



Social interactions across media

Interpersonal communication on the internet, telephone and face-to-face

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Abstract

Two studies compared college students' interpersonal interaction online, face-to-face, and on the telephone. A communication diary assessed the relative amount of social interactions college students conducted online compared to face-to-face conversation and telephone calls. Results indicated that while the internet was integrated into college students' social lives, face-to-face communication remained the dominant mode of interaction. Participants reported using the internet as often as the telephone. A survey compared reported use of the internet within local and long distance social circles to the use of other media within those circles, and examined participants' most recent significant social interactions conducted across media in terms of purposes, contexts, and quality. Internet interaction was perceived as high in quality, but slightly lower than other media. Results were compared to previous conceptualizations of the roles of internet in one's social life.

Key words

face-to-face • internet • interpersonal communication • media • social interaction • telephone

Socializing with others is among the most popular uses of the internet (Pew Project on the Internet and American Life, 2000; UCLA Center for Communication Policy, 2000). This has prompted considerable speculation and disagreement about the nature and consequences of online social contacts. As we review below, the collective findings from the recent burst of research on the internet ‘can be interpreted to support or refute the claim that the internet is a solitary activity, harmful to social relations with others’ (Haythornthwaite and Wellman, 2002: 24; Nie and Erbring, 2000; Pew Project on the Internet and American Life, 2002). This article argues that understanding the role of the internet in social life requires that we differentiate between the wide variety of online activities, recognize that individual relationships can be maintained through multiple media, acknowledge that internet use is shaped by user choices, and make direct comparisons between internet social contacts and other means of pursuing social contact. This article presents two studies that compared interpersonal interaction online, face-to-face, and on the telephone in a population of American college students who used the internet to socialize.

Our first study, a communication diary, assessed the relative amount of social interactions that college students conducted via the internet in comparison with face-to-face conversations and telephone calls over the course of several days. The second, a survey, compared participants’ reported use of the internet within their local and long-distance social circles to the use of other media within those circles. It also compared participants’ most recent significant social interactions that were conducted online, face-to-face, and on the telephone in terms of purposes, contexts, and quality. Together, the two studies examined the relative place of online social contact in the naturalistic patterns of typical days and compared online social activity to socializing in other media directly.

THE NEED TO DIFFERENTIATE ONLINE ACTIVITIES

A common strategy in assessing the social and personal well-being consequences of the internet has been to compare people based on their amount of internet use. Although rarely articulated, this positions the internet as a technologically-deterministic force. The internet is seen as a single entity that influences its users through sheer exposure. As Jung et al. (2001) note, using internet exposure as an independent variable presumes the direct effects model that was cast out of media studies decades ago. Instead, the internet should be treated as ‘a cultural devise used to achieve social and cultural goals’ (Matei and Ball-Rokeach, 2002: 408). The pursuit

of those goals should provide the starting point for analysis rather than totalizing measures of all internet use (which includes activities as varied as staying in touch with faraway friends, arranging appointments, banking, shopping, listening to music, reading news, and viewing pornography).

Nonetheless, many of the most influential and widely-publicized studies of the internet's role in sociability compare internet users and non-users, heavy and light users, or experienced and new users. The findings are mixed. The first article from the Carnegie-Mellon Homenet Project (Kraut et al., 1998) and Nie and colleagues (Nie and Erbring, 2000; Nie et al., 2002) associate internet use with negative social outcomes including less time spent with family and friends, less total social involvement, and more loneliness and depression. On the other hand, Kraut et al.'s (2002) follow-up analysis of the Homenet sample a year later found that these negative associations were gone, suggesting the importance of user experience (see also LaRose et al., 2001). The UCLA Center for Communication Policy (2000) found no reported differences in socializing with friends since going online, but did find that experienced users reported spending slightly less time with family than new users. UCLA's comparisons of internet users and non-users found no differences in the amount of friends that were seen or spoken with at least once each week, or the amount of friends outside their household. The Pew Project on the Internet and American Life (2000) found that internet users were more likely than non-users to have visited family or friends 'yesterday', and that they spent more time with clubs and volunteer organizations. Robinson et al. (2002) examined time-diary data and found that internet users spent three times more time attending social events and reported significantly more conversation than non-users. One reason that these findings are so mixed may be the conflation of all internet activities into one. In contrast to this approach, we began with the activity of social interaction. Our first research question aimed to specify the internet media (e.g. email, instant messaging, chat, MUDs, newsgroups, webboards, multiperson role-playing games) that college students used in their significant social interactions.

RQ1: What kinds of internet media do college students report using for significant social interactions?

THE NEED TO VIEW RELATIONSHIPS AS MAINTAINED THROUGH MULTIPLE MEDIA

Conceptualizing the internet as a causal monolith makes it easy to imagine that there is a 'cyberspace' that exists apart from everyday life rather than integrated into it (e.g. Haythornthwaite and Wellman, 2002; Miller and Slater, 2000). This perspective often presumes the inferiority of 'cyberspace' in contrast to 'real' space. For example, Kraut et al. (1998) argued that poorer quality, weak-tie, internet social relationships may be substituted for

better (i.e. face-to-face) relationships, or that time spent online might otherwise be spent forming strong-tie (i.e. face-to-face) relationships. Both perspectives set the internet in juxtaposition to, and competition with, a world of strong, deep, rewarding face-to-face relationships. Nie et al. claimed that 'virtual contact may be more superficial than that which occurs in more personal settings', and that email 'appears to imply an obvious tradeoff between quantity and quality of social interaction' (2002: 238). Such a 'tradeoff' is only 'obvious' if one believes the internet is both separate and significantly different (i.e. more impersonal) from the theoretically privileged world of face-to-face social contact.

The view of the internet as inherently unreal has become increasingly problematic as research has demonstrated that most online interactions are between people who have also talked on the telephone or met face-to-face (Miller and Slater, 2000; Pew Project on the Internet and American Life, 2000; UCLA Center for Communication Policy, 2000, 2001, 2002). Relationships are maintained through multiple media. One goal of this article is to examine how internet interactions are woven into the daily maintenance of relationships (i.e. telephone conversations and face-to-face interactions). Specifically, we examined the following research questions:

- RQ2: What are the relative frequencies of significant voluntary social interactions that college students report conducting on the internet in comparison to face-to-face conversations and telephone calls?
- RQ3: How many media do students report using for significant social interactions over a three to five-day timespan?
- RQ4: On average, how many relationships are sustained *only* through the internet?
- RQ5: What are the relative percentages of students' social relationships that are maintained at least in part through the use of the internet in comparison to those maintained at least in part through face-to-face communication, telephone calls, and mail?

THE NEED TO CONSIDER MULTIPLE INFLUENCES ON SOCIAL INTERNET USE

In examining the diffusion of the telephone into daily life, Fischer (1992: 269) argued that 'users try to put a new technology to their own ends, which can lead to paradoxical outcomes not easily deducible from the straightforward logic of the technology'. This social shaping of technology perspective emphasizes users' active roles in making choices about how to engage technologies depending on their circumstances, personality traits, and needs. How people choose to use the internet socially is influenced by their relationships, including their geographical distance and type, and individuals' pre-existing sociability (Dimmick et al., 2000). They proposed that online social interaction fills a different niche from telephone interactions in long-distance communication. Their interviews showed that email was considered

superior to the telephone for keeping in touch with people who lived far away and in different time-zones. Nearly half of their respondents said that they used long-distance telephone calls less, now that they were online. Interpersonal media use also seems to depend in part on the kinds of relationships in which people communicate.

Large-scale international survey studies conducted through the National Geographic website (Chen et al., 2002; Quan-Haase et al., 2002) examined the reported frequency of weekly contact with relatives and friends face-to-face, on the telephone, and via email. Chen et al. (2002) compared near (i.e. within 50 km) versus faraway friendships and family relationships. They found that locally, the telephone was used most. In long-distance relationships, email predominated. Regardless of distance, email was used more with friends than relatives. Quan-Haase et al. (2002) found that email and face-to-face communication each comprised of 29 percent of all contact with nearby friends. However, with local kin email was less frequent, constituting 17 percent of all contact compared to the 27 percent that was conducted face-to-face. In distant relationships, Quan-Haase et al. (2002) found that 49 percent of all social contact with kin was conducted online, while 62 percent of interactions with friends employed the internet.

The extent to which people use the internet and other media interpersonally also seems to be driven by the users' underlying sociability. Matei and Ball-Rokeach (2002) looked at the strength of local ties of internet users in Los Angeles. They found that the stronger one's local ties were, the more likely one was to meet new people online. Chen et al. (2002) found that the more subjects reported that they emailed family, the more they reported interacting with them face-to-face and on the telephone. Copher et al. (2002: 274) requested that community leaders keep diaries of 'all communications involving the transmission of information beyond a simple greeting' for one week, and compared the results of heavy and light email users. Subjects also completed a survey about their communication partners or 'alters'. They found that heavy email users had 'greater numbers and percentages of communications, time spent communicating, and alters than light email users'. For personal (as opposed to work) communications, heavy email users used proportionately more face-to-face communication than light users (Copher et al., 2002). Analyses such as these bear repeating in other populations. Thus, we posed these general research questions:

- RQ6: How does college students' use of communication media to maintain relationships differ when the relationships are local, long distance, close local, and close long distance?
- RQ7: Does college students' use of the internet in their social circles correlate with the use of other media within those circles?

THE NEED FOR COMPARATIVE ANALYSIS OF INTERACTIONS

Ultimately, the primary reason for concern about the consequences of online interaction would be that there are meaningful differences between online interaction and other means of socializing. However, very little research has directly compared interactions across media. Cummings et al., (2002) had students keep interaction diaries. For each interaction, subjects were asked to assess the medium's usefulness for achieving purposes including getting work done, maintaining relationships, and exchanging information. They found that the internet was rated worse for maintaining relationships, and better for getting schoolwork done and exchanging information. They concluded that email was inferior to phone calls or face-to-face meetings for relational communication.

As they acknowledged, their sampling procedure in which students were asked to record all interactions in a four-hour block may have resulted in data filled with insignificant interactions. To mitigate against this problem in the current studies, we asked subjects to report only 'significant' social interactions, leaving it to them to determine what constituted 'significance.' Cummings et al.'s (2002) measures are also problematic in that they conflate interaction quality with interaction purpose, as the sole measure of quality was participants' ratings of how useful the medium was for specified purposes. We separated quality of interaction from purpose. In order to directly compare online social contacts to those conducted in other media, we proposed three research questions, which assessed the interactions in terms of their purposes, contexts and quality. These variables, while far from exhaustive, together describe interactions from a variety of perspectives.

- RQ8: Are media used in different amounts depending on the purpose of the interaction (social vs. non-social)?
- RQ9: How do the physical contexts (location, local vs. long distance, presence of others, and engagement in other activities) of online interactions differ from those in other media (face-to-face conversations and telephone calls)?
- RQ10: Does the perceived quality of interaction depend on medium (face-to-face, internet, telephones), relationship (romantic partner, friend, family member, and acquaintances), purpose (social/non-social), or interactions amongst these variables?

STUDY 1: DIARY

To examine our research questions about internet use and frequency relative to other media within the context of ongoing daily life, we began by having students keep interaction diaries over the course of several days. Interaction diaries provided a detailed portrait of the flow of spontaneous social interaction (Duck, 1991; Duck et al., 1991; Reis and Wheeler, 1991).

METHOD

Participants

Fifty-one students (M age = 22.42, SD = 3.64) at two large midwestern universities were recruited from introductory public speaking courses and received course credit for their participation. Participants had to meet the minimal criterion of identifying themselves as someone who 'socializes over the internet'. College students represent a particularly appropriate sample through which to understand the rise of the internet in social life, given their status as 'pioneers' for whom social internet use has already become frequent and mundane (Pew Project on the Internet and American Life, 2002). Furthermore, college represents a time in life during which people are particularly likely to be learning how to use and integrate multiple means of communication in their social lives (Pew Project on the Internet and American Life, 2002). The Pew Internet Project found that 42 percent of students socialized online, more than they engaged in any other online activity. The average student spent one to three hours a week in online social communication.

There were 36 (70.6%) females and 14 (27.4%) males and one participant (2%) did not indicate gender. Among the 51 participants, there were 35 white, six African-American, five Hispanic, three Asian/Pacific islanders, and two other. Participants reported that they had used the computer for 11.39 years (SD = 3.29) and had been online for 5.59 years (SD = 1.76).

Materials and procedures

Participants completed a survey which assessed demographic information and computer and internet use history. Then, they were asked to complete a record of each 'significant voluntary social interaction' in which they engaged during the next three to five-day period. The interactions represented by these logs are a subset of a person's total interactions. The interaction record noted the medium through which the interaction was conducted. By collecting these records over a span of several days, we were able to access a typical sample of each subject's everyday social life. The 51 students recorded 862 interactions. Study 1 addressed the first three research questions.

RESULTS

The first research question asked what types of internet interaction were used for significant voluntary social interactions. Almost all of the internet interactions which participants reported were email (72.79%), chat (19.85%), and instant messaging (7.35%). No interactions were identified as taking place in newsgroups, MUDs, role-playing games, or any of the other internet-enabled communication formats.

• Table 1 Number of media used

MEDIA USED	N
Only face-to-face	1
Only telephone	0
Only internet	1
Face-to-face and telephone	12
Face-to-face and internet	4
Telephone and internet	1
Face-to-face, telephone, and internet	32
Total	51

The second research question asked about the frequencies of significant voluntary social interactions that were conducted face-to-face, on the telephone, and on the internet. The specific medium used in nine out of the 862 interactions was unidentified and thus were omitted from this analysis. Of the 851 interactions, most (64%) were face-to-face. There were only slightly fewer internet interactions (16.1%) than telephone calls (18.4%).

Our third research question asked how many, and which, combinations of media individuals reported using for significant social interactions within a three to five-day timespan. As seen in Table 1, the diaries showed that people conducted their social lives through at least two, and often three, channels on any given day. Among the 51 participants, only one person reported exclusively face-to-face interactions or internet interactions during the reported days. By contrast, 32 people (64%), reported conducting interactions face-to-face, on the phone, and online. Thirteen people reported no significant internet interactions; six people reported no significant telephone calls; and two did not report any face-to-face conversations.

DISCUSSION

These diaries demonstrated an online social life that was both connected to communication in other media and had its own limited but pervasive use in interpersonal communication. Although these users were adept at using the internet socially and had integrated it into their daily lives, face-to-face communication clearly remained their dominant mode of interaction. This is in contrast to Chen et al.'s (2002) finding that the telephone was the most frequent communication medium. There were nearly as many internet interactions as there were telephone interactions, supporting previous studies (Dimmick et al., 2000; Flanagin and Metzger, 2001; Stafford et al., 1999) which found that the internet has come to rival the telephone as a medium for conducting personal relationships.

Overwhelmingly, the online interactions that students identified as significant were conducted through email and, to a lesser extent, chat and instant messaging (IM). In contrast to public spaces such as webboards or chatrooms, these modes of online interaction often privilege communication with people whose email addresses or screen names were acquired face-to-face. This suggests that much of the significant social interaction that these students reported having online was conducted very likely in multimedia (rather than 'online') relationships.

The diary study collected rich data on social interaction from a small set of students over time, and hence provided insights into the relative use of each medium in daily social interactions. However, because the interactions were all collected from the same 51 students (i.e. were not independent), we were unable to compare interactions. This sample size also limited the generalizations that we can draw. Our second study used a survey with a larger sample and collected only one interaction from each student. We also controlled for the frequencies of interactions reported in each medium and for the kinds of relationships in which people reported their interaction.

STUDY 2: SURVEY

This second study revisited the first research question that was examined in Study 1, answering our remaining questions regarding the relative use of the internet within students' social circles and the comparative purposes, contexts, and quality of online (versus face-to-face or telephone) interaction.

METHOD

Participants

For the participants, 496 college students (M age = 20.67, SD = 1.63) were recruited from a midwestern university. They received course credit for their participation. Participants had to meet the minimal criterion of identifying themselves as those who 'socialize over the internet'. Among the 496 participants, there were 40.9 percent (N = 203) males and 59.1 percent (N = 293) females. The majority of the participants were white (N = 424), 20 were Asian/Pacific islanders, 20 were African-American, 13 identified their races as 'other', 11 as Hispanic/Mexican-Americans, four as Native American, and one did not identify any race. Participants reported an average of 7.37 years of experience in using computers (SD = 2.81), and 5.33 years of experience of using the internet (SD = 1.72).

Materials and procedures

Participants were asked to answer questions about their most recent significant social interactions in order to minimize the effects of memory distortion. First, we controlled for the medium of the interaction (three types: face-to-face, telephone, internet) and relationship type (four types:

acquaintances, friends, family members, and partners). Thus, there were 12 versions of the survey, and participants were randomly given one of the 12 questionnaires (e.g. a face-to-face interaction with a friend, a phone conversation with a family member, or an internet interaction with a partner). There were a few instances where participants were unable to recall the type of the interaction as described by the survey. These participants were given a different version of the survey. In all, approximately one-third of the participants were asked to report their most recent significant face-to-face conversation, one-third to recall a telephone call, and one-third to recall an online interaction. Within each medium, one-quarter reported conversations from each relationship type. In addition to describing the interaction, participants were asked to answer a series of questions about the history of their computer use, communication in their social circles, and their perceptions of the quality of interaction.

With regards to questions about communication in their social circles, a local social circle was defined as 'the number of people, including relatives and friends, in the same town with whom you keep in touch at least once a month' (Kraut et al., 1998: 1021). The distant social circle was defined as 'the approximate number of people, including relatives, work colleagues, and personal friends, outside of the [town name] area whom you keep in touch with at least once a year' (Kraut et al., 1998: 1021). Within the local and long-distance social circles, participants were asked to estimate how many people they were close to and, of those, the percentage with whom they communicated using each medium. Participants estimated how many people they interacted with within each of their social circles (local, close local, distant, close long-distant) by circling a number (1 = 0–5 people, 2 = 6–10 people, 3 = 11–15 people, 4 = 16–20 people, 5 = 21–25 people and 6 = more than 26 people). They also provided a specific number within the range that they circled. Participants were asked to estimate the percentage of each social circle with whom they communicated using each medium (i.e. face-to-face, telephone, internet, mail) by giving a number between 0 and 100 percent for each medium. Then, participants specified the number of people in their social circles with whom they interacted *only* through the internet.

Participants who reported online interactions were asked to specify types of internet use (email, IM, or others). All participants were asked to report the purpose of the interaction by indicating whether or not the interaction was social (i.e. facilitating some social objective such as arranging an activity, becoming better acquainted or interacting just for the sake of interacting). Participants also reported the location of this interaction (1 item; 1 = at home, 2 = someone else's home, 3 = work/school, 4 = public space, 5 = others), the presence of others in this interaction (1 item; 1 = yes, 2 = no), and whether participants were engaged in other activities during

the interaction (1 item; 1 = yes, 2 = no). Finally, participants were asked to evaluate interaction quality on a four-item semantic differential scale of 1–5: the extent to which the interaction was boring/interesting, dissatisfying/satisfying, distant/intimate, and unpleasant/pleasant. Higher numbers indicated more interesting, satisfying, intimate, or pleasant. The internal consistency of the four items using Cronbach's alpha was satisfactory ($\alpha = .81$). Therefore, a mean index ($M = 3.89$, $SD = .04$) was created for interaction quality by collapsing the four items. The mean interaction quality in this sample indicated that, overall, these voluntary social interactions were perceived as high in quality.

RESULTS

In order to verify the findings from Study 1 with a larger sample, the first research question that was addressed in Study 1 (i.e. 'What types of internet interaction were used for significant voluntary social interactions?') was re-examined in Study 2. Participants who reported on internet interactions were asked to specify the kind of online interaction that it was; 128 participants specified the type of internet use. Results revealed that 91 (71.1%) of the specified internet interactions were conducted through email, and 37 (28.9%) were conducted through IM.

Distribution of media use within social circles

Our next set of research questions explored the relative use of the internet in participants' social circles (M local social circle = 18.32, SD local social circle = 11.96; M distant social circle = 18.45, SD distant social circle = 16.45; M close local social circle = 9.41, SD close local social circle = 7.01; M close distant social circle = 8.50, SD close distant social circle = 7.54).

Question 4 asked how many relationships participants reported that they sustained only through the internet. Results indicated that of the average of 36.77 people in their local and long-distant social circles combined, subjects communicated with an average of 2.65 through the internet alone. Note that these relationships did not necessarily develop online, but were maintained online.

Questions 5 and 6 asked about the relative amount of social circles sustained, at least in part, through each medium and how this was affected by the geographical distance or perceived closeness of relationships. Table 2 summarizes the mean percentages of each social circle communicated with using the internet, face-to-face communication, telephone, and mail. The social circles were the local and the long-distant and, within each of these, the subset of close relationships. That the rows do not total 100 percent demonstrates that single relationships are often maintained through multiple media, creating overlap in the columns.

• Table 2 Mean percentage of interaction: social circle by medium type

	FACE-TO-FACE	TELEPHONE	INTERNET	MAIL
Local social circle	73.49	49.32	35.07	5.70
Distant social circle	41.55	49.61	48.99	13.94
Close local social circle	79.33	57.15	35.66	6.74
Close distant social circle	50.23	56.57	49.77	15.90

Note: single relationships are often maintained through multiple media, creating overlap in the columns. Therefore, rows do not total 100%.

These patterns of interpersonal media use depended heavily on geographical location and, to a lesser extent, on the closeness of the relationship. Local relationships were considerably more likely to be maintained face-to-face (73.49%) in comparison to the telephone (49.32%), internet (35.07%), or mail (5.6%). Long-distance relationships were equally likely to be maintained using the telephone (49.61%) and the internet (48.99%), and slightly less likely to use face-to-face communication (41.55%). Mail was used more in long distance relationships than local ones, but in a relatively small subset of relationships overall. More intimate relationships within the social circles were reported to use more face-to-face communication and telephone calls than the circle as a whole, but only negligibly more than internet and mail.

Question 7 examined the correlations between students’ estimated percentages of online interaction within their social circles and interaction using three other media (face-to-face, telephone, and mail). Four sets of correlation analyses were conducted between participants’ estimated percentages of online interaction and estimated percentages of face-to-face conversations, telephone calls, and mail within their local social circle, distant social circle, close social circle and close distant social circle. Results indicated positive correlations between estimated percentages of online interaction with all three other media (see Table 3) in all four social circles. The strongest correlations were between telephone and internet use in the local social circle, especially the close local circle.

Comparisons of interactions across media

Our final set of research questions turns from the distribution of media use within social circles to comparisons amongst specific social interactions, controlling for media type and relationship type. Interactions were compared in terms of their purpose, physical contexts, and perceived quality.

Question 8 examined the purposes of online interactions in relation to face-to-face interactions and telephone conversations. Participants were asked whether or not they were pursuing social purposes. Cross tabulation of results indicated that interactions in all three media were predominantly social (internet: 85.4%; face-to-face: 79.3%; telephone: 78.9%).

• Table 3 Correlation between online interaction and interaction using the other three media

	FACE-TO-FACE	TELEPHONE	MAIL
Online interaction	Local social circle .19**	.48**	.27**
Online interaction	Distant social circle .16**	.19**	.16**
Online interaction	Close local social circle .26**	.56**	.33*
Online interaction	Close distant social circle .27**	.34**	.29**

* $p < .01$; ** $p < .001$.

Question 9 examined the contexts of online interaction and those conducted face-to-face as well as on the telephone. These contextual variables included:

- (1) the location of the interaction (e.g. home, at work);
- (2) the geographical location (local versus long-distance nature of the interaction);
- (3) engagement in other activities during the interaction; and
- (4) the presence of another person during the interaction.

Location of interaction and media use: as indicated by cross tabulations (see Table 4), the majority of the reported face-to-face interactions (49.1%), telephone calls (75.2%), and online interactions (73.5%) were conducted at home. Compared with face-to-face and online interactions, telephone calls were least likely to occur at work or school. Results also indicated that online interaction was conducted less frequently in public places than telephone calls and face-to-face interaction. In addition, face-to-face

• Table 4 Location of interaction and media use

LOCATION	MEDIA TYPE			
	FACE-TO-FACE	TELEPHONE	INTERNET	TOTAL
Home	81	124	122	327
Someone's home	18	5	4	27
Work/school	30	12	26	68
Public place	19	11	3	33
Other	17	13	11	41
Total	165	165	166	496

interaction was more likely to happen at someone else’s home than over telephone calls and online interaction.

Local versus long-distance interaction and media use: these data were also examined for the distribution of telephone and internet use in local versus long-distance social interaction. Since face-to-face conversations are necessarily local, they are not included in these analyses. Online interactions were more likely to be long distance (65.6%) than local (34.4%). By contrast, telephone conversations were more likely to be local (57.3%) than long distance (42.7%). A series of 2 × 2 Chi-square tests of significance indicated that long-distance internet interactions were reported significantly more than local internet interactions ($\chi^2(1) = 15.96, N = 163, p < .001$), and long-distance phone calls ($\chi^2(1) = 9.20, N = 174, p < .01$). In addition, local phone calls were reported significantly more than local internet interactions, $\chi^2(1) = 7.92, N = 146, p < .01$. Long distance and local telephone calls did not differ significantly from one another.

Presence of other individual(s) during the interaction and media use: we compared the mean percentage of conversations in which people other than the interaction partner were present across media. Results indicated that 26.5 percent of online interaction was conducted in the presence of other people, and 73.5 percent of the reported online interactions were conducted without others there (see Table 5). Telephone calls were more likely to be conducted alone than not, but by a considerably lesser margin than the internet.

Number of activities during the interaction and media use: cross tabulation of results indicated that the majority of the participants reported that they were engaged in other activities while communicating across media. Multi-tasking was reported on the telephone (61.2%), on the internet (63.9%), and most often, face-to-face (73.9%).

Interaction quality across media: finally, question 10 examined whether the perceived quality of interactions varied depending on media use, relationship type, and purposes. A 3 (medium type) × 2 (social and nonsocial) × 4 (relationship type) analysis of variance was conducted. Results indicated a significant media-type main effect, $F(2,464) = 6.67, \eta^2 = .03, p = .00$, a

• Table 5 Presence of other people during interaction and media use

LOCATION	MEDIA TYPE			
	FACE-TO-FACE (N)	TELEPHONE (N)	INTERNET (N)	TOTAL (N)
With	93	69	44	206
Without	72	96	122	290
Total	165	165	166	496

relationship-type main effect, $F(3,464) = 22.55$, $\eta^2 = .13$, $p = .00$, and a social/non-social main effect, $F(1,464) = 15.03$, $\eta^2 = .03$, $p = .00$. There were no significant interaction effects.

Fisher's LSD (Least Significant Difference) post-hoc analyses of the medium-type main effect revealed that face-to-face ($M = 3.94$, $SD = .79$) and telephone ($M = 3.99$, $SD = .78$) interactions were perceived as equal in quality, and as higher in quality than internet interactions ($M = 3.75$, $SD = .83$). Tukey's HSD (Higher Significant Difference) post-hoc analyses of the relationship-type main effect indicated that interactions between acquaintances were perceived as lower quality ($M = 3.37$, $SD = .79$) than interactions in the other three relationship types, which were perceived to be of equal quality (friends: $M = 4.07$, $SD = .68$; partners: $M = 4.01$, $SD = .80$; family members: $M = 4.11$, $SD = .71$). The social/non-social main effect indicated that interactions facilitating social goals were perceived as higher quality ($M = 3.97$, $SD = .77$) than those which were not social in purpose ($M = 3.56$, $SD = .86$).

DISCUSSION

Study 2 examined the distribution of internet media use across different kinds of online media, the distribution of internet use in comparison to the use of face-to-face conversations and telephone calls, and compared interactions across media. The findings from Study 1 – that email was the main internet medium for social interaction – were further supported by Study 2. Given the absence of 'chat' in Study 2, it is possible that the reports of 'chat' in Study 1 were in fact instances of instant messaging. The predominance of email supports the Pew Project on the Internet and American Life (2002) which found that 62 percent of college students used email as their main form of online social communication, making it by far the most common. Like the Pew Project on the Internet and American Life (2002), we also found that chatrooms, message boards, and newsgroups were not serving as venues for meaningful social interaction in this population. In contrast to those forums, it was particularly likely that email was going to be used with those that one knows through other media, so this finding supports a view of online social interaction as part and parcel of multimedia relationships rather than a measurably distinct realm. The connections between online and offline social life are further buttressed by the finding that the average student reported only two or three internet-only relationships, which may well have been established face-to-face.

The view that users make active choices about media use, shaping their experience of the technology, is supported by our findings regarding distance and intimacy. Local relationships were most likely to use face-to-face conversation and least likely to use the internet. In long-distance relationships, the internet was used in nearly as many relationships as the

telephone, and more than face-to-face conversation. People were more likely to use face-to-face conversations and telephone calls in more intimate relationships. The internet did not get that boost from closeness, suggesting that although these students do use the internet in close relationships, being close may not 'call for' internet use in the same way that intimacy has come to require face-to-face contact or telephone calls. Our findings also support the claim that those who use the internet the most are more sociable in the first place. The more that students reported using the internet to maintain their social relationships, the more likely they were to use face-to-face conversations, telephone calls, and mail. Together, this set of findings support Dimmick et al.'s (2000) contention that the internet fills a unique niche shaped by geography, relationship, and sociability. However, our findings also demonstrate that internet use is by no means restricted to that niche, and is used in many local and intimate relationships.

Finally, Study 2 compared specific interactions, controlling for medium and relationship type. Differences did emerge regarding purposes, contexts, and quality. It has been often argued that the internet is far better for the accomplishment of tasks than social interaction. However, it was slightly more likely that internet interactions were identified as social rather than face-to-face conversations and telephone calls. Furthermore, there was no interaction effect between social purposes and perceived quality, indicating that the quality of an online interaction does not diminish when the goals of the interaction are purely social, or that it increases when the goals are not.

In terms of contexts, the home emerged as the place of internet use, but also as the place of telephone calls and face-to-face conversations. The biggest difference was that face-to-face conversations were least likely to be held at home. Internet interactions were unlikely to be conducted in public, but were more likely than phone calls at work or school, when email may be more accessible or discreet than the telephone. These differences seem to reflect ease of access to technologies and environmental norms about their use.

Our findings about physical proximity in interactions complements our findings regarding the use of each medium within relationships in social circles, and further support the idea that the internet is particularly useful in maintaining long distance relationships. Most local interactions that were not face-to-face were conducted on the telephone rather than the internet. Long-distance interactions were more likely to use the internet than the telephone. Internet interactions were more likely to be long distance than local. Our findings do suggest that internet use is a solitary activity, in the sense that internet interactions were most likely to be conducted alone. However, given how few relationships were reported as maintained only

online, these interactions were most likely moments in ongoing relationships that cross media. Rather than isolating contrasts to face-to-face or telephone relationships, these internet social interactions are better understood as occurring within the context of these multimedia social relations. Finally, though online interactions have been seen as 'multi-tasking' (Pew Project on the Internet and American Life, 2002), and therefore perhaps less meaningful or rich, our data show that face-to-face conversations are even more likely to be conducted while engaged in other activities.

Internet interactions were evaluated as slightly lower quality than face-to-face conversations and telephone calls. However, the average quality of an online interaction was rated approximately one-fifth of a point on a five-point scale, lower than telephone calls and face-to-face conversations. The proportion of variance in conversation quality accounted for by each medium was 3 percent (in contrast, the proportion accounted for by relationship type was 13%). On average, internet interactions were perceived as high in quality. Though there may be cumulative effects of this marginal loss of quality that this study did not allow us to examine, our findings offer no reasons to believe that internet communication is harmful for relationships or the people who have them.

CONCLUSION

These two studies examined social internet use by college students in the United States. This population has integrated the internet into many aspects of their daily lives and may well represent where many other populations will eventually find themselves. However, we do not mean to suggest that these findings can or should be generalized beyond this population. College students are often living in group situations where access to face-to-face communication is high and incentives for local online social relating may be low. Social interaction may mean more during college life than many other phases of the lifespan. Given our argument that people will incorporate the internet into their social lives in ways that fulfill their particular social needs, we would expect that other populations would differ in the conditions under, and the extent to which, they used the internet socially rather than other media. For example, older populations who encounter the internet later in life may not find it nearly equal in quality to other modes of interacting. Those working full-time may use it more locally. Future studies should explore more diverse populations for comparative analysis. They would also benefit from richer measures of interactions than those we have used here. Finally, we caution that our findings do not speak to the consequences of non-social uses of the internet. However, our findings do suggest that the temptation to assume that the internet has strong effects may be misguided, particularly if that assumption is made without

contextual understanding of the users or other ways that those users pursue similar ends.

We began by questioning Nie et al.'s (2002) claim that the internet provides a trade-off between quantity and quality of interaction. Our results suggest that the quantity of interactions in other media does not seem to be threatened by social internet use. Face-to-face communication was by far the most common mode of local interaction, and was only slightly less common in long-distance relationships than the internet. Furthermore, the more people with whom students communicated using the internet, the more they communicated with face-to-face and on the telephone. The quality of online interactions was lower than that of face-to-face conversations, but only by the slimmest of margins. Our findings also demonstrate that face-to-face conversations may not always be the rich, deep, and inherently superior means of communication that it is often presumed to be. The quality of face-to-face conversation was rated no higher than telephone calls (in fact, the mean quality of telephone calls was higher, although not significantly so). People having face-to-face conversations were most likely to be engaged in other activities simultaneously. In sum, our studies suggest that, instead of a trade-off between high quality face-to-face conversations and lower quality internet interactions, students are supplementing high quality face-to-face conversations and telephone calls with really good internet interactions. The grounds for worrying about this phenomenon seem shaky at best.

When a technology grabs hold and diffuses as rapidly as the internet, it is reasonable to be concerned about its impact. However, understanding these impacts requires demystifying the internet. Rather than studying 'The Internet', we need to differentiate between multiple aspects of this complex and pervasive technology and to distinguish the internet clearly from other strategies for accomplishing the same cultural goals. We need to understand that users may be influenced by the technologies' affordances, but they also appropriate technologies to serve their needs. We need to explore different populations of users as well as different kinds of internet uses. Before we have built a strong foundation for such studies, any pronouncements about the internet's dangers or salvations should be treated with skepticism.

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