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# COMPUTER-MEDIATED FRIENDSHIP NETWORKS

*Research-in-Progress*

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## Abstract

*Social networks have been around since the dawn of civilization. What is unique about social networks today is that a large part of these social networks is computer-mediated. Computer-mediated friendship networks (CMFNs) are a prime example of IT that matters. This research-in-progress focuses on the antecedents to CMFN usage based on Self-Determination Theory and Socio-Emotional Selectivity Theory. Findings show that Perceived Intrinsic Value, Perceptions of Homophily, and Perceptions of Emotional Support as well as Stage of Life impact CMFN usage in interesting ways. Contributions of this study include 1) showcasing the important role that friendship style plays in CMFNs, 2) empirically demonstrating the role of intrinsic motivation in an information system which has been unsuccessful previously, and 3) extending the literature on computer-mediated social networking by defining and analyzing a particular category of computer-mediated social networks, namely, the CMFN, which has not been examined previously in the literature.*

**Keywords:** Computer-mediated friendship networks, social networking, self determination theory, socio-emotional selectivity theory

## Introduction

The growth of social networking has been exponential over the last five years. Four of the top ten most frequented internet sites are social networking sites (Alexa.com, 2009). Social networking has been defined as “the use of social software--tools that support social interaction and communication” (Slack, 2007) or “hardware, software, and applications that support any sort of social behavior” (Smith & McKeen, 2008, p.410), or more precisely as “web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system” (boyd & Ellison, 2007, p.211). Social networks have been around since the dawn of civilization. What is unique about social networks today is that a large part of these social networks is computer-mediated. The largest type of Computer-Mediated Social Networks (CFSN) is friendship networks such as Facebook, MySpace, and Friendster. Other social networking applications focus on different audiences, such as Linked-In or Spoke for professional networking or YouTube, Flickr, and Tumblr for sharing multimedia or Twitter for micro-blogging. Because there is so much variety in social networking tools and applications, we are defining the more popular online friendship networks as Computer-Mediated Friendship Networks or CMFNs. Friendship is a cultural ideal embodied as a “mutually edifying moral covenant voluntarily negotiated between people” (Rawlins, 1992, p. 13). We propose that CMFNs are a prime example of IT that matters. A CMFN is a subset of social networking. A CMFN is defined here as *any online application that allows friendship relations to be managed with a suite of integrated functionality including, but not limited to, friendship lists and groups, email and instant messaging, forums, photo and video management, as well as interactive applications.*

While the focus of this research-in-progress (RIP) study is on friendship networks, the relevance to business is also a critical element of this research. CMFNs are already being considered as the next target for business users in a variety of areas. Managers are interested in friendship networks primarily from a marketing point of view. Word of mouth among a network of friends and family is known to be the most effective form of advertising, but, until recently, was the most expensive (Anderson, 1998; Hogan et al., 2004; Laczniak et al., 2001; Richins, 1983; Walker, 2001). If managers can be informed about the antecedents of CMFNs and their use by consumers then managers may be better equipped to take advantage of word of mouth advertising strategies in the context of increasing popularity of CMFNs. Other potential business uses of CMFNs include marketing research, innovation incubation, and knowledge sharing (Parameswaran & Whinston, 2007); research and development, sales, and customer support (Bernoff & Li, 2008); and discussion forums, online experiences, customer collaboration, and hiring (Kettles & David, 2008). Internal social networks for large companies may take the form of a CMFN in order to increase morale, retention, and a sense of community (Bernoff & Li, 2008). Technology in an organization is inherently social (Baptista, 2008; Kotlarsky and Oshri, 2005). While there are clear business consequences to social networks in general and CMFNs in particular, this study will focus on the antecedents to CMFN usage. A number of theories have been previously applied to online social networks in order to explain their usage, including TAM (Technology Acceptance Model), Social Exchange, and Social Capital. However, to date, no one has looked at the theories of friendship to explain CMFNs. This study offers an alternative explanation of CMFNs using Self-Determination Theory (SDT) and Socio-Emotional Selectivity Theory (SST) in contrast to most studies that have utilized TAM. The best example of a CMFN is Facebook. Facebook is a social networking website that was introduced at Harvard University in 2003 and was launched to the world in February 2004. Using Facebook, “users can join networks organized by city, workplace, school, and region to connect and interact with other people. People can also add friends and send them messages, and update their personal profiles to notify friends about themselves” (Facebook.com, 2009). Facebook has recently surpassed MySpace with over 250 million users (Facebook.com, 2009). Facebook is the largest social networking tool in the world at this time (Holahan, 2008), making it the largest social networking platform for friendship networks. To quote one participant in the study,

*MySpace and a few others I looked at were too juvenile for my tastes; too much into loud wallpaper and loud background music. And there is an age (13 - 19 years old?) when it seems as if only thing that can truly express your ‘unique’ individuality is the latest song playing on every pop radio station in the entire country. So I gave MySpace and assorted others a pass. Facebook seems to be past the “shiny and loud” interface -- it seems to be designed more for interaction than than distraction.*

There are significant gaps in the literature in terms of providing a) clear definitions of the different types of social networking applications, b) an overall framework for computer-mediated social network research, or c) analytic treatment of CMFNs. When computer-mediated social networks (CMSNs) are examined in the IS literature they are typically all lumped together without any clear differentiation among the different types of CMSNs (such as professional networks like Linked-In, avatar networks like Second Life, and CMFNs like Facebook). In this study, we merely identify CMFNs as one of the major components of CMSNs that is deserving of closer attention and examine its antecedents. Given the importance of CMFNs to business and the gap in existing knowledge, this study investigates the following research question: *What are the antecedents of Computer-Mediated Friendship Networks, using Facebook as the focus of study, that drive their usage?* In order to answer this question, a pilot study has been completed utilizing a survey of 102 Facebook users including students and business professionals. This research-in-progress is further discussed in the rest of the paper.

This paper is organized as follows. In the second section, we present the theoretical foundation with a review of the relevant literature. In the third section, the proposed research model is presented with relevant hypotheses. The fourth section describes the methodology of the study including survey construction, data collection, and measurements. The fifth section presents the results and key findings based on the preliminary data. The final section addresses limitations and the next steps for this research-in-progress.

## Conceptual Development and Proposed Research Model

Computer-mediated social networks are receiving more and more attention in the IS literature although the topic is still in its infancy. As a result, there are no agreed-upon and clear-cut definitions or taxonomies of computer-mediated social networks. A variety of theories have been used recently to explain CMSNs including the Technology Acceptance Model (TAM) (Hu & Kittinger, 2008; Sedgianowski & Kulviwat, 2008), Social Capital Theory (Hu & Kettinger, 2008; Reynolds, 2007), Social Exchange Theory (Hu & Kittinger, 2008), Flow Theory (Hu & Kittinger, 2008) and Personality Type Theory (Birnie & Horvath, 2006; Rosen & Kluemper, 2008). The predominant theoretical foundation for examining CMSN usage is still the Technology Acceptance Model (TAM), despite growing concerns that TAM may not be the proper theoretical foundation to study CMSNs. Because TAM was developed and studied in the context of business professional use of computer systems, it may not necessarily provide the theoretical foundation for the use of computers and computer applications outside of the professional setting. To provide alternate theoretical foundations to study CMSNs, in general, and CMFNs, in particular, we use Intrinsic Motivation and Self-Determination Theory (SDT) to move beyond TAM. Additionally, we incorporate Socio-emotional Selectivity Theory (SST), which explicitly addresses friendship and friendship development.

### *Limitations of Technology Acceptance Model*

The original TAM defines two constructs namely Perceived Usefulness (PU) and Perceived Ease of Use (PEU). PU is defined as “the degree to which a person believes that using a particular system would enhance his or her job performance” and PEU as “the degree to which a person believes that using a particular system would be free of effort” (Davis, 1989, p.320). TAM simply says that if a technology is useful, in a professional context, and easy to use, people are more likely to use it.

However, we do not see Perceived Usefulness being the best explanation for CMFN usage. The problem is that the original and extended versions of TAM alone cannot account for the use of CMFNs. Anecdotal evidence points to the fact that users do not find Facebook to be “useful.” Informal polling of Facebook users prior to the study indicated reasons for use such as:

- “I like reconnecting with old friends.”
- “I just use it to keep in touch with people I never get to see.”
- “reconnecting with old friends (and even relatives!)”
- “I just want to keep up with my friends.”
- “critical mass of people I want to interact with”
- “to connect with friends and reconnect with friends from my past... to stay connected and keep friendships strong, despite distance or time challenges.”

Other extensions of TAM do not fully address the idea of reconnecting with friends. Specifically, subjective norm (Venkatesh & Morris, 2000), social influence (Venkatesh et al, 2003), social attitudinal beliefs (Premkumar et al.,

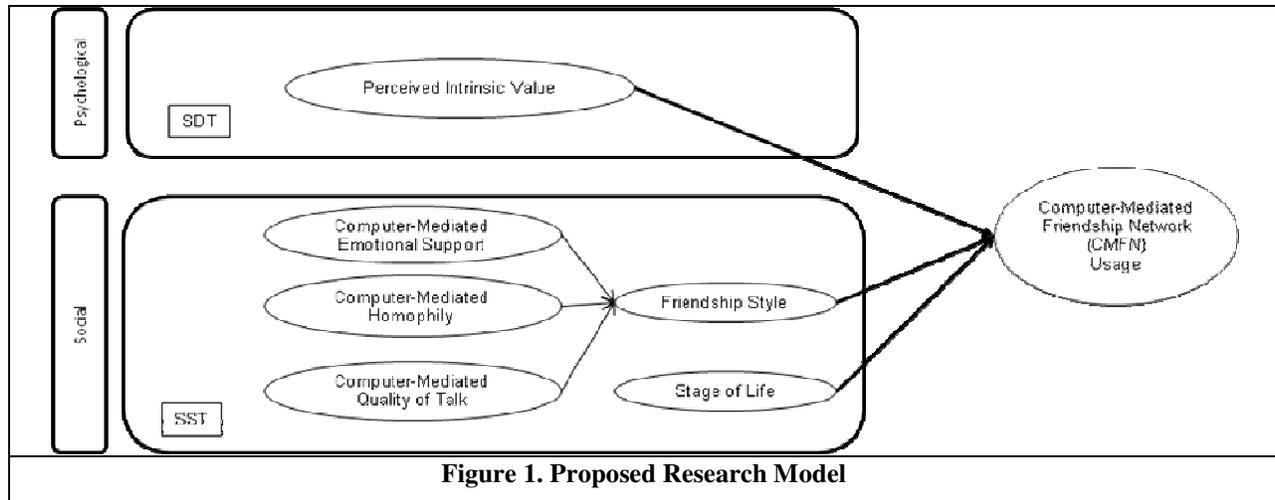
2008), computer playfulness and perceived enjoyment (Venkatesh & Bala, 2008) might be initially considered to explain CMFN usage. Subjective Norm is the degree to which an individual perceives that most people who are important to him or her think he or she should or should not use the system (Venkatesh & Morris, 2000) and Social Influence is defined as what others in society will think of the user's actions (Premkumar et al., 2008), however no one in this study indicated that others expected them to use a CMFN. Computer Playfulness is the degree of cognitive spontaneity in microcomputer interactions (Webster & Martocchio, 1992) and Perceived Enjoyment is the extent to which the activity of using a specific system is perceived to be enjoyable (Venkatesh, 2000). But these purely hedonic motivations such as playfulness or enjoyment or flow do not appear to be at the forefront of reasons given by people in this study. It becomes clear that the TAM model approaches the problem from an extrinsic motivation perspective. There are specific rewards and external reasons for using technology – i.e., *usefulness*. Interestingly, *intrinsic* value has not received much attention in the IS literature. One recent study (Malhotra et al, 2008) explores the area of intrinsic motivation as Internal Perceived Locus of Control, but research in this area remains sparse. In this context, the relevant question is why do people spend hours on Facebook every day with no professed *utility* besides “keeping up with friends”? This paper contends that CMFN's use is driven by a fundamentally different motivation. Whereas spreadsheets and ERP systems have extrinsic value, CMFNs, on the other hand, have intrinsic value. They matter in and of themselves. For intrinsic value, we need to leave TAM behind and consider Self-Determination Theory.

### ***Self-Determination Theory***

The intrinsic motivation aspect of this study is grounded in Self-Determination Theory (SDT). Self Determination Theory is “an approach to human motivation and personality that uses traditional empirical methods while employing an organismic meta-theory that highlights the importance of humans' evolved inner resources for personality development and behavioral self-regulation” (Ryan and Deci, 2000, p.68). Malone and Lepper (1987) have defined intrinsic motivation simply in terms of what people will do without external inducement. When Facebook users are pressed to answer why “keeping up with friends” is important, the response is simply “It just is. It is important to me”. Anecdotal evidence of this sort would indicate that there is an intrinsic motivational element to using social networking tools, rather than extrinsic. The motivation to use CMSNs is intrinsic because maintaining relationships is perceived to be good and important in and of itself. The construct we propose to examine more closely is “Perceived Intrinsic Value” (PIV). The possibility of such a construct has already been suggested (Davis et al., 1992; Srite and Karahanna, 2006; Venkatesh, 2000), however it has not yet been demonstrated empirically. PIV is defined here as *the degree to which a person believes that using a particular system is important in and of itself without any external inducement*.

Intrinsic motivation was explicitly examined by Davis et al. (1992), however ‘intrinsic’ was defined in the hedonic sense of enjoyment. Venkatesh et al. (2003) demonstrated that there was no significant relationship between intrinsic motivation and intention to use a particular technology. These past studies were inconclusive in their assessment of the important factors of technology adoption – veiled in a traditionally extrinsically-motivated framework. The reason these past studies did not find a relationship between intrinsic motivation and technology use was that a) past technology was more oriented to extrinsic motivation and b) CMFNs were not available yet. The construct of PIV makes sense when examining a specific kind of technology such as a CMFN that has a strong intrinsic element. SDT holds that “the most positive outcomes are derived from the self-determined types of motivation (i.e., intrinsic motivation, integrated and identified regulation), while the less self-determined forms of motivation (introjected and external regulation) are either unrelated or negatively related to adaptive outcomes” (Vallerand et al., 2008, p.259). If intrinsic motivation can result in better explanatory outcomes, this bears further scrutiny in IS.

**H1: Perceived Intrinsic Value (PIV) will have a positive relationship with CMFN usage.**



**Theories of Friendship Formation and Development**

Friendship is a specific type of relationship. The selection of friends is a free choice as opposed to familial relationships or neighbor relationships (Bellotti, 2008). Friendship is not an institution, but rather a private type of relationship (Bellotti, 2008). “Friendships are important for individuals’ health, self-esteem and well-being” (Reynolds, 2007, p.385). While friendship is difficult to define at a technical level and is associated with a variety of meanings in sociology, it is “the only traditional affective tie that seems to last today” (Bellotti, 2008, p.320). For these reasons, friendship is an important area of study in any context. While Social Capital Theory and Social Exchange Theory are certainly relevant to friendship, neither one has elaborated on the specific nature of friendship networks which is critical for our study of CMFNs. Social Capital Theory has been used in prior studies on social networking in general (Hu & Kettinger, 2008), however social capital theory does not focus in on friendship as a key component. Rather, social capital can be divided up into: group characteristics, generalized norms, togetherness, everyday sociability, neighborhood connections, volunteerism, and trust (Narayan & Cassidy, 2001). Furthermore, there is no consensus on a definition of social capital (Mand, 2006). For these two reasons, we look elsewhere for a specific friendship theory for CMFNs. Socioemotional Selectivity Theory (SST) is the theory that individuals have a set of socioemotional goals for friendships throughout their lives (Carstensen et al., 1999). While these goals stay the same, the priority of the different friendship goals shifts as people age and gain new experiences (Wright & Patterson, 2006). “SST posits that younger individuals tend to be future-oriented when developing relationships, and they are interested in forming expanded and diverse social networks in an attempt to gain novel experiences, information, and new social contacts. By contrast, older people, due to the perception they have relatively limited time, tend to prefer smaller social networks comprised of familiar, emotionally close, and meaningful relational partners” (Wright & Patterson, 2006, p.164). Friendship styles can be divided into three categories: 1) discerning, 2) independent, and 3) acquisitive (Matthews, 1986). It is suggested that the friendship styles will have a direct relationship with the usage of the CMFNs since friendship is often the reason that these types of CMFNs exist.

A discerning style is one in which the individual forms few but deep and enduring friendships. An independent style is one in which the individual forms many new friendships easily which may not endure over the long run (Wright & Patterson, 2006). The third style, acquisitive style, is a hybrid of the first two, having both close long-term friendships as well as new and transitory friendships. This study will focus on the primary two styles.

**H2: The Independent friendship style will have a positive relationship with CMFN usage.**

**H3: The Discerning friendship style will have a negative relationship with CMFN usage.**

Stage of life is known to have an effect on traditional friendship networks in terms of both friendship style and number of friends (Wright & Patterson, 2006). “Friendship is intimately related to stages in the life course” (Mand, 2006, p.321). There is empirical evidence that younger and older people view friendship itself differently over the lifespan (Patterson, Bettini, & Nussbaum, 1993). Furthermore, social networking sites in general and CMFNs in particular have been targeted towards young people, at least initially when new sites have been launched (Hargittai,

2007). While age is not the only factor that affects CMFN usage, it is clearly a large part of the story. The notion of stage of life in CMFN usage is starting to garner much needed attention (Beer, 2008). Therefore, we propose that:

**H4: Stage of life will have a significant relationship with CMFN usage.**

Three major elements of meaningful friendships have been used previously in SST literature: 1) perceptions of homophily, 2) perceptions of emotional support, and 3) perceptions of quality of talk (Wright & Patterson, 2006). Homophily is defined as “a preference principle referring to the tendency to seek out and bond with others who are like ourselves” (Zeng & Xie, 2008, p.616). Perception of emotional support includes both actively communicating support as well as listening (Wright & Patterson, 2006). Emotional support also means talking about private matters in particular (Bellotti, 2008). Quality of talk refers to whether communication is relaxed or strained, in-depth or superficial and guarded or open (Wright & Patterson, 2006). Where perceptions of emotional support and perceptions of quality of talk have been shown to have a large impact on friendship style in an offline context (Wright & Patterson, 2006), it is unclear how the situation changes in an online CMFN context. One might argue that it is more difficult to convey emotional support or high quality talk in an online environment than it is in a traditional offline (face-to-face) friendship network. At the same time, we cannot assume that online friendships are completely different from offline friendships (Beer, 2008). In this context, we propose the following hypotheses:

**H5: Perceptions of Homophily will have a significant relationship with Friendship Style in the context of CMFN usage.**

**H6: Perceptions of Emotional Support will have a significant relationship with Friendship Style in the context of CMFN usage.**

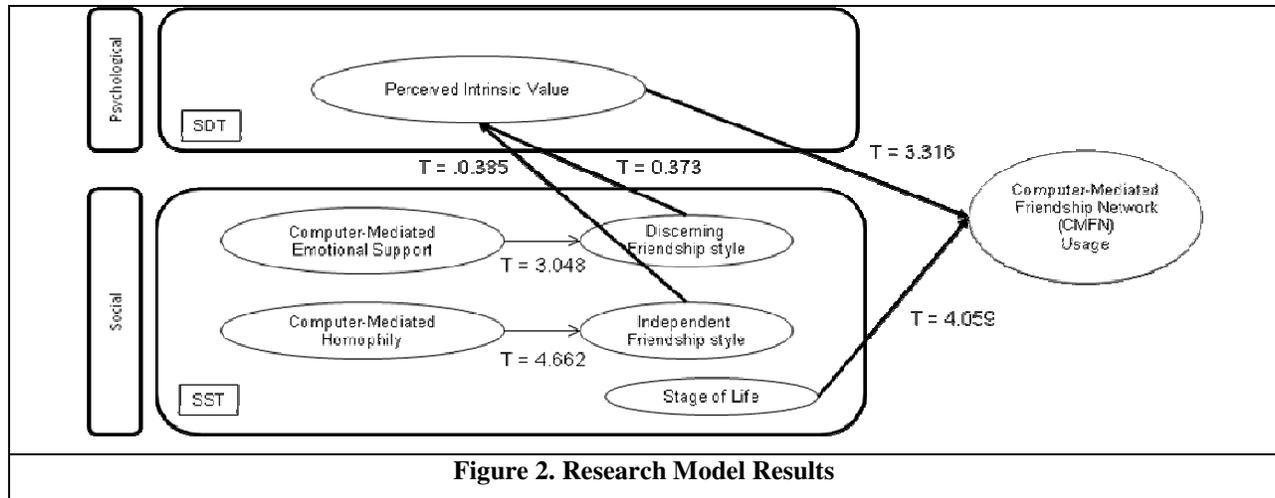
**H7: Perceptions of Quality of Talk will have a significant relationship with Friendship Style in the context of CMFN usage.**

## **Methodology**

The research model was tested with pilot data from 118 Facebook users. Users invited to participate included students, business professionals, and retirees so the social spectrum was broad. Recruitment of participants was done via posting the survey as available in different Facebook groups, different Linked-in groups, and personal email distribution lists. Because age can be a factor in friendship style, it was important to get more than just student-based data. Facebook was selected as the exemplar of a CMFN due to 1) its overall size as the largest CMFN, and 2) its more mainstream and adult popularity. Measurement items were adapted from IS, psychological, and sociological literature. After pilot testing, the survey instrument may require slight modifications to be determined. All items are five-point, Likert-type scales from 1 “strongly disagree” to 5 “strongly agree”. The survey itself is being distributed electronically using surveymonkey.com. Items for “Perceived Intrinsic Value” were adapted from Deci and Ryan (2000) and Vallerand et al. (2008), including questions about control, decisions without influence, and feelings of connectedness. Items for “Perceived Quality of Talk”, “Perceived Homophily” and “Perceived Level of Emotional Support” were adapted from Wright and Patterson (2006). Items for the three Friendship styles were adapted from Matthews (1986). Respondents were asked which friendship style they related to, similar to Wright and Patterson (2006). “CMFN Usage” was measured by three elements of use: 1) size of friendship network (literally the number of online friends), 2) frequency of usage, and 3) how many months it had been used. Structural Equation Modeling (SEM) with SmartPLS software was used to analyze the data and determine the relationships between constructs.

## **Initial Results**

A total of 118 people completed the survey. Out of these, 16 participants indicated that they were not currently Facebook users. Of these, 57% said they had no interest, 28% had privacy or security concerns and 10% indicated they had no time to try it. The remaining 102 respondents were Facebook users made up of 53% females and 47% males. The mean number of months of usage was 15 and the mean number of online friends was 179. Roughly half the respondents are currently university students (based on their Level of Education selection), the other half non-students. Support was found for H1. Partial support was found for H2 and H3 insofar as PIV mediates the relationship between style and usage instead of style affecting usage directly. Support was found for H4, H5, and H6. No support was found for H7, Perceptions of Quality of Talk. Research results are presented in Figure 2.



Average Variance Extracted (AVE) for the constructs is shown in Table 1 below. All constructs have an AVE of at least 0.5 for internal consistency. The latent variable correlations from SmartPLS are shown in Table 2.

**Table 1. Average Variance Extracted**

	AVE
Age	1
Discerning	0.866701
Emotional Support	0.997827
Homophily	0.793196
Independent	0.996656
PIV	0.584402
Use	0.573387

**Table 2. Latent Variable Correlations**

	Age	Discerning	Emotional Support	Homophily	Independent	PIV	Use
Age	1						
Discerning	-0.10616	1					
Emotional Support	-0.127909	0.975854	1				
Homophily	-0.144055	0.947739	0.96812	1			
Independent	-0.143445	0.976723	0.996818	0.968062	1		
PIV	-0.161705	-0.014885	0.032119	-0.014339	0.016262	1	
Use	-0.433184	0.076581	0.082809	0.051318	0.07952	0.420081	1

## Discussion

The finding that PIV is much more significant for CMFN usage is important and represents a valuable contribution to the field in terms of continuing the trend of evolving our field beyond straightforward TAM studies. Stage of life is clearly important for CMFN usage which underscores the relevance of Socio-Emotional Selectivity theory – as people get older their friendship network tends to get smaller but stronger whereas younger people tend to have more friends (both online and traditional). Age, however, does not completely explain CMFN usage because it is not

as simple as “young people use technology and older people do not” because the 16 non-users were spread out over age ranges (4 were 18-25, 3 were 26-35, 6 were 36-55, 2 were 56-65 and 1 was 65+). Rather, it is the combination of age and friendship style that drives usage of CMFNs. It is possible for younger people to have a discriminating style and older people to have an independent style, for example. An interesting line of research would be to compare users versus non-users within a particular age group (Hargittai, 2007), but more non-user data would need to be gathered in order to address this relevant issue. Some of the 16 non-users did provide some interesting detail around why they did not use Facebook including:

- *I use e-mail and cell phone to stay in touch with friends. It fits well with my schedule and it is very convenient[sic] for me.*
- *I found Facebook superficial and distracting. Facebook consumes too much time in trivial and meaningless 'networking'. I find it more meaningful to actually communicate via phone or email as well as in person.*
- *I don't use it because it could hurt my professional reputation. My friends use it and like it but I've heard a lot of stories about inappropriate activities being discussed online.*

The idea of superficiality of communication mentioned by the second quote is exactly the phenomenon of interest here. The online context of CMFNs is clearly different from the context of offline friendships, but the extent of these differences requires further exploration. The constructs of Homophily, Quality of Talk, and Emotional Support as well as Perceived Intrinsic Value should get us better explanations than simple TAM.

To this end, we have several next steps for this research in progress. Based on the qualitative data gathered as part of the survey, we need to uncover additional aspects of friendship style in order to tell the compelling story of how the emotional elements of friendship affect PIV. The idea of “talking” on a CMFN versus other types of communication comes up frequently, as do emotional elements.

- *It's easy to talk over the internet than face to face...*
- *Something can be easily said easily through Facebook but not phone call.*
- *It is useful for me to be able to contact others when I am traveling to a city where I'm not sure if I know anybody. That is just about the extent to which I find facebook useful.*
- *Nice way to keep up with distant friends/family...it is less hassle than going to reunions.*
- *To stay up to date on other friends ... and to try and be supportive for others.*
- *What I have found is that the depth of communication is much less here. You "hear" from or about people, but don't talk much to them; moreover, "old-fashioned" emails and phone calls have become much fewer from the group.*
- *I started using Facebook when I retired to keep in touch with my work acquaintances since I do not live in the same town that I worked in. Once on Facebook a lot of people from my High School class found me and I re-connected. However, I find that I have very little in common with them and they seem to be the group that wants to make religious and political pronouncements. Something that I personally am not interested in using the internet for. Therefore communicating with them seems to be one-way.*
- *Easy to maintain casual contact and rediscover folks from prior stages in life.*

## **Limitations and Contributions**

There are a few limitations of this research-in-progress so far. The sample size needs to be increased. The link between friendship style and PIV does not yet show the significance that was theorized. Refinement of the Quality of Talk items should increase this. This study contributes to the current literature in several ways by extending our understanding of the popularity of CMFNs. First, this study showcases the important role that friendship style, in general, and perceptions of emotional support, in particular, play in CMFNs. Second, the role of intrinsic motivation in an information system is empirically demonstrated, which has been unsuccessful previously. Third, the literature on computer-mediated social networking is extended by defining and analyzing a particular category of CMSNs, namely, the CMFN, which has not been examined previously in the literature. Practitioners will ultimately benefit from understanding the factors that lead to larger and more frequently used CMFNs. If word of mouth among a large network of friends is the most effective form of advertising, then managers will need to be better informed about the antecedents of CMFNs in their advertising strategies. For example, relegating CMFN to a purely youth phenomenon would be a serious error in business strategy. Some businesses will also want to know how to increase CMFN usage within their own organizations as they build out social networking platforms for internal collaboration. As this is a research-in-progress, we gladly welcome feedback on how to improve the approach to studying CMFNs.

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