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Mobile content contribution and retrieval: An exploratory study using the uses and gratifications paradigm

Alton Y. K. Chua, Dion Hoe-Lian Goh and Chei Sian Lee

ABSTRACT

Using the uses and gratifications (UnG) theory, this paper explores the gratification factors for which people contribute and retrieve mobile content. Through the deployment of MobiTOP, a mobile content sharing application, it was found that perceived gratification factors for mobile content contribution were different from those for mobile content retrieval. In particular, factors which had significant positive effects on content contribution stemmed from leisure/entertainment and easy access. Factors fuelling content retrieval included the efficient provision of information resources/services and the need for high quality information, both of which tend to be information-centric. Interestingly, gratification factors for mobile content contribution were also found to have significant effects on mobile content retrieval intention and vice versa. Specifically, the access gratification factor had a significant positive effect on content retrieval intention while the self-gratification factor for content contribution had a significant negative effect on content retrieval intention.

KEYWORDS

Mobile content sharing application, mobile phone, uses and gratifications paradigm

1. INTRODUCTION

The wide-spread ownership of mobile devices has spawned the development of myriad mobile applications ranging from email and instant messaging clients to games, media players and productivity tools such as diaries and spreadsheets. Among these, mobile content sharing applications represents a genre that has begun to show propitious signs of adoption in recent years. This phenomenon is fuelled in part by the increasing sophistication of mobile devices. Commonly equipped with wireless networking, cameras and GPS, mobile devices allow multimedia content to be captured, shared and retrieved easily.

With mobile content sharing applications, users are able to create and associate digital content with physical objects and locations in the real world, as well as receive content tailored to their specific needs. For example, Yahoo's ZoneTag (Ames & Naaman, 2007) provides a service for users to tag photos with location and other information using their mobile phones, and upload them to Flickr. Using CityFlocks (Bilandzic, et al., 2008), users in urban communities are able to share experiences and offer recommendations about places in their living environment via mobile phones. Key characteristics of such content are their locative nature and that they are generated by the user community.

Given that the success of mobile content sharing applications rests on sustained user participation, it is no surprise to find user-centricity a dominant perspective in mobile computing research. Works with a user-centric orientation include those on developing mobile systems that facilitate users' task execution such as tagging and retrieving content (e.g. Wilhelm, et al., 2004; Church & Smyth, 2007; Olsson, et al., 2008) and evaluating mobile systems through user studies in context (e.g. Göker & Myrhaug, 2008; Chua, et al., 2010). Despite the sizeable body of literature, the underlying dynamics that explain why users are drawn to mobile content sharing have yet to be thoroughly explored.

Related works in this area have mainly focused on examining users' motivation in photo sharing (e.g. Ames & Naaman, 2007; Goh, et al., 2009). However, more sophisticated mobile content sharing applications that support multiple media have not been studied extensively. Given that multiple media afford a richer communication environment and convey more information than a single medium (Nov, et al., 2008), a separate investigation is warranted to study user motivation in sharing messages that bear multiple media.

A better understanding of user motivation has a direct bearing on the design of systems supporting mobile content sharing activities. Thus, this paper seeks to enrich ongoing research efforts by exploring

the reasons for which people contribute and retrieve mobile content using the uses and gratifications theory. Specifically, four research questions investigated are as follows: (1) What perceived gratification factors have significant effects on mobile content contribution? (2) What perceived gratification factors have significant effects on mobile content retrieval? (3) Given the perceived gratification factors derived from the first two research questions, which of them have significant effects on intention to contribute mobile content? (4) Given the perceived gratification factors derived from the first two research questions, which of them have significant effects on intention to retrieve mobile content? These research questions are addressed through the deployment of MobiTOP (Mobile Tagging of Objects and People), a mobile content sharing application that allows users to create, share and seek for geospatial annotations, which are content bearing multiple media.

The contribution of this paper lies in two main areas. One, it employs the uses and gratifications (UnG) paradigm, a well-established theory in mass communications research which has not been applied to much extent to mobile content sharing. Based on the concept of an active user who chooses how and when to use a media, and whose actions are goal-directed, the UnG paradigm explicates media uses in light of social and psychological needs (Leung & Wei, 2000). Since the UnG tenets fit well with the context of mobile content sharing, the UnG paradigm is deemed to be suitable for this study. Two, this paper differentiates between motivations for contribution and those for retrieval of mobile content. Many previous studies on users' motivations in content sharing do not make explicit distinctions between contribution and retrieval (e.g. Ames & Naamam, 2007; Olsson, 2009), or focus solely on either contribution (e.g. McLure-Wasko & Faraj, 2005) or retrieval (e.g. Church & Smyth, 2009). By teasing apart motivations for contribution and retrieval, this paper offers a more nuanced perspective of users' motivations on mobile content sharing.

The remaining sections of this paper are structured as follows. Section 2 provides a review of the literature, culminating in four research questions. Section 3 describes MobiTOP, a mobile content sharing system. Section 4 presents the methodology used in this paper while Section 5 reports and analyzes the results. The major findings are discussed in Section 6. In conclusion, Section 7 acknowledges the limitations of this paper and offers some directions for future research.

2. LITERATURE REVIEW

2.1 Uses and Gratifications (UnG) Paradigm

Originally developed from mass communications research as a paradigm to study consumer motivations for media usage and access, the uses and gratifications (UnG) focuses on why consumers turn to the media to satisfy their social and psychological needs. It seeks to explain how media are used to satisfy those needs, what the underlying motives are, and the consequences arising from the confluence of needs, motives and media use (Katz and Blumler, 1974). Central to the UnG paradigm are three tenets: (1) consumers actively seek out the media to satisfy individual needs; (2) consumers' communication choices are purposeful and goal-directed; and (3) consumers are conscious of their own motives in using the media. As media industries continue to offer a wide range of media platforms and content, UnG is often considered one of the most appropriate paradigms for investigating why consumers choose to deal with different media (LaRose et al., 2001). In recent years, the objects of adoption being studied using the UnG paradigm have been extended to include technologies, software services and cell phones. Nonetheless, the UnG paradigm has received little attention in the context of mobile content sharing.

For example, in a study which examines users' motivation on Internet use, Stafford, et al., (2004) identified three major gratification types, namely, content, process and social. Content gratifications concern the information hosted on the Internet, process gratifications concern the actual use of the Internet while social gratifications are related to the Internet's role as an interpersonal communication and social networking platform. Internet users are motivated either by the need for specific informational content, such as product or store information, or the experience of random browsing and site navigation, or the enjoyment of forging social ties.

In another study which draws on the UnG perspective to understand the motivations to use an instant messaging service, Leung (2001) uncovered seven perceived gratification factors, namely, relaxation, entertainment, fashion, inclusion, affection, sociability and escape. Heavy users of the instant

messaging service were motivated by affection and sociability while light users were motivated by fashion. In addition, familiarity with technology in the forms of emails usage and mobile phone ownership were predictors of instant messaging use. Analyzing along gender lines, female users chat longer for sociability reasons while male users spent less time each session for entertainment and relaxation.

Using the UnG paradigm to study mobile phone use, Leung and Wei (2000) found the major perceived gratification factors to include affection/sociability, entertainment, instrumentality, psychological reassurance, fashion/status, mobility and immediate access. The findings revealed that the use of mobile phones on buses, cars and trains was linked to mobility and immediate access gratifications. In addition, talking to business partners via mobile phones fulfilled instrumental purposes while talking to family members provided mobility and affection gratifications.

2.2 Perceived gratifications for mobile content sharing

Given their interactivity, media-like characteristics and user-centered nature, mobile content sharing is a well suited context in which the UnG paradigm can be applied. In light of works related to user motivations for photo tagging (e.g. Ames & Naaman, 2007; Kindberg, et al, 2005), it appears that the intention to use a mobile content sharing application is driven by perceived gratification factors that can be cast along at least two dimensions, namely, affective-functional and social-individual. The affective-functional dimension comprises gratifications related to the emotions and instrumentality while the social-individual dimension specifies the scope of use, whether it is collective or personal. Users derive affective gratifications by creating and maintaining social relationships with others or by expressing themselves. Users may also derive functional gratifications when they share mobile content to elicit an action (e.g. sharing an image of a location to which the recipient is invited to visit), to convey information, to record personal and collective experiences, and/or to support both personal and group tasks (Scifo, 2005; van House, et al., 2005).

Mobile content sharing involves two distinct activities, namely, contribution and retrieval. While both fulfill different users' needs, such a distinction has not always been made explicit in previous studies (e.g. Ames & Naaman, 2007; Olsson, 2009). Contribution seems to be underpinned by many of the perceived gratification factors cited earlier such as the desire to forge social ties or to convey information. On the other hand, retrieval seems to be driven by other affective-functional gratification factors. These include information needs, social needs and personal-psychological needs (Church & Smyth, 2009; Naaman, et al., 2008). Information needs are focused on the goal to obtain quality information about a topic or those related to a location such as the shortest route from one point to another. Social needs revolve around the maintenance of relationships or gaining a sense of belonging while personal-psychological needs include the desire to take a break from a routine activity or simply to alleviate boredom.

To better understand users' motivation in the context of mobile content sharing, we apply the UnG paradigm by identifying the range of perceived gratification factors that compel users' intentions to use. The gratification factors which include affective-functional and social-individual dimensions represent proposed constructs whose significance will be determined empirically in this study. Given that content contribution and content retrieval are two distinct activities, the set of perceived gratification factors underpinning each activity may be different. Thus, the first two research questions are as follows:

> RQ1: What perceived gratification factors have significant effects on intention to contribute mobile content?
>
> RQ2: What perceived gratification factors have significant effects on intention to retrieve mobile content?

The perceived gratification factors for RQ1 and RQ2 will be derived through exploratory factor analysis, and thereafter, tested through regression analysis.

However, since content contribution and content retrieval are mutually-reinforcing constituents in the information management cycle (Choo, 1998), a user who is driven by factors to contribute content could also be compelled to retrieve content and vice versa. In other words, apart from perceived gratification factors for content contribution, those for content retrieval could also affect intention to contribute content. Likewise, apart from perceived gratification factors for content retrieval, those for content contribution could also affect intention to retrieve content. Hence, the next two research questions are as follows:

RQ3: Given the perceived gratification factors derived from RQ1 and RQ2, which of them have significant effects on intention to contribute mobile content?
RQ4: Given the perceived gratification factors derived from RQ1 and RQ2, which of them have significant effects on intention to retrieve mobile content?

RQ3 and RQ4 will be addressed through regression analysis on the perceived gratification factors derived earlier.

3. MobiTOP – A mobile content sharing application

MobiTOP (Mobile Tagging of Objects and People) is a realization of a location-based mobile content sharing application (Kim, et al., 2009). In MobiTOP, content refers to location-based annotations which are user-generated descriptions or comments. Each annotation comprises multiple media such as title, tags, multimedia content (e.g. images) and textual information. Tags are freely assigned keywords that are not limited by any taxonomy, ontology or controlled vocabularies (Goh et al., 2009). They are intended to help users organize and access annotations.

MobiTOP employs a client/server architecture. The server makes use of the LAMP (Linux, Apache, MySQL, PHP) open source software as the solution stack for its infrastructure. It runs on Linux with an Apache server and is implemented using PHP scripts and a MySQL database. The database maintains information such as users' profiles, annotations and their associated multimedia content. The MobiTOP server communicates with its clients using XML over HTTP.

The MobiTOP client provides a map-based interface for creating, sharing and seeking annotations on mobile devices. It is currently developed in J2ME and targeted primarily for Nokia N95 8GB smartphones which are equipped with the global position system (GPS). Users can contribute content to MobiTOP in the form of annotations either by selecting a location on the map manually or automatically via GPS. Along with textual information, users can also post images taken via the phone's camera. Once an annotation is posted, MobiTOP automatically captures other implicit attributes including user's name, current location of the user (latitude and longitude), time and date. An annotation is represented by a marker on the map (Figure 1a).

Users can retrieve content from MobiTOP by selecting any marker. This will cause its details to be displayed in a separate screen with three tabs. The first shows the textual information of the annotation (Figure 1b), the second its tag cloud (Figure 1c), while the third its multimedia components. The tabbed-design was adopted to maximize screen real estate for the content given the small display sizes of mobile phones. Other access mechanisms include selecting desired tags, and filtering by attributes such as date/time, location and user. In addition, standard navigational features such as panning and zooming on the map are also available.

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Figure 1a. MobiTOP's map view.

Figure 1b. Annotation details.

Figure 1c. Tag cloud of annotation.

Figure 1d. Multimedia components.

4. Methodology

4.1 Sample respondents

Students from two large universities in Singapore were invited to participate in this study. The general concept of mobile content sharing was first introduced. Following that, a detailed live-demonstration of the capabilities of MobiTOP was shown. To help the respondents understand how MobiTOP works, two possible usage scenarios were presented: (1) creating content, and (2) retrieving content. Thereafter, a survey, which sought to determine the perceived gratifications of using MobiTOP to contribute and retrieve content was administered. Participation was voluntary and anonymous. A total of 203 respondents participated in the written survey.

The survey comprises two similar sections designed to capture the respondents' perceptions of various gratification factors to use MobiTOP to contribute mobile content and retrieve mobile content respectively. Each section features a total of 42 affirmative statements, representing a wide range of potential perceived gratification items in using MobiTOP. These items, which include sociability, leisure, entertainment, information quality and information discovery, are based on constructs drawn from past UnG and mobile content sharing studies (Stafford, et al., 2004; Leung, 2001; Leung and Wei, 2000; Ames & Naaman, 2007; Kindberg, et al, 2005; Scifo, 2005; van House, et al. 2005) reviewed earlier in Section 2.2. A five-point Likert scale, ranging from "Strongly disagree" to "Strongly agree" was used to solicit responses for each item.

4.2 Measures

4.2.1 Perceived gratifications

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Principal component factor analysis with varimax rotation was run to determine the potential groupings of the perceived gratifications items. Varimax rotation was used to better account for expected correlations among potential factors. We based the decision about the number of factors to retain on a combination of methods such as eigenvalue > 1.0 and scree plots, as well as conceptual clarity, interpretability and theoretical salience of the rotated factors, and simple structure.

A total of three content sharing items and nine content retrieval items were dropped during the analysis due to high cross loadings to multiple constructs. Nine distinct perceived gratifications factors emerged from the factor analysis with five perceived gratifications factors supporting content contribution as shown in Table 1, and another four perceived gratification factors supporting content retrieval as shown in Table 2. The five perceived gratification factors for content contribution are shown below:

- Leisure (LEIC): Items related to content contribution for entertainment and relaxation purposes.
- Access (ACCESS): Items related to content contribution due to the ease of access to MobiTOP from anywhere at any time.
- Self (SELF): Items related to content contribution for self-promotion reasons.
- Socialization (SOCIALC): Items related to content contribution for interaction and socialization purposes.
- Relationship Maintenance (RELMAINT): Items related to content contribution for helping friends and strengthening existing social relationships.

Table 1. Factor analysis for perceived gratifications for content contribution

N=203	**Factors**					Alpha
	1	**2**	**3**	**4**	**5**	
1.Leisure						0.84
because it helps me to combat boredom	**0.87**	-0.03	0.07	0.06	0.04	
because it helps me to pass time	**0.80**	0.10	0.22	-0.06	0.01	
because it helps to relax	**0.75**	0.01	0.22	0.37	0.04	
because it is a pleasant break from my routine	**0.67**	0.26	0.16	0.18	-0.07	
because it is entertaining	**0.59**	0.12	0.34	0.21	0.16	
2.Access						0.88
because I can provide immediate access to others anywhere anytime	0.14	**0.89**	0.05	0.13	0.14	
because it is easy to share information anywhere anytime	0.16	**0.87**	0.01	0.11	0.19	
because it is more convenient than sharing information elsewhere	0.01	**0.80**	0.11	0.19	0.15	
3.Self						0.79
because it helps me to gain status	0.16	0.08	**0.83**	0.12	0.01	
because it helps me to look good	0.22	-0.04	**0.77**	0.12	0.12	
because it helps me feel important	0.24	0.12	**0.75**	0.10	0.13	
because I feel more in control	0.14	0.04	**0.55**	0.36	0.07	
4.Socialization						0.85
because I need to interact with people	0.09	0.00	0.30	**0.83**	0.05	
because I can interact with people	0.27	0.30	0.08	**0.80**	0.10	
to keep in touch with people	0.15	0.30	0.16	**0.75**	0.20	
5.Relationship Maintenance						0.72
to thank friends	0.06	0.05	0.12	0.06	**0.85**	
to help friends	0.01	0.34	-0.04	0.02	**0.80**	
because I am concerned about friends	0.02	0.16	0.27	0.29	**0.65**	
Variance Explained (%)	29.42	20.00	8.28	6.84	5.09	

Eigenvalue	5.88	4.00	1.66	1.37	1.02	

The four perceived gratification factors for content retrieval are shown below:

- Information resources/services (INFORS): Items related to content retrieval for the efficient provision of available information resources and services.
- Leisure (LEIR): Items related to content retrieval for entertainment and relaxation purposes.
- Information quality (INFOQUAL): Items related to content retrieval due to the quality and credibility of information provided.
- Socialization (SOCIALR): Items related content retrieval for interaction and socialization purposes.

Table 2. Factor analysis for perceived gratifications for content retrieval

N=203	**Factors**				
	1	**2**	**3**	**4**	Alpha
1. Information resources/ services					0.89
because it helps me find locations, required products and services	**0.86**	0.01	0.00	-0.09	
because it is easy to get information I need	**0.86**	-0.02	0.08	0.05	
because it provides up-to-date information and news	**0.85**	-0.04	0.08	-0.05	
to get information about something	**0.84**	0.01	0.07	-0.01	
to keep abreast of the latest news and events	**0.72**	0.09	0.18	0.24	
because it is more convenient than accessing information from other sources.	**0.60**	0.12	0.30	0.23	
because I can have immediate access to information anywhere anytime	**0.60**	0.05	0.21	0.37	
2.Leisure					0.86
because it helps me combat boredom	0.04	**0.85**	0.04	0.17	
because it helps me pass time	0.06	**0.81**	0.17	0.09	
because it is a pleasant break from my routine	-0.01	**0.76**	0.15	-0.04	
because it is entertaining	0.04	**0.72**	0.16	0.23	
because it helps me to relax	-0.04	**0.71**	0.05	0.42	
3.Information Quality					0.87
because I can trust the information	0.16	0.14	**0.89**	0.12	
because I know the information will be accurate	0.11	0.18	**0.88**	0.07	
because I know I can rely on the information when I need it urgently.	0.19	0.15	**0.78**	0.12	
4.Socialization					0.85
to keep in touch with people.	0.07	0.26	0.07	**0.88**	
because I can interact with people.	0.14	0.27	0.22	**0.81**	
Variance Explained	33.15	20.72	9.59	7.06	
Eigenvalue	5.63	3.52	1.63	1.2	

The reliability constructs for the perceived gratification factors for content contribution and retrieval were assessed using Cronbach's Alpha. The results exhibited acceptable alpha values (i.e. ranged from 0.72 to 0.89) for the given sample size.

5. Analysis and Results

Statistical analyses were carried out using least squares regression on four models. Model 1 examined the associations between the five extracted perceived gratifications factors from the factor analysis on the intention to use MobiTOP for content contribution. Next, Model 2 examined the associations

between the four extracted perceived gratification factors from the factor analysis on intention to use MobiTOP for content retrieval. Model 3 examined the effects of all the perceived gratifications on intention to use MobiTOP for content contribution while Model 4 examined the effects of all the perceived gratifications for both content contribution and retrieval on intention to use MobiTOP for content retrieval. Table 3 summarizes the regression models used.

Table 3: Regression models

Model 1: Usage Intention $_{Contribution}$ = f(LEIC, ACCESS, SELF, SOCIALC, RELMAINT)
Model 2: Usage Intention $_{Retrieval}$ = f(INFORS, LEIR, INFOQUAL, SOCIALR,)
Model 3: Usage Intention $_{Contribution}$ = f(LEIC, ACCESS, SELF, SOCIALC, RELMAINT, INFORS, LEIR, INFOQUAL, SOCIALR)
Model 4: Usage Intention $_{Retrieval}$ = f(LEIC, ACCESS, SELF, SOCIALC, RELMAINT, INFORS, LEIR, INFOQUAL, SOCIALR)

Note: ACCESS: Access, INFORS: Information Resources and Services, INFOQUAL: Information Quality, LEIC: Leisure with contribution intention, LEIR: Leisure with retrieval intention, RELMAINT: Relationship Maintenance, SELF: Self, SOCIALC: Socialization with contribution intention, SOCIALR: Socialization with retrieval intention

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Table 4: Regression Results

Model 1 (Intention to Use for Content Contribution)				**Model 2 (Intention to Use for Content Retrieval)**			
	Coeffs	t-value	Sig.		Coeffs	t-value	Sig.
LEIC	0.25	3.74	0.00**	INFORS	0.53	8.65	0.00**
ACCESS	0.48	7.62	0.00**	LEIR	0.10	1.51	0.13
SELF	-0.03	-0.41	0.68	INFOQUAL	0.10	1.52	0.10+
SOCIALC	0.07	1.00	0.32	SOCIALR	0.04	0.62	0.54
RELMAINT	0.08	1.36	0.18				
Adjusted R^2	0.43			0.36			
F-Stats	30.56**			29.46**			

Note: ** p ≤ 0.01; * p ≤ 0.05; + p≤0.10
Note: ACCESS: Access, INFORS: Information Resources and Services, INFOQUAL: Information Quality, LEIC: Leisure with contribution intention, LEIR: Leisure with retrieval intention, RELMAINT: Relationship Maintenance, SELF: Self, SOCIALC: Socialization with contribution intention, SOCIALR: Socialization with retrieval intention

Table 5: Regression Results

Model 3 (Intention to Use for Content Contribution)				**Model 4 (Intention to Use for Content Retrieval)**			
	Coeffs	t-value	Sig.		Coeffs	t-value	Sig.
LEIC	0.13	1.31	0.19	INFORS	0.35	5.06	0.00**
ACCESS	0.46	6.22	0.00**	LEIR	0.25	2.62	0.01**
SELF	-0.02	-0.34	0.73	INFOQUAL	0.09	1.37	0.173
SOCIALC	0.05	0.56	0.57	SOCIALR	-0.05	-0.54	0.59
RELMAINT	0.08	1.23	0.22	LEIC	-0.10	-1.06	0.29
INFORS	.081	1.154	0.25	ACCESS	0.29	3.86	0.00**
LEIR	0.16	1.63	0.11	SELF	-0.18	-2.49	0.10+
INFOQUAL	0.00	-0.02	0.99	SOCIALC	0.08	0.95	0.34
SOCIALR	-0.01	-0.06	0.95	RELMAINT	0.04	0.69	0.49
Adjusted R^2	0.43			0.42			
F-Stats	17.55**			17.13**			

Note: ** p ≤ 0.01; * p ≤ 0.05;+ p≤0.10
Note: ACCESS: Access, INFORS: Information Resources and Services, INFOQUAL: Information Quality, LEIC: Leisure with contribution intention, LEIR: Leisure with retrieval intention, RELMAINT: Relationship Maintenance, SELF: Self, SOCIALC: Socialization with contribution intention, SOCIALR: Socialization with retrieval intention

Results from the analyses are shown in Tables 4 and 5. The regression results of Model 1 show two perceived gratification factors, namely, LEIC and ACCESS to have significant positive effects on intention to use MobiTOP for content contribution. These results suggest that users view leisure and ease of access to the application on the go as important motivators to use MobiTOP for contributing content. Next, the regression results of Model 2 show two perceived gratification factors, namely, INFORS and INFOQUAL to have significant positive effects on intention to use MobiTOP for content retrieval. These results suggest that the efficient provision of available information resources and information quality are factors important to motivate users to employ MobiTOP as a means to retrieve desired content.

The regression results of Model 3 show only one perceived gratification factor for content contribution to have a significant effect on intention to use MobiTOP for content contribution. Specifically, ACCESS which was a factor for content contribution had significant positive effects on intention to use MobiTOP for content contribution. Interestingly, the regression results of Model 4 indicate that perceived gratification factors for content contribution and retrieval have a combination of positive and negative effects on intention to use MobiTOP for content retrieval. In particular, INFOR and LEIR, which were factors for content retrieval, as well as ACCESS which was a factor for content contribution, had significant positive effects, but SELF which was a factor for content contribution, had a significant negative effect on intention to use MobiTOP for content retrieval.

6. Discussion

Three major findings can be drawn from our results. First, through the UnG paradigm, perceived gratification factors for mobile content contribution were found to be different from those for mobile content retrieval. In particular, factors which had significant positive effects on content contribution stemmed from leisure/entertainment and easy access to MobiTOP while on the go. Interestingly, the significance of the leisure gratification factor reveals that a primary impetus for content contribution is to derive enjoyment or simply to kill time, a use that was not anticipated in the original design of MobiTOP. Thus, this study suggests that contributing content on a mobile application such as MobiTOP potentially provides a good source of entertainment and companionship due to the 'on the move' nature of mobile users. Here, developers could capitalize from this gratification by exploring new approaches to foster content contribution through the use of games. Research in this area is emerging (e.g. Lee, et al., 2010; von Ahn & Dabbish, 2008) and our present study seems to reinforce the viability of harnessing entertainment for motivating user-generated content. In addition, the access gratification factor suggests the importance of inherent characteristics of mobile devices such as mobility and convenience as affording gratification not only for voice communication (Leung & Wei, 2000) but also content contribution. Consequently, developers would do well to adopt established mobile usability guidelines in their applications to facilitate anytime, anywhere access (e.g. Ji, et al., 2006)

In contrast, factors fuelling content retrieval tend to be information-centric. Specifically, the efficient provision of information resources/services and the need for high quality information were found to be the primary motivators for mobile content retrieval. This is consistent with previous studies (e.g. Sohn et al., 2008; Church & Smyth, 2009) which highlighted the critical role of quality in satisfying the mobile information needs of users who are retrieving content while on the move. Thus, issues related to facilitating easy access to content as well as ensuring high quality content may be essential technological and social considerations when designing a mobile content sharing application such as MobiTOP. This could be accomplished through features such as content and user ratings, comments and other feedback mechanisms (Bian, Liu, Agichtein & Zha, 2008; Chung & Kim, 2008).

Second, gratification factors for mobile content contribution were found to have significant effects on mobile content retrieval intention. In particular, the access gratification factor had a significant positive effect on content retrieval intention. This suggests that users who are motivated by the ease of contributing content on a mobile content sharing application such as MobiTOP are also likely to use the application to retrieve content when the need arises. Again, this finding seems to underscore the importance of the usability aspects of mobile content sharing applications such as menu design, map navigation and content management (Goh, et al., 2009) since they have the potential not only to encourage contribution but also to stimulate retrieval. In this way, the supply and demand cycle of content amongst users can thrive, which in turn leads to sustained usage.

Interestingly, the self-gratification factor for content contribution had a significant negative effect on content retrieval intention. This suggests that users who contribute content for the purposes of image enhancement and self-promotion are not likely to use a mobile content sharing application such as MobiTOP to retrieve content to meet their information needs. Displaying typical ego-centric behaviors, these users are only keen to express themselves rather than have an interest in others' ideas and works. This finding extends extant literature on user motivation (e.g. Ames & Naaman, 2007; Kindberg, et al, 2005) by showing that incentives such as social signaling and self-expression afforded by mobile content sharing applications which entice contribution may not promote retrieval for some users.

Finally, from a motivational standpoint, mobile content retrieval was found to be a more complex process than mobile content contribution. Results in Model 3 show that content contribution intention appeared to be influenced only by perceived gratification factors for content contribution. In fact, Model 3 is no better than Model 1 in explaining content contribution intention. However, content retrieval intention appeared to be influenced by perceived gratification factors for both content contribution and content retrieval, as revealed by the results in Model 4. Furthermore, Model 4 provides a more holistic description than Model 2 in explaining content retrieval intention. This highlights the complex human information behavior-related dynamics embedded in the content retrieval process (Spink & Cole, 2006) and enriches existing information-seeking behavior models (e.g. Wilson, 1999; Foster, 2004) by considering information creation as an inter-related component in information seeking.

7. Conclusion

Augmenting current research efforts, this paper uses the UnG paradigm to explore mobile content sharing behaviors. To develop a more nuanced perspective, it also teases apart users' motivations in content sharing into gratification factors for contribution and those for retrieval of mobile content. Through the deployment of MobiTOP, a location-based mobile content sharing application (Kim, et al., 2009), it was found that leisure and access gratification factors had significant positive effects on mobile content contribution intention while efficient provision of information resources and information quality gratification factors had significant positive effects on mobile content retrieval intention. When gratification factors for content contribution and retrieval were jointly taken into account, it was found that only access, which was a factor for content contribution, had a significant positive effect on mobile content contribution intention. However, efficient provision of information resources and leisure, which were factors for content retrieval, as well as access, which was a factor for content contribution, had significant positive effects, but self-promotion, which was a factor for content contribution, had a significant negative effect on mobile content retrieval intention.

Two limitations in this paper must be acknowledged. One, respondents who participated in this study were primarily undergraduate and graduate students. This could potentially reduce the generalizability of the findings. Two, given the huge sample size, it was not logistically feasible to equip each respondent with actual mobile devices. Instead, a detailed live-demonstration and two possible usage scenarios of MobiTOP were presented. Possible contextual and environmental factors such as location and time which may have bearings on users' perceived gratifications could not be considered in this study.

The paper has important implications for researchers. Specifically, it represents a modest step towards unraveling a much understudied area: the relationship between gratifications and intentions to contribute and retrieve in a mobile content sharing environment. Apart from replicating this study in other contexts with participants from more diverse age groups, a meaningful extension to this study is to include individual profile analyses. Since past research has shown that individual characteristics influence the use of mobile gaming applications (e.g. Lee et al., 2010), examining profiles of users (e.g. gender, educational backgrounds, personality) and their attitudes towards content contribution and retrieval in a mobile content sharing environment would be an interesting area of work.

Another possible direction for future research could involve procuring a limited set of mobile devices that run a mobile content sharing application such as MobiTOP. By developing a schedule in which all participants take turns to be equipped with the devices, it is possible for rich data to be collected through diary studies and personal interviews. Contextual and environment factors such as location and time can also be incorporated as part of the analyses. The results obtained from participants who have a first-hand experience with the application are likely to shed insights on gratification factors and usage patterns.

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