Being connected to the local community through a Festival mobile application

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Abstract
In this paper we report our investigation into how using and interacting with a local festival mobile app enhanced users' festival experiences and connected them to other local users and their community. We explored the relationship between users' perceived basic affordances of mobile technology, perceived opportunities of the festival app, and three elements that sustain the local community — attachment, engagement, and social support networks. Based on the usage logs of 348 active users, as well as survey responses from 80 users, we present a mobile-mediated local community framework and found that engagement is a key mediator of mobile experiences and facets of community.
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1   Introduction

Technologies have been applied to many different contexts in order to provide better services and enhanced user experiences. Applying technology in a variety of activities such as community events, conventions, and even at museums has become commonplace. Rather than adding another layer of complexity to user interactions, these technologies provide a more accessible sense of connection to otherwise unfamiliar territory (vom Lehn & Heath, 2005). In particular, taking advantage of smartphone technology has been increasing, because of its pervasiveness and ease-of-use and people's expectation to have designated mobile apps in many situations (Aldhaban, 2012).

There has been a growing interest in leveraging the benefits of mobile technology in many local communities. A variety of local community stakeholders (e.g. individuals, local groups, organizations, or governments) try to deliver local information to people, increase people's awareness of and participation in local activities, and bring people closer to the local community, which are the primary local community goals (Wellman, 1999). Studies also reflect active efforts toward understanding the influence of mobile technology on people's community connection (Hampton, Lee, & Her, 2011); for instance, designing new mobile tools in different local contexts such as local news and events (Han, Shih, & Carroll, 2014); providing access to history and culture (Glasson, 2014; Han et al., 2014; Procyk & Neustaedter, 2014); and discussing local issues (Schroeter, 2012). A recent report evidenced that local citizens have a great interest in sharing and receiving local information through their smartphones. This understanding is even more important considering that 64% of Americans have smartphones, and two thirds of them use their phones to remain informed about their local community (Smith & Page, 2015).

Our literature review shows that existing community research generally falls into two categories: (1) *studying people's local activities or perceptions through existing technologies*, and (2) *introducing new community tools and detailing their affordances through user studies*. However, there seems to be a lack of understanding and evaluation of these technologies through both empirical and theoretical standpoints, which will allow us to discover nuances that might have been invisible, as well as to articulate, assess, and develop conceptual frameworks. To the best of our knowledge, little or no research has presented or discussed such a framework that incorporates both approaches and could be used in other local studies.

In this paper, we present our efforts to address this gap. Our setting for this work is an annual local Arts Festival where we introduced an app that was designed to leverage the benefits of a mobile technology. We present the design of a field-based user study and its empirical results that evidence an enhanced user experience. Furthermore, we apply theoretical insights detailing how users' perception of the basic affordances of mobile technology influenced their perception of the opportunities presented by our festival app and how this in turn influenced the three local community elements — attachment, engagement, and social support networks. The primary research question that we sought to answer through the design of the mobile app and user study is:

> **RQ**: *How do citizens' perceived opportunities from mobile technology generally, and from a local community mobile app specifically, influence their local community connection?*

2   Related work

We first summarize prior research in understanding one's community connection through technology and the introduction of mobile apps for local festivals or events. We then describe a conceptual framework for the local community that we used as well as our research goal in this paper.

2.1   Understanding community connection through technology

With social attention largely dedicated to online and technologized spaces, a question that commonly arises is how we can share aspects of our own lives and communities with other people through media, adding to the interconnectedness of the modern world (Ognyanova et al., 2013). Using technology to enhance community engagement has been employed to great effect in areas such as youth outreach and citizen journalism. O'Donnell and Coe-Regan (2006) in their studies of a youth technology camp focused on interacting with community and governing bodies, found that participants exhibited a significant increase in community-oriented qualitative responses. These responses were often directly framed within the context of technology, where participants claimed that technology gave them a greater sense of voice and local knowledge. Nah et al. (2014) found similar results in their study of college students who participated in citizen journalism, finding a significant increase in community engagement, social capital, and civic education.

In addition, a considerable amount of research has focused on the development of systems that harness the benefits of supplementing community activities with technologies. One of the main goals of community-oriented app development is to make local information more visible to community members, thereby making them more aware of their community and promoting participation and engagement. For example, *CiVicinity* is a community portal that builds upon the tools provided by modern web technology (Hoffman et al., 2013). It collects and displays community information, bringing it into one easily accessible and central location. *Discussion in Space* is a feedback platform utilizing large screens and mobile devices to advertise community relevant questions and issues to the public as well as encouraging people's responses to the questions via SMS and Twitter (Schroeter, 2012).

Our study aimed to further investigate the effects of technology on one's community connection, through the development of a mobile app that allows attendees of a local arts festival to share their experiences, interact with other users, and readily access information about the festival itself. To this end, our app included several features designed with social interaction in mind, such as the ability to share posts and photos, comment on what other users of the app have shared, receive updates on festival activities, and send notifications to fellow users as an informal salutation.

2.2   Mobile applications in local festival contexts

Using mobile technology in local festival contexts has been done for many years, and as such, there have been quite a few research studies and reports on this topic. For example, Jacucci et al. (2007) presented a mobile app named *CoMedia*, which was designed to support friend-like group experiences during a festival. They found that people in the same group created stories together about the event through texts, images, videos, and audios at anytime from anywhere. Cheverst et al. (2008) described an app that incorporates the concept of user-generated geo-tagged photos during a local community festival. Participants shared photos taken from mobile devices and watched the uploaded photos on a situated public display. Along with a photo sharing tool, Ganoe et al. (2010) presented an app that also supported a status update tool, allowing users to post and share short messages about their personal status with locations, increasing the visibility of their festival activities to their friends. Larsen and Stopczynski (2011) introduced an app that allowed people to interact with others through scanning a barcode on a wristband. Users' activities, such as photos and microblogs, were shared on situated displays, presenting festival-wide social networks and activities.

One common aspect that all of these studies showed is the benefit of using mobile technology with respect to easily accessing and sharing festival information and experiences. Some studies demonstrate a potential for combining additional technologies (e.g., large display, wristband, etc.) to further increase engagement in festival activities. However, they did not specifically investigate a broader question of how technologies were experienced as contributing to community connection, which is what we have studied and present in this paper.

2.3   Conceptual framework for the local community

For a theoretical baseline, we employed a conceptual model of a community (Carroll, 2012), which consists of three facets: attachment, engagement, and social support networks. We acknowledge that there are other community models. For example, O'Neil (2002) introduced five elements including strong democracy, social capital, individual empowerment, sense of community, and economic development opportunities. Williams and Durrance (2008) emphasized the necessity of considering social networks and social capital, which would greatly influence the launching and sustaining of technology in local communities. We used Carroll's model (2012), because its three components incorporate the notion of technological influences on people, providing a lens through which potential innovations in community processes and infrastructures can be examined and evaluated. His model not only emphasizes personal commitments, experiences, activities, and relationships but also focuses on members' connection to their community and to other members, which complies with our goal of articulating the role of the app in supporting and facilitating those aspects through the empirical outcomes. Lyon and Driskell (2011) indicated that there are more than 100 community theories, and clearly there are much more elaborated and articulated theories of community. However, the one that we used allowed us to investigate technology affordances and perceptions at a finer level of conceptual analysis, through the three key facets, than examining "local community" as a single integrated construct.

Community attachment (identity) indicates a sense of attachment and belonging to people, local places, and past events. It is one of the core elements of a sense of community (McMillan & Chavis, 1986) and has been widely used to gauge the level of people's attachment to a community (Gruzd, Wellman, & Takhteyev, 2011). Having a community identity is a fundamental requirement for local people to experience a genuine sense of civic engagement, awareness, and a desire for participation.

Engagement (awareness and participation) refers to more visible actions or activities developed from a community identity (Adler & Goggin, 2005). Depending on individual preference and motivation, some local residents are actively involved in different types of community activities to voice their opinions to the public or their community. Some less active and motivated people prefer to maintain their awareness of local topics, such as local community news, events, or activities.

Social support networks refer to the myriad actions and roles that individual community members can take while participating in different activities. Each member has his or her own perception and knowledge of local community information, which affects their individual level of participation and the diversity of roles available to them. For example, one member is the father of a family, a local high school teacher, and a member of a local volunteer group. He may be motivated to express his opinions on various local topics and issues, such as high school renovation projects or other local volunteer activities. This will generate a variety of information that will be shared by community members who have different motivations and expectations, thereby providing benefits to these other members.

Overall, these three facets capture fundamental aspects of what local community is meant to be. They are distinguishable but not independent. They tend to co-occur and mutually entail one another in many circumstances. However their relationships have been conceptually understood and have not been measured through empirical data or evidence. Although studies have shown that mobile technology has a potential for increasing local engagement (Campbell & Kwak, 2010; Foth, 2011), there exists a lack of understanding of how the use of a local community tool will strengthen one's community connection. Much of the existing research, even that which introduced new local community tools and presented user study results, does not seem to explicitly discuss how their tools connect users to their local community.

Our work is the investigation of a conceptual framework for a local community based on empirical outcomes. We study the basic affordances of mobile technology — mobility and immediacy — as well as the special opportunities from our app — notifications, personal update page, and user recommendations — and the relationships between these aspects and one's local community connection. By combining the conceptual model with empirical study results, we strived to understand how and to what extent users' perceived opportunities supported by the app affect their perception of the three community elements. We also investigated the interrelation of three community facets. We present a model that integrates mobile technology benefits and local community connection, which we hope to be used or further developed by other local community studies.

3   Arts Festival and mobile application (ArtsFestApp)

Arts Festival is one of the largest and most popular summer events in State College, Pennsylvania, USA. The festival takes place annually in mid-July, downtown and on the adjacent university campus. It is a five-day event, celebrating the arts with a sidewalk sale and juried gallery exhibition involving around 400

artists, as well as having music, dancing, theatrical performances, and several workshops and events for children.

For the design of ArtsFestApp, we worked with festival administrators and staff for around three months before the festival. We had several meetings to discuss how to design the app and to promote and advertise it to people. The festival team provided us with festival content such as texts, images, and other general information. We created and managed a local database to store the data and created APIs for information communications between a mobile client and server.

(a)   (b)   (c)   (d)
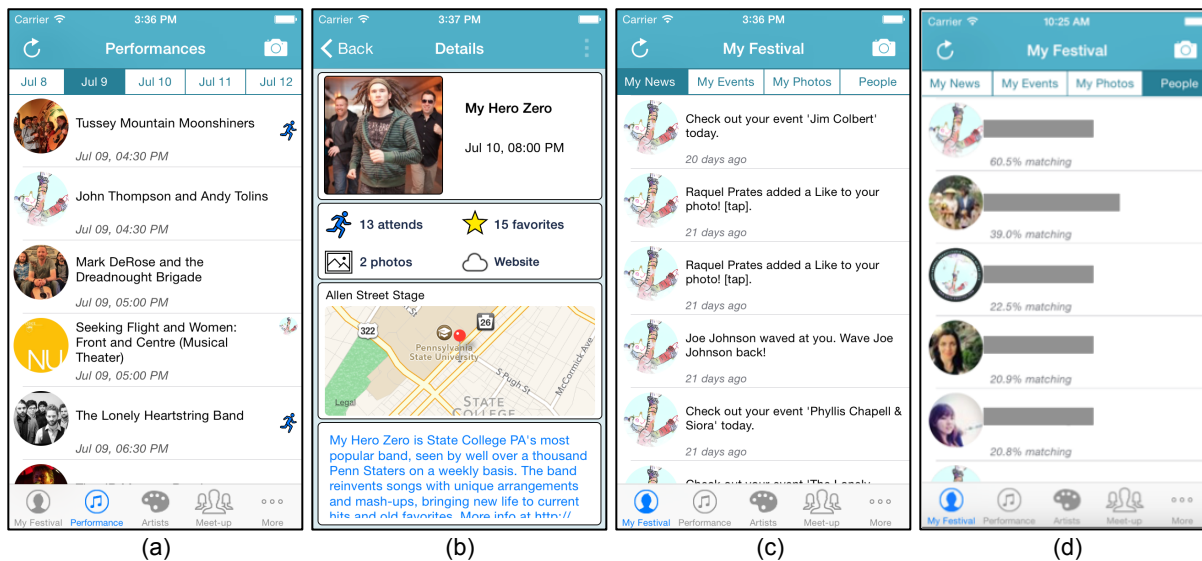
Figure 1. Screenshots of ArtsFestApp (usernames anonymized).

ArtsFestApp offers the basic features that most festival apps are usually expected to provide, such as a schedule of events (Figure 1-a), information on performances, of the location of various artists (Figure 1-b). It also provides more interactive features for sharing photos, comments, and likes and the ability to bookmark festival events and artists. There are additional features that are more tailored to mobile devices including sending or receiving real-time notifications, having a "My News" page that shows a history of notifications and messages (Figure 1-c), and a "Recommendation" page that shows a list of recommended users (updated every hour) based on user's interests and app usage logs (Figure 1-d).

ArtsFestApp offers several types of notifications (Figure 1-c). Users receive a reminder one hour prior to the scheduled start time of any of their bookmarked events, and they will receive notifications when other users add likes or comments to her photos or if they receive a person-to-person message. A user will also receive a message about recommended users (e.g., "Check out users similar to you.") once a day (Figure 1-d). Our back-end server calculates the similarity between two users based on the number of similar events, performances, artists, and user-generated photos that the two users both indicate that they either attended or liked (note that the details of the recommendation algorithm are out of scope of this paper).

4   Study Design

We advertised ArtsFestApp through local news coverage, mailing lists, and word-of-mouth. We also had a designated booth at the festival to help people download and use the app. The study was conducted naturally to capture the spontaneous use of the app. Users downloaded the app voluntarily and were not asked to do specific tasks by researchers, as we wanted to see the natural results and usage of the app. Our study was also IRB approved, and users were aware (and agreed) that the shared data (e.g., photos, comments, etc.) are publicly accessible and can be used for a research purpose.

After the festival, we invited all users to participate in an online survey through email. In the survey, we asked questions about their demographics, perceived opportunities of ArtsFestApp, and perceived local community connection. We used a 7-point Likert scale combined with open-ended survey questions to gather this information.

5   Results

5.1   Demographics

ArtsFestApp was downloaded approximately 1,200 times. Out of these users, we considered 348 to be active users, as they posted more than one time through the app. We received 102 post survey responses, but 80 responses were completed, which were what we used in our analysis. Among the respondents 57% were female. Their age groups ranged from young adults (18-29, 20%), adults (30-49, 42%), and senior adults (older than 50, 38%). About 68% of them were from the local region, 20% from other areas, and the rest were visitors from outside the state. About 84% of them had attended the festival before. For the time they spent at the festival, 62% of the respondents spent more than 5.4 hours in total at the festival and visited 2.3 days on average at this year's festival.

5.2   Perceived affordances of mobile technology

The principal advantage of mobile technology is increased mobility, which allows people to access services wherever they go and transcend limitations of geography and distance when digitally communicating with others. Another advantage of mobile technology is immediacy, which refers to the quality of bringing one into direct and instant involvement with entities, events, or actions in more time-critical situations or conditions (Anckar & D'Incau, 2002). When immediacy is specifically linked to mobile technology, it usually pertains to how fast one could meet his or her expectations in terms of obtaining or accessing information in a particular situation or context. In a local community context, both mobility and immediacy will facilitate access to and interaction with local information and support social interactions with other local members anytime and anywhere.

Perceived Mobility & Immediacy (MI)	Mean	SD
MI1: The app allows me to access festival schedules, photos, or shared content anytime anywhere	5.86	1.19
MI2: The app allows me to share my festival experiences anytime anywhere	5.26	1.17

Table 1. Result of perceived basic opportunities of mobile technology through ArtsFest.

In this regard, we asked users to answer their perceived mobility and immediacy when using ArtsFestApp. As shown in Table 1, users were generally positive about the basic affordances that mobile technology provides through the experience of the app.

Figure 2. Examples of user-generated photos during the festival.

In our study context, sharing photos is an example of the key perceived affordances of mobile technology and the fact that people actually used these features means that the perceived features were actionable affordances. During the festival, app users posted 75 photos, to which 137 "likes" and 25 comments were added. There were 225 "attendances" indicated for performance events. To better understand what kinds of festival photos users shared through the app, we conducted a content analysis for the photos. This analysis was done by three of the authors who independently categorized all of the photos and jointly derived the three categories (inter-coder reliability: 0.90). The most frequent category (45 photos; 60%) was depicting general pictures of the festival, such as work pieces by artists, festival surroundings, and so on. The second most frequent category (23 photos; 31%) was capturing exciting festival moments, such as showing how people enjoyed a variety of musical performances. The last category, which was admittedly somewhat rare (7 photos; 9%), was sharing photos of users themselves, their friends or family members. We noticed that for the three categories of photos, the individuals who posted the photos typically added descriptions to express their excitement about the festival (e.g., *what a beautiful event!*; *very nice weather for the festival*; *Entrain… 7 years since they played here!; family reunited!*, etc.). Figure 2 shows some examples of the photos shared by users. Overall, users showed content sharing and social interactions through the use of the mobile device and the app.

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5.3   Perceived affordances of Arts Festival application

Along with the perceived opportunities from mobile technology, we also measured how users experienced and perceived the interactive features — real-time updates through notifications, my update page, and user recommendations — of the app (Table 2). Users somewhat agreed with the positive impacts of using those features on their festival awareness and engagement. They did not find the recommendation feature to be as useful as other aspects, but the result was still above borderline, indicating a somewhat positive impact.

Perceived Opportunities (OP)	Mean	SD
OP1: Having my update page in the app allowed me to keep up with the festival events and news	4.95	1.18
OP2: Having my update page in the app made the festival more engaging	4.79	1.19
OP3: Receiving notifications from the app about festival activities was useful	4.74	1.37
OP4: Receiving recommended users was useful	4.28	1.14

Table 2. Result of perceived opportunities of ArtsFestApp.
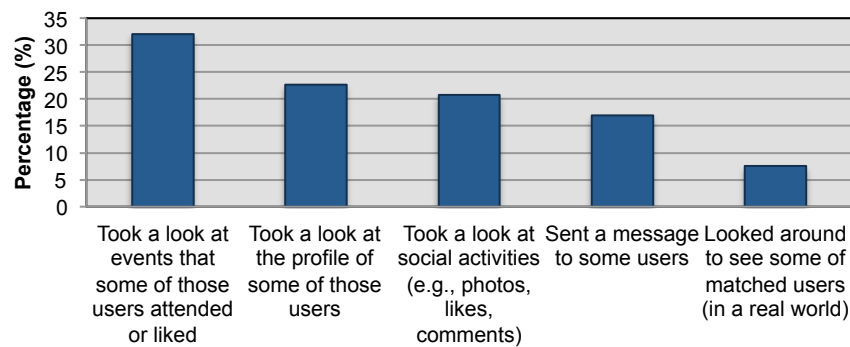

Figure 3. Users' actions after they received user recommendations.

We were particularly interested in how people used the recommendation feature. Recommended users are the ones who have shown similar interests in the festival based on their usage activities of the app; therefore, examining users' reactions to this feature will give us better understandings of the app's unique affordances.

We asked about the actions that users took after they received a list of recommended users (Figure 3). 32% of users mentioned that they looked at the events that some of the recommended users attended or liked, 22% of users mentioned that they looked at the profile of some of those users, and 20% mentioned that they looked at social activities (e.g., photos, likes, and comments). 16% said that they sent a "Wave" message to the recommended users, which simply means saying hello or getting receiver's attention, similar to the "poke" feature on Facebook. Based on the usage logs, we found that 60 unique users (17.2% out of the 348 active users) sent "Wave" messages during the festival. Although we did not measure how many Wave messages were shared after receiving recommendations, this survey result indicates a relationship between recommendations and subsequent messages. 7.5% answered that they looked around to see some of the matched users in the real world. Although one of our design rationales of the app was to create some level of social interactions in the real world, our app users seemed to leverage the recommendation feature as a sort of personal-index into festival activities and information, and of social interactions in the online environment.

5.4   Community connection mediated by the Arts Festival application

Our last goal was to present a model that integrates users' perceived opportunities of the app described in the two previous sections and their local community connection. Table 3 (below) describes the three constructs of the local community with corresponding questions and results.

Variable	Mean	SD
Attachment (AT)		
AT1: The app makes me think I belong in the local community	4.83	1.14
AT2: The app makes me think being a local community member is good	5.09	1.12
AT3: The app makes me feel connected to the local community	4.92	1.08
Engagement (EN)		
EN1: The app encourages me to say what goes on in local community	4.73	1.19
EN2: The app encourage me to interact with local activities	5.21	1.13
EN3: The app makes me think people are engaging in local activities	5.22	1.01

EN4: The app allows me to reflect on experiences of local activities	4.61	1.11
Social Support Networks (SN)		
SN1: The app makes me think people share important local information together	4.82	1.15
SN2: The app makes me think people create diverse local activities	4.92	1.08
SN3: The app makes me think people share different local experiences	4.79	1.10

Table 3. Summary of effects of ArtsFestApp on one's community connection.

With all survey responses, we used Structural Equation Modeling (SEM), because SEM allows a set of relationships between independent variables and dependent variables to be examined (Fornell & Larcker, 1981). Through this, we can formalize the relationships among the perceived affordances of the app and local community elements. Regarding a sample size, SEM requires minimally five times the number of variables for significance testing of model effect (Kling, 1998), which is satisfied in our study.

Variable	Loading	α	CR	AVE
MI1	0.66	0.76	0.77	0.75
MI2	0.83			
OP1	0.75	0.87	0.85	0.75
OP2	0.88			
OP3	0.68			
OP4	0.70			
AT1	0.64	0.73	0.74	0.71
AT2	0.83			
AT3	0.66			
EN1	0.66	0.79	0.73	0.70
EN2	0.72			
EN3	0.64			
EN4	0.77			
SN1	0.74	0.80	0.78	0.76
SN2	0.80			
SN3	0.74			

Table 4. Loading, reliability, and average variance extracted of each construct.

Variable	MI	OP	AT	EN	SN
MI	**0.86**				
OP	0.37	**0.86**			
AT	0.28	0.62	**0.84**		
EN	0.41	0.71	0.66	**0.84**	
SN	0.29	0.69	0.60	0.82	**0.88**

Table 5. Correlation of latent variable and AVE for discriminant validity.

In order to validate the model, we measured reliability, and convergent and discriminant validity for each factor. For internal consistency reliability, we measured Cronbach's α and composite reliability (CR). The interpretation of the coefficient of CR is similar to that of Cronbach's α, except that it also takes into account the actual factor loadings, rather than assuming that each item is equally weighted in the composite load determination. The results show that both parameters have high values (the requirement is above 0.70), indicating acceptable internal consistency among factors for each construct.

To measure convergent validity (testing whether constructs are expected to be related are in reality related) and discriminant validity (testing whether the constructs that should have no relationship actually do not have any relationship), several indexes were assessed. For convergent validity, all factor loadings should exceed 0.60 (Hair et al., 2009) and Average Variance Extracted (AVE) should exceed 0.50 (Fornell & Larcker, 1981). The result showed acceptable convergent validity. Lastly, for discriminant validity, we compared the inter-construct correlations between constructs with the square root of AVE. In general, the shared variances should be lower than the square root of AVE (Fornell & Larcker, 1981), and the result again showed acceptable discriminant validity. Overall, our data met all criteria (Table 4, 5).

After having gained confidence about the appropriateness of the measurement, we examined the model's goodness-of-fit. We used the ratio of χ^2 to Degrees-of-Freedom (df), Comparative Fit Index (CFI), and Root Mean Error of Approximation (RMSEA), which are the most commonly used measures in SEM. The model showed χ^2/df = 1.24, RMSEA = 0.05, and CFI = 0.98, confirming that our model exhibits a good fit with the data. Figure 4 illustrates the full model.

The results of the model show a number of insights. First of all, perceived mobility and immediacy of ArtsFestApp showed a significant influence on perceived opportunities of the app (β = 0.32, p < 0.01) and a strong direct influence on engagement (β = 0.13, p < 0.05). Mobility and immediacy have been acknowledged as the basic affordances of mobile technology. Users who experienced these affordances when accessing festival information and when sharing festival experiences and reflections were more positive about the interactive features of ArtsFestApp. It is also worth noting that users' community engagement was strengthened by their positive perception on mobility and immediacy, showing a strong relationship between the basic opportunities of mobile technology and community engagement. This substantiates previous findings about mobile technology and civic engagement (Foth, 2011).
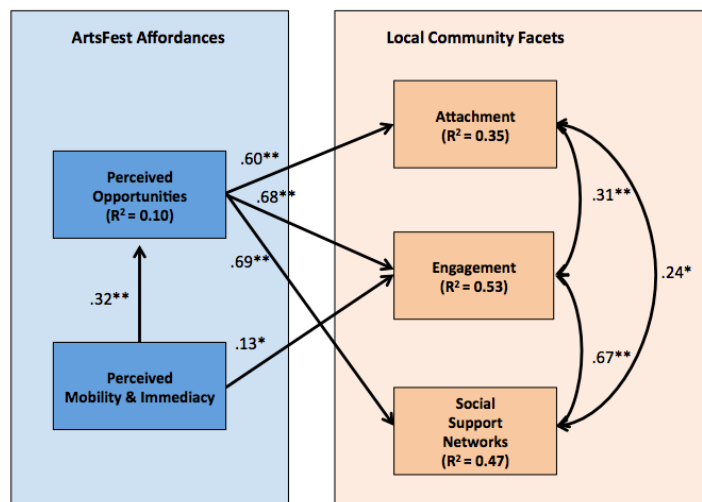

Figure 4. Structural equation model of two affordances of ArtsFestApp and on community attachment, engagement, and social support networks. X^2(2) = 2.492, p = 0.287. Note: lines with arrows represent standardized path coefficients or correlations statistically significant at p < 0.05. R^2 indicates the amount of variance in an endogenous variable that is explained by its predictor(s) in the model (note: *p < 0.05, **p < 0.01).

In addition, perceived opportunities of ArtsFestApp showed a strong and positive influence on all community facets (β = 0.60, 0.68, 0.69, p < 0.01). This indicates the role of the app in evoking and facilitating one's community connection in a positive manner. Accessing and interacting with festival information through an official (e.g., events, artists, etc.) and social channels (e.g., photos, comments, recommendations, etc.) seemed to give users positive impressions, making them feel attached to other users and local community as well as encouraging them to share more interesting festival information.

The model also verifies the theoretically studied relationships among three community elements. Attachment was positively related to engagement (β = 0.31, p < 0.01), indicating that feeling more connected to the local community leads to having more engagement and vice versa. Attachment was also positively related to social support networks (β = 0.24, p < 0.05) but weaker than their relationships with engagement were stronger (β = 0.31, 0.67, p < 0.01). It is also important to see that *engagement is a key mediator of mobile experiences and facets of community*, since it is strongly related to mobile affordances and strongly connected to two other local community elements. Overall, the model demonstrates that the basic affordances of mobile technology lead to positive perceptions on new opportunities by ArtsFestApp, and that also amplifies one's community connection.

6   Discussion

6.1   Assessment of a mobile-mediated local community model

This study aimed to understand how the usage of a mobile app could heighten one's sense of community, awareness, engagement, and social interactions. Our analysis revealed rich interactions and captured users' personal and varied festival experiences. The data also evidenced the ability of the app to evoke users' own festival reflections and experiences with other festival users.

ArtsFestApp was designed to offer features (i.e., real-time push notifications, a personal update page, and recommendations) that are better supported over the mobile device than physical or real-world alternatives. The study results showed that basic mobile affordances, perceived mobility, and immediacy all positively influenced the specific and more advanced opportunities provided by ArtsFestApp, which in turn led to strengthening one's community connection. The analysis also shows the positive relationships

among community attachment, engagement, and social support networks, and especially engagement is found to be a key mediator of mobile experiences and facets of community. Overall, our study effectively demonstrates the model of technology-to-community intervention.

This conceptual mobile-mediated local community model could benefit from operationalizing other new measures or re-appropriating theoretical conceptualizations depending on a context. For example, civic efficacy can be measured, because it is strongly related to community awareness and engagement (Farnham et al., 2013). Other aspects of mobile technology; for example, information exchange, social communication, etc., can be also studied together due to the understanding that mobile devices facilitate communications among local people, and are thus found to be well-associated with online and offline civic engagement (Campbell & Kwak, 2010).

In this paper we tried to understand empirical outcomes through theory-based standpoints. We wanted to claim the importance of considering fundamental community aspects for the assessment of community tools and to bring attention to this topic, as we have found they were not well articulated in most prior studies. As such, we have presented a model as an example and starting point. We attempted to connect the perceived affordances of local community technology to users' perceived connection to the local community. Our approach can be applied to other local community research studies that present new tools and technology and discuss outcomes with respect to community connection. We hope that this way of understanding a local community tool can provide a guideline to people who study technologies in the context of local communities and also bring additional methodological discussion points in the future.

6.2 Limitations and future work

Although our study presents several insights on the application of mobile technology in local communities, it also has several limitations that offer directions for future research.

First, several users raised privacy concerns over the recommendation feature. Providing an interface that allows users to control the visibility of their information to the public would mitigate this concern to some extent. An in-depth analysis of the privacy implications and risk assessment of future mobile apps, which leverage some of one's contextual information (e.g., activities, locations, time, etc.) used by many people, seems necessary to maximize collective benefits at the local community level and to minimize the risks of unintended disclosure of personal data. If the privacy concern is somewhat managed, there is also a research opportunity to provide more accurate and relevant information based on user's context. As an example, there is a growing interest in using iBeacon technology for accurately detecting user's location and providing relevant information directly to user's mobile device (Kouhne & Sieck, 2014). This will show a potential for receiving context-aware festival information and engaging in new interactions with others.

Second, it might be difficult to generalize the present model to other local contexts. Investigating the impacts of mobile technology and apps from people with more diverse backgrounds, degrees of technology affinity, or a level of local awareness/participation, etc., would provide more comprehensive understandings of mobile technology to local citizens and their community. As there are other festivals and events in our community, we are planning to provide apps, conduct studies, and collect usage reports from more users. This will also address some concerns about a limited sample size and the measurement of users' community connection through a single local event. We also acknowledge that our findings were mostly from users' survey responses. We are planning to investigate how users' use of the app (through not only the content shared, but also click through data) and the perceptions measured in the survey are related, which would show additional insights of technology impacts on one's local community connection.

7　Conclusion

This paper describes our design of a smartphone app and a user study to understand the impacts of the app on users' festival experiences and community connection. We studied the relationship among users' perceived basic affordances of mobile technology, perceived opportunities of the festival app, and three elements that sustain the local community — attachment, engagement, and social support networks — from 348 active users' usage logs during a five-day local arts festival and 80 post-survey responses. We presented a theory-based, mobile-mediated local community framework and showed that the app was experienced as contributing to one's local community connection based on empirical outcomes.

8　References

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