PROFILING USERS OF A UNIFIED COMMUNICATION SERVICE: UNDERSTANDING COMMUNICATION TRAITS AND STYLES

Leonardo Ruppenthal and Mark Chignell
Interactive Media Group
Department of Mechanical and Industrial Engineering
University of Toronto
Toronto, Canada

In spite of the powerful functionality and message integration offered, unified communication (UC) has yet to be widely adopted as a solution that meets the demands and complexities of modern communicators. By understanding individual differences, requirements, and preferences, it should be possible to design better communication interfaces and services. This study examined the characteristics of communication-related preferences among users of a three-month UC trial. Survey data from 123 respondents were analyzed. A series of factor analyses identified 19 communication traits, 7 of which were particularly interesting. A cluster analysis suggested three types of communication styles: Low-tech, Power, and Strategic. Future research will attempt to relate the current findings to actual communication behaviour. The creation of a communication preference inventory (CPI) is also discussed.

INTRODUCTION

As telecommunication technologies proliferate, an ever-expanding array of services and devices is available to users. The rapid evolution and integration of these services has led to an increase in communication complexity; it has raised expectations among family, friends, and colleagues about the connectedness and availability of users. Rather than being liberated by communication technology, users are in danger of being stifled by it.

One class of innovative services that seeks to reduce communication complexity is referred to as Unified Communications (UC). UC services enable users to access messages in several formats through a variety of devices and modalities. The communications are "unified" in that they are accessible via a single account, regardless of the method of access. For example, a user may either read an email message on the screen of a personal computer, or he may listen to the message on a telephone through text-to-speech functionality. UC services typically integrate voicemail, email, text messages, and fax, and are accessed via telephones (landline and mobile), pagers, computers, personal data assistants, and fax machines.

In spite of the powerful functionality and service integration features offered, unified communication has yet to be widely adopted. For communicators, learning to use such a system can be difficult and time-consuming (UMC, 1998). Moreover, users have differing needs and preferences, and the one-size-fits-all approach of the single UC interface does not satisfy everyone. A typical complaint among users is that most UC systems are prejudiced in favor of the mobile "road-warrior", rather than the far more common desk-bound user (Thompson, 1999).

An important factor that may affect UC service adoption is the extent to which the service fits the needs of different types or categories of users. Individuals differ from one another in their personalities and aptitudes, and in their use of technologies and tools. By understanding individual differences and requirements, it should be possible to design better communication interfaces and services (Dillon & Watson, 1996).

Recent findings suggest a relationship between individual differences and technology-related behaviour. The Technology Profile Inventory, for example, is an instrument designed to determine the technology-related characteristics of individuals, and the extent to which those characteristics predict technology use (DeYoung & Spence, 2001).

We are particularly interested in understanding how individual differences influence communication usage. While the research literature on this topic is not extensive, there is some evidence of differences in the way people approach and use communication technology. For example, one study identified two distinct types of communicators: telephone-centric users who prefer interacting through voice; and PC-centric users who prefer email (UMC, 1998). Marold and Larsen (1997) evaluated user preferences for email and voicemail, and found that the majority of users do not have a direct preference for either medium; rather, media preference appears to depend on the purpose of a message and on the context of its access. A research group at the University of Toronto is in the process of developing an inventory to identify individual differences in communication preference and behaviour (Chignell et al, 2002).

The goal of this study is to examine the characteristics of communication-related preferences. We attempt to determine the existence of communication traits, and the extent to which individuals might be categorized according to their communication styles. The data and analyses presented here reflect communication preferences

with specific reference to unified communications; however, we expect that the results can be generalized to communication in general.

METHOD

From July to September 2000, 179 customers of Bell Canada, a Canadian-based telecommunications firm, participated in the trial of a unified communication service. The service enabled users to access voicemail, email, and fax messages through a single account via telephone or PC. The service was offered free of charge for the duration of the study.

Users were selected from existing Bell customers – high-value customers, as defined by marketing metrics. The great majority of users, 85%, were male; only 15% were female. Most users were between the ages of 25 and 54, and employed in a variety of professional service industries.

Participants were encouraged (but not required) to complete four surveys at specific points during the trial. The surveys were administered via a website.

This study analyzed data from the third survey, administered during the second month of the trial. The survey was chosen because it produced the highest number of completions (123) and the most variable data.

The survey consisted of over one hundred items covering a variety of topics, including marketing and technology issues. However, only the items contributed by this research team are analyzed here. We have termed the items as communication "preferences" for convenience, even though they more truly reflect a wide range of subjective measures of communication-related attitudes.

RESULTS

Preference variables were removed from analysis if they exhibited little or no variance, if they exhibited a skew of greater than 3, or if they contained data from fewer than 50 participants. Following this qualification procedure, 68 communication preference variables remained.

Initial factor analyses performed on all 68 preference variables resulted in too many non-interpretable factors. Therefore, the experimenters elected to conduct several factor analyses on subsets of preference variables.

In total, three principle component factor analyses, with varimax rotation, were conducted on the communication preference variables. The resulting factors with eigenvalues of greater than 1 were examined and interpreted. When factors were interpretable, their constituent variables were summed together to create subscales, and the variables were removed from further analyses. The subscales were created because the scores were more easily interpretable than the factor scores, especially for the subsequent cluster analysis. When factors were not interpretable, subscales were not created, and the variables were returned for the final factor analysis.

Most factors (and the resulting subscales) were composed of 2-3 variables.

The first factor analysis was of 19 self-referential items that invited participants to agree or disagree with statements describing their communication preferences. The analysis resulted in 5 interpretable factors. Together, these factors accounted for 45% of the variance of the self-referential items.

The second analysis was of 19 items that invited participants to assess the usefulness of various features associated with UC. The analysis resulted in 5 interpretable factors. Together, these factors accounted for 54% of the variance of the usefulness items.

The third analysis was performed on the 30 remaining variables, as well as on the variables that remained from the previous two factor analyses. The analysis resulted in 9 interpretable factors accounting for 52% of the variance.

Seven communication traits derived from the factors are presented in Table 1 below; they are listed in an order corresponding to the strength with which they differentiated between groups of users in a subsequent cluster analysis. A general description of each trait is offered together with the rotated eigenvalue of the original factor; this is followed by the original survey items and their rotated factor loading scores.

Table 1 - Main communication-related traits

Trait	Description / Items	Rotated eigen-values	Rotated Factor Loading
Interruptibility	Likelihood to interrupt current activity to handle communications	2.347	
	How likely are you to make or accept cell phone calls while doing something else?		0.805
	How likely are you to check voice mail while doing something else?		0.768
	I like to keep my cell phone on in meetings in case there are important calls		0.598
Community through Interpersonal Interaction	Feeling part of a community through one-on-one interaction, such as email, telephone, and in-person visits	2.363	

Trait	Description		
	Makes you feel part of a community - Using personal e-mail		0.840
	Makes you feel part of a community - Talking on the telephone		0.795
	Makes you feel part of a community - Visiting friends and relatives		0.588
Email via Telephone	Usefulness of accessing email messages via text-to-speech functionality on telephone	1.513	
	Usefulness – Responding to your email using voice response technology		0.820
	Usefulness – Accessing your emails from any telephone (email text to speech)		0.715
Trust in UC	Trust in unified communication services to help manage business and personal communications	1.928	
	How comfortable would you be using Unified Communication to help you manage your personal message communications?		0.857
	How comfortable would you be using Unified Communication to help you manage your business message communication?		0.850
Management and Administrative Features	Usefulness of management and administrative features, such as changing passwords and greetings	2.351	
	Usefulness – Recording and changing your greeting		0.770
	Usefulness – Message management features (such as saving and deleting messages)		0.768
Business Communication at Home	Conducting business communication at home, including emails and telephone calls	1.662	
	How frequently do you take business calls after you've retired for the evening?		0.797
	How frequently do you check your business e-mail at home?		0.610
Mobile Text Messaging	Text messaging through mobile devices	1.623	
	I encourage people to use my pager in my voicemail greeting		0.770
	I receive text messages through my pager		0.649
	I receive text messages through my cellular telephone		0.542

The remaining communication traits and their rotated eigenvalues are presented in Table 2 below:

Table 2 - Other communication-related traits

Trait	Description	Rotated eigen-values
Telephone-based Devices	Preference for communication via telephone, voicemail, and pager	2.159
Community through Online Group Interaction	Feeling part of a community through online services such as chat rooms and email discussion lists	2.364
Text-based Devices	Preference for communication via email and fax	2.027
Customization	Modification to settings of email and voicemail accounts	2.021
Contact Distinction	Distinction between different types of contacts (e.g. family, friends, work associates)	1.810
Immediacy	Desire for immediate ring-throughs and message alerts	1.500
Email Account Distinction	Distinction between personal and work email accounts	1.464
Forwarding Across Media	Forwarding messages from one service to another (e.g. from voicemail to email)	2.614
Message Access via PC	Usefulness of ability to access voicemail and email messages via a PC	2.022
Fax Messages via Telephone	Usefulness of ability to redirect fax messages via a telephone	1.796
Account Management	Changes to account, such as outgoing messages and administrative options	1.715
Communication Schedule	Adherence to a communication schedule, including maintaining a to-do list of communications and checking messages at particular times	1.677

Several variables did not load onto factors, but are also presented here, in Table 3 below. Ongoing research suggests that these variables most likely predict actual communication behavior.

Table 3 - Communication-related variables

Variable	Description
Number of Communication Devices	Number of communication devices, including landline telephones, mobile telephones, and pagers
Email Multitasking	Likelihood of checking email while doing something else
Availability	Mobile phone always at hand
Voicemail Archiving	Number of voicemail messages archived or saved
Business vs. Personal	Distinction between business and personal for UC usage

A variety of analysis methods was performed in attempt to identify groupings of the communication preference data. These methods included hierarchical cluster analysis, K-means partitioning, and visualizations of the data with 2- and 3-D scattergrams.

K-means cluster analysis revealed (after iterating between different numbers of clusters and different subsets of factors and variables) a three-cluster solution that differentiated users according to seven of the communication preference traits and one of the preference variables, as listed below:

- Preference factor - Trust in UC to manage communications
- Preference factor - Community through interpersonal interaction
- Preference factor - Usefulness of email access through telephone
- Preference factor - Interruptibility
- Preference factor - Usefulness of management and administrative features
- How many communication devices do you use?
- Preference factor - Pager and text messaging through mobile devices
- Preference factor - Business communication at home

The three cluster-based user groups and their descriptions are presented below:

Low-tech Communicators (51 users)

The members of this group are characterized by their lack of trust in UC services and their relatively low level of orientation to communication technology. Low-tech Communicators are typically non-interruptible, and they do not find email access via telephone to be useful. They also do not find message management and administration features to be useful.

Power Communicators (32 users)

Members of this group are characterized by their high-touch and technological orientation to communication. Although these users have some trust in UC services, they are highly interruptible and seem to prefer real-time, interpersonal interactions. Power Communicators, posses a greater number of communication devices than members of the other groups; they frequently receive text messages via their mobile devices and find email access through the telephone to be useful. Power Communicators are willing to conduct business communications from home.

Strategic Communicators (40 users)

The members of this group are characterized by their trust in UC services to help them manage their communications. These users find UC message management and administrative functions to be useful. Although Strategic Communicators are moderately interruptible, they do not experience a sense of community through interpersonal interaction. Strategic Communicators appear to use UC services as a buffer between themselves and the outside world.

DISCUSSION

In this study, we identified 19 communication traits. We expect that at least some of the factors may be a useful stimulus for further research. The traits with the most predictive power were: Interruptibility; Community through Interpersonal Interaction; Email via Telephone; Trust in UC; Management and Administrative Features; Business Communication at Home; Mobile Text Messaging.

We also identified three well-differentiated types of communicators within the sample. We expect that membership in these clusters will be predictive of a number of differences in service usage and communication behaviour. For instance, we would expect Low-tech communicators to exhibit some resistance to communication technologies; these users appear to prefer to communicate with others in person. Low-tech communicators most likely use communication technologies out of necessity and may resent the "intrusion" of some forms of communication.

In contrast, we would expect Power communicators to welcome new technologies and services as long as they promoted and enhanced their ability to communicate easily and at will. These users do not necessarily care to understand the inner-workings and complexities of the communication technologies – what is important is that they work well.

We would expect Strategic communicators to also embrace communication technologies and seek out new ways to use the services to their advantage. These users are conscious of the role communication plays in their lives and often use it to guard against undesired personal interaction. While there may be some overlap between early adopters and Strategic communicators, we believe that these constructs are not synonymous.

We are currently developing a communication profiling instrument (CPI) (Chignell et al., 2002). The early versions of the CPI have been influenced by our findings in the present study. However, we are also seeking to broaden the sample of users assessed, since due to the marketing focus of the UC trial, the user sample reported in this paper was very specific. The majority of users were high-value, male presidents who operated companies of fewer than 50 employees. It is therefore difficult to generalize these results to a less specific user population.

We are also in the process of correlating the present findings with actual communication behaviour. By understanding how individual differences influence the ways in which people communicate, we expect to offer insight to inform the design and personalization of future communication services.

In conclusion, the present study was successful in identifying a number of communication-related traits, as well as three distinct types of communication styles. Further research is needed to examine how well these factors and clusters predict communication behaviour, and how well they generalize to different user populations.

ACKNOWLEDGMENTS

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