as influential to its users remains a gap in our understanding. Thus, our research question for this study was to determine young adults' perceptions of aspects of Facebook that they view as influential. The goal of the study was to create a concept map based on those findings.

This study utilized concept mapping methodology to develop a conceptual model of Facebook influence. We anticipated that a conceptual framework to describe Facebook influence would be complex. Thus, we sought an analytical approach that would accommodate this complexity. Concept mapping methodology is frequently used toward developing conceptual frameworks to describe complex topics.[34–38] Further, this approach allows the conceptual framework to be built from the "bottom up" based entirely on the views of key stakeholders. Given that young adults are among the most avid social media users, we wanted to generate a model based on the views and experiences of these particular Facebook users. However, we also wanted an approach that would allow us to go beyond qualitative analysis to allow more complex statistical modeling to ensure that the process was systematic. Concept mapping integrates open-ended qualitative data collection methods and quantitative analytical tools in a standardized and replicable process.[34,36] The outcome of this process is a concept map—a visual representation of the key concepts and their interrelationships. While this map does not dictate cause and effect between an exposure and outcome, it can be applied to explore relationships with pertinent variables in different contexts. The final map that is created is entirely in the language of the participants, and produces a visual representation that is easy to interpret. This method has been used in previous health research to provide insights into complex phenomena such as sexual behavior or mental illness.[35,39–41]

Methods

This study was conducted at a large, public Midwestern university. The University of Wisconsin Institutional Review Board approved this study (2011-0714).

Participants

The concept mapping approach is ideally suited to data collection from stakeholders relevant to the concept under investigation. In order to ground our conceptual framework in views of users of this medium, participants were college students, a population with nearly ubiquitous use of Facebook. Students were recruited through purposeful sampling from a variety of campus activities, majors, and groups in an effort to create more diversity in experience and viewpoints from our participants. Participants were recruited from a large Midwestern university between November 2011 and June 2012. Eligible subjects were current undergraduate students between the ages of 18 and 23 years. Each participant gave written consent for participation. Before the start of each concept mapping step, participants completed a demographic survey, which included questions about age, year in school, race/ethnicity, what kind of campus organizations they were involved with, and major in school.

A total of 80 students participated in one or more phases of the study. Twenty-five students participated in three groups for the generation step; these students had a mean age of 19.7 years, were 92% female, and 96% Caucasian. In the structuring sessions, 33 students participated in three groups, and had an average age of 20.5 years, were 58% female, and 96.9% Caucasian. In the interpretation step, 22 students participated in four groups, and had an average age of 21.2, were 63.4% female, and 81.8% Caucasian. The focus groups ranged in size from 3 to 12 students. One of these focus groups was made up of students who had additional experience with social media and were considered "advanced users." These students had participated in a marketing, research, or other project related to social media. This group was formed to provide enhanced expertise and feedback on the concept map. Table 1 provides demographic information for all phases of the study.

Concept mapping

This methodology directly involves participants and balances group consensus with individual contributions, as some steps require group participation while others are done individually. Concept mapping studies usually use sample sizes typical of qualitative researcher; between 20 and 75 participants are typically involved in some or all of the data collection steps. There are five steps involved with the concept map creation process: preparation, generation, structuring, representation, and interpretation.[34]

Step 1: Preparation. The goal of preparation is to develop a focus prompt used to generate brainstorming statements from participants in the generation step. The focus prompt was specifically designed to be an open-ended question that required participants to complete a sentence in order to achieve consistent phrasing. The focus prompt was designed to promote participants to consider more than one response to the prompt without producing a sense of pressure that there is a "right" answer or answers. In an iterative process, the two primary investigators (MM and RK) developed a focus prompt

Table 1. Participant Demographics

Part of study	Number of participants	Gender		Mean age (years)
		Males	Females	
Brainstorming	25	2	23	19.7
Sort and rank	33	19	14	20.5
Interpretation	22	8	14	21.2
Total	80	29 (36.3%)	51 (63.7%)	20.5

using guidance and example focus prompts from previous literature. The initial focus prompt was "What makes Facebook influential is…." This focus prompt was discussed with a pilot group of 20 college students in prestudy testing, and based on feedback and comments it was revised to "Some aspects of Facebook that make it influential are…."

Step 2: Generation (brainstorming) sessions. The goal of the brainstorming step is to generate a large list of participant generated items with sufficient breadth and depth to represent the full spectrum of ideas related to Facebook influence. The brainstorming step was conducted using a semi-structured focus group format. Focus groups were used to investigate this topic, as they allowed for interaction between participants, as well as opportunities for participants to build on each other's thoughts.[42] Each session lasted between 45 and 90 minutes. Participants who completed the focus group received a meal and $20 as an incentive. All focus groups were audio recorded and transcribed verbatim.

After obtaining consent and providing instructions, the facilitator presented the focus prompt to the group. Participants were initially given 10 minutes to write individual responses to the prompt on paper, and then the topic was opened for group discussion toward further idea generation and revision. At the conclusion of the session, all written responses were collected from the participants, and any additional ideas that were discussed by the group as a whole were recorded by the facilitator through transcription of the audio recording. The brainstorming list was then reviewed by the two primary investigators to eliminate redundancy, and compiled into one revised list that represented all ideas and statements generated in the brainstorming step.

Step 3: Structuring (sorting and rating) sessions. The goal of the structuring step is to sort and rank the statements that were generated in the brainstorming step. This process provides insights into how individual ideas are related to form overarching constructs. In the sorting step, participants were given a stack of index cards, each of which had a single written item from the revised brainstorming list. Individuals were asked to sort the cards into categories that made sense to them and create a label for each pile. All groups were determined by the participants; each item could only be sorted into one group, and every group needed to include at least one item within it.

In the second activity, participants were given the revised list of brainstorming statements and individually rated each item on a scale of 1 to 5, with 1 indicating an aspect of Facebook that had little influence and 5 indicating an aspect with great influence. Participants who completed these tasks received a $20 incentive and a small meal.

Step 4: Representation. The goal of representation is to apply quantitative approaches to analyze the sorted and ranked statement data into a visual point map representing individual items. Analyses were conducted using Concept Systems Core software version 4 (Concept Systems, Inc., Ithaca, NY) and SAS software version 9.3 (SAS, Cary, NC). Data from the sorting and ranking step were organized into a square symmetric similarity matrix (SSSM) for each participant, which denoted whether each pair of brainstorming items had been grouped together. An overall SSSM was constructed by summing the matrices for all participants. Multidimensional scaling

(MDS) of the overall SSSM was used to produce a two-dimensional point map. A stress index was calculated to assess the fit of the MDS solution to the data. Stress indices ranging from 0.10 to 0.35 indicate acceptable fit. From the point map, a cluster map, which overlaid the point map with discrete statement groupings or clusters, was created.

The cluster map was created using hierarchical cluster analysis (HCA) over the overall SSSM. The software analyzes the data to perform cluster analysis and multidimensional scaling (MDS) in order to create a visual representation of the ideas in the form of clusters. The analysis groups the ideas according to the results of the MDS into clusters. Items that were similarly categorized by participants appear closer together on the map than items that were not commonly categorized together.

A standardized method was employed to determine the appropriate number of clusters. Using the point map, the concept mapping software generates sequential versions of the concept map with a change of one cluster per version. The upper and lower bounds of the range of clusters were the maximum and minimum number of clusters created by a participant. The analysis process included reviewing cluster arrangements sequentially and identifying the optimal cluster solution through an iterative process.

Each cluster was initially named by the software based on the ideas generated by participants; these names were then reviewed and revised for clarity by three raters. The entire map was reviewed by three raters to ensure it was qualitatively consistent and logical. Any revisions to the map were based on consensus of all three raters.

Step 5: Interpretation. The goal of these sessions was to allow participants to view, discuss, and interpret the concept map. Group discussion was led by the trained facilitator, and began with an introduction and review of the concept mapping methodology. The steps of the project and the focus prompt were reviewed, and then the preliminary concept map was introduced. Participants were asked to discuss cluster groupings and labels, as well as to explore the overall structure of the map. Each group was asked to explain the ways in which the map represented aspects of Facebook that were influential and also ways it could be improved. Participants who completed the session received a meal and a $20 incentive. All sessions were audio recorded and fully transcribed. Transcripts were then reviewed by two primary investigators for content in an iterative process to determine representative quotations.

Results

Step 2: Generation

A total of 187 statements were produced during the generation step of data collection. Refining the statement list led to removal of duplicate statements and merging similar statements. The final list of brainstorming statements included 169 unique aspects of Facebook that were perceived to be influential.

Step 3: Structuring

During the sorting procedure, participants sorted the statements into between 6 and 22 groups ($M = 13$, median = 12). During the rating procedure, the mean item influence rating was 3.2 ($SD = 0.5$).

Step 4: Representation

The stress value for the fit of the MDS solution to the structuring data was 0.34 after 14 iterations. Cluster analysis indicated that the 13-cluster solution presented in Figure 1 was found to represent the best fit for the data after assessing between 6 and 20 clusters.

The 13 clusters depicted on the Facebook Influence Concept Map (Figure 1) included: connection to people, far reaching, fast communication, curiosity about others, business and promotion, accessible and adaptable, data and information, Facebook establishing social norms, identity expression, influence on identity, positive experiences, negative experiences, and distractions. The concept map provides a visual representation of both key constructs and their relationship in proximity to each other. These 13 clusters embody unique aspects of Facebook that represent perceived sources of influence.

Step 5: Interpretation

After reviewing this map during the participant interpretation step and discussions with our experts, there were no recommendations to delete or add clusters to the map. Participants often commented on the high number of clusters within the map and that it took some time to process the clusters and their relationships to each other. Recommendation emerged from both participants and experts to subcategorize the map by further sorting the 13 clusters into four domains, which included connection, comparison, identification, and Facebook as an experience. These constructs can be considered within domains based on their proximity on the map and the overlap in concepts within each cluster. Table 2 provides the cluster groups, clusters within them, and example items from each cluster.

Participants frequently commented on the most centrally located cluster of "Facebook establishing social norms." Many participants felt that this cluster's central location was

because many of the items in this cluster were related to the surrounding clusters but also represented unique ways in which Facebook has "become the new social norm." Participants described how Facebook has contributed new standards for online behavior and even new language terms, such as "status update" and "Facebook stalking." Participants often discussed whether people's Facebook behaviors were volitional attempts to influence social norms. One participant described "uploading photos contributes to setting the social norm. I don't think we upload photos to set social norms, we upload photos to share and connect with other people and a byproduct of that is setting social norms."

Another frequent topic raised by participants was the placement of the "negative experiences" cluster adjacent to the "positive experiences" cluster. One participant commented, "They seem to be polar opposites and yet they are almost touching, at least at one point." After further discussion, it was determined that these represented distinct experiences within the larger immersive experience that Facebook offered to users.

Participants were asked what clusters represented possible types of influence that may concern them if they were to consider a younger sibling's exposure to Facebook. Participants agreed that Facebook may be more influential to younger teens. Participants often commented on "influence on identity" as a key area of influence, since the younger teen may be early in the identity development process and may be exposed to inappropriate material that impacts their own attitudes and intentions. One participant explained why it would be worrisome: "If they are friends with their older cousins or something or in college and choosing to do things that are illegal."

Discussion

This study used a concept mapping approach to gain insights and perspectives from college students regarding
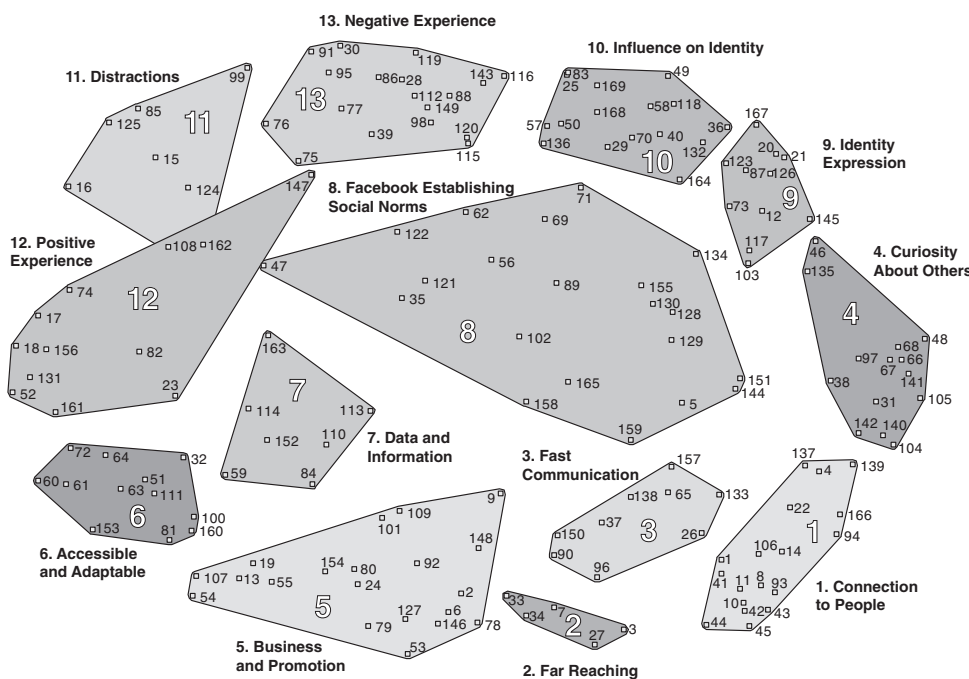

FIG. 1. Cluster map illustrating items that represent Facebook influence within 13 clusters.

TABLE 2. FACEBOOK INFLUENCE MODEL CLUSTERS AND EXAMPLE ITEMS

Domain	Cluster label	Example items within cluster
Connection	Connection to people	Allows people to constantly stay updated with others' lives; way to get to know acquaintances almost instantly; keep in touch with people you wouldn't call or text
	Far reaching	Ability to reach many people with one Web site; can reach anyone, young and old, rich and poor; bonding across cultures and distances
	Fast communication	Feel connected and in the loop constantly; puts everyone you know and what they're doing in one place; updates on people's lives faster than with a cell phone
	Business and promotion	Ability to plan influential events such as protests or sit-ins; statuses provide a way to blog instantly about events or political topics; every company uses it to promote business or provide deals
	Accessible and adaptable	Largest network in human history; easy to use and navigate; widely known and talked about
	Data and information	Huge database of information; compiled data from millions of individuals; news feature
Identification	Identity expression	Freedom to express things and let it be heard; present the best side of yourself; show off accomplishments to everyone you are friends with on Facebook, not just close friends
	Influence on identity	Provides others with pictures that can influence perceptions; display aspects of yourself that you wouldn't share in offline life (sexuality, substance use); wonder if you should be doing what you see everyone doing in pictures
Comparison	Curiosity about others	Can know what people are up to without asking them about it and without them knowing you know; creep culture/stalking; see who associates with whom with pictures and comments
	Facebook establishing social norms	Reinforces beliefs or opinions by seeing that others hold same beliefs or opinions; can see what is popular by observation; can follow norms
Facebook as an experience	Distractions	Procrastination; addictive; huge distraction
	Positive experiences	Facebook is referenced in daily life; provides entertainment at any time; status updates can promote a good mood
	Negative experiences	Changes the nature of communication from face to face to screen to screen; people willing to sacrifice privacy; inspires competition in people

aspects that make Facebook influential. During the brainstorming step, these key stakeholders generated a diverse and expansive list of statements. The sorting and ranking procedures yielded a robust map of 13 clusters that describe what makes Facebook influential from the viewpoint of its users. These 13 clusters can be further grouped into four key areas of influence. Items within the clusters and their ratings provide further insight into the constituents of influence. Thus, the current study provides a unique and comprehensive insight into the multidimensional ways in which Facebook may influence attitudes, intentions, or behaviors.

Previous work has illustrated the influence of both peers and media on adolescent and young adult behavior in the context of large ecological models. Facebook, as a social networking site, provides a venue for peer interaction and social networking; both are recognized as contributors to behavior.[43] While Facebook provides a novel lens through which to consider behavioral influence, its influence can best be considered in the context of robust behavioral theory. Thus, each of the four cluster groups can be considered alongside the framework of previous supporting work. In some cases, our concept map is synergistic with previous models, and in others it provides expanded applications of the initial framework or entirely novel contributions.

Connection

The six clusters that comprise the "connecting" group on the concept map illustrate ways in which Facebook provides and enhances peer communication, networking, and connection. These items dovetail well with decades of previous work that emphasizes the role of peers as a major focus of adolescence, including the older adolescent/young adult years that comprise college. Facebook expands the ability to connect with those known and new to people with great frequency and accessibility. Facebook allows this connection to take place across long distances and in real time, at any time, day or night. The influence of items in this cluster has synergy with the Homophily Model, which explains that media role models are more likely to be mimicked when the media model is viewed as someone like you.[44] Facebook provides an accessible platform to identify and connect with these like-minded peers without the traditional limits of geography. Connections to these individuals can be important to older adolescents because they allow them to establish a

degree of social presence, which, according to Short et al., is "the degree of salience of the other person in the interaction and the consequent salience of interpersonal relationships."[45] Via social networking, adolescents can have direct or indirect human contact, so virtual communication can occur in a way that is similar to face-to-face communication.[46] This can positively impact college students who are seeking peers with similar unusual hobbies such as bagpipes, or negatively influence college students who are seeking peers to engage in risk taking such as drug use.

Comparison

Comparison with other people has long been part of adolescence and young adulthood; social norms play a large role in perceptions of attitudes and behaviors that are acceptable and desirable. For example, previous studies have shown that adolescents who perceive their peers are sexually active are more likely to voice intention to become sexually active.[47] The Theory of Reasoned Action postulates that behavior is influenced by attitudes and perceived social norms, and Social Learning Theory explains how behavior can be learned by modeling.[48,49] Facebook allows this comparison to take place using tangible "evidence" such as photos, stated behaviors, and the ability to note peer feedback via comments on this information. The concept of "creep culture" began with Facebook, and describes how Facebook allows for passive investigation into peers' lives using the lens of Facebook.

Identification

This group describes the clusters regarding exploring and reflecting on one's identity using Facebook. Identity development is an essential part of older adolescent development, and Facebook provides a novel platform on which these efforts can take place.[50] The Media Practice Model explains that users choose and interact with media based on who they are and who they want to be at that moment.[51] Facebook allows a profile owner to develop an online identity through a profile. Profile owners can then reflect and revise that identity via feedback from peers' comments and "likes," or by personal perusal through the Facebook "timeline." The ability to develop one's identity in real time provides a unique multimedia view of the self.

Immersive experience of Facebook

Both negative and positive experiences are described in these grouped clusters, experiences that can even alter the experience of a given day including mood and decisions. This cluster may represent the most intriguing set up of items to consider, as it suggests that today's college students are well aware that these sites present immersive experiences, including positive, negative, distracting, and tool-based features, yet still are willing to make substantial commitments to their involvement in these online environments.

In considering the intersection between our concept map and existing behavioral models, it seems unlikely that Facebook would provide an entirely new mechanism by which behaviors are influenced. However, these 13 constructs and four groups suggest a comprehensive base for theoretical consideration to inform future work and the potential for intervention development using Facebook.

There are several limitations to the current work that should be considered. Traditional concept mapping methodology provides guidelines for small numbers of participants at each stage. In order to provide additional depth to this process, we included views from other social media researchers at the interpretation phase of the concept mapping process. Additionally, participant data were collected from students at one Midwestern university. Our study focused on young adults from a college student population. Finally, the data generated in this study is based on perceptions. Thus, the model created is based on these perceptions, which should not be considered as factual data. Further work should investigate whether findings may generalize to younger age groups and older adolescents not attending college.

Despite these limitations, our findings have implications for future work regarding Facebook. These study findings provide a comprehensive framework derived from a validated process that illustrates key elements of Facebook that may influence attitudes, intentions, or behaviors. The concept map may also contribute to the development of future interventions using Facebook. For example, the model supports the importance of comparison among Facebook users. At present, Facebook provides prompts that incorporate peer comparison to try to influence user behavior, such as "22 of your friends have already switched to Timeline." Future work could consider providing such prompts to promote positive health behaviors linked to keywords present on profiles, such as "12 of your friends exercised this week." As another example, the model illustrates the role of Facebook as a place in which identity development takes place. Researchers could consider providing prompts as Facebook advertisements that trigger users to consider whether they want certain behaviors as part of their online identity. For example, an advertisement could be triggered by keywords related to tobacco use on a profile, and could include a message such as "Do you want your tobacco use to be part of your public online identity?" These are only a few of the myriad of ideas that future researchers may consider. Thus, the findings in this study may inform both future research and clinical practice efforts to understand and address further this immersive and influential new tool.

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