

Towards Uncovering Factors that Influence Adoption of Networked Public Displays within Communities

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ABSTRACT

Networked public displays have the potential to become a new and powerful communication medium. This novel communication medium can be used to foster community interaction, i.e., a “sense of community” through improved social interaction. To assure the prosperity of networked public displays within communities this position paper examines some of the factors pointed out by the literature that might lead to adopting the novel medium. We find that these factors are (1) *community structure*, i.e., the number of strong and weak ties in the community; (2) *uncovering and supporting community ethos*, i.e., representing them on a display; (3) *determining adequate communication channels* to communicate with the display, and (4) creating a *community beacon*, i.e., a central place where community members and outsiders can learn about the community. These factors can be used to inform the design of networked public display applications that aim at stimulating community interaction.

Author Keywords

Networked Public Displays, Community Interaction, Design

ACM Classification Keywords

HCI theory, concepts and models

General Terms

Design

INTRODUCTION

Public displays have been used as a tool that stimulates sense of community and improved social interaction, i.e., *community interaction* [19, 20], for a long time. Even before digital displays were available traditional notice

boards have been used as a ‘place’ for community discussion: service offers, items to sell, or community event advertisements are common elements of public notice areas (PNAs). The PNA’s overall content makes a central place where community values and activities are displayed [1]. Although PNAs represent very primitive technology they are still able to foster the notion of a community.

Technologically more advanced representatives come in the form of digital displays. For more than a decade researchers have been using them to foster community interaction in a variety of settings ranging from urban public spaces [21], company office space [5] to more leisure ones like a coffee shop [13], local grocery store [27], or a post office [28].

Due to the significant price drop of LCD screens and the World Wide Web it is not hard to imagine that globally networked public display systems will soon become a novel communication medium [6] thus making systems that foster community interaction appear everywhere [18, 17]. To assure their wide acceptance this position paper analyzes previous work on public displays and communities and present factors that influence their adoption as a communication medium. We identified four factors that lead to it.

The first factor is the *community structure* within display’s location. Public display technology might have different success depending on the social relations *within* the community, i.e., on the ratio between weak and strong ties between the community members [23]. The second factor is *recognizing community ethos*, i.e., recognizing the values shared between community members [2], p. 2., that should be shown on a display. In order to allow community members to publish on a display and represent their *ethos appropriate communication channels* should be uncovered, assuring they complement community’s communication practices [22]. By uncovering appropriate communication channels community members will be able to contribute to a display and create a *community beacon*, i.e., a central place where community ethos are displayed. In turn this will support legitimate peripheral participation [29], p. 9, i.e., learning about the community without direct participation by observing display content. A structured display of these factors is illustrated in Figure 1.

Of course, these factors are not definite and are just a first step towards better understanding of the ingredients that lead to adoption of networked public displays within communities.

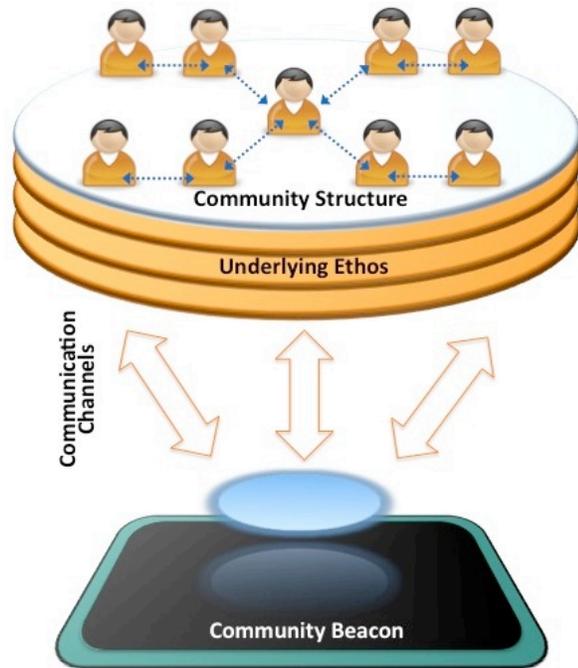


Figure 1 Community Structure, Ethos, Communication Channels, and Community Beacon as Adoption Factors for Networked Public Displays

COMMUNITY STRUCTURE

Among the first to reveal the connection between community structure and technology adoption were Pickering and King [25] who were looking into Internet appropriation/acceptance within a workplace community. They note that communities comprising of members that are seeking to establish and maintain weak social relationships will accept new information and communication technologies faster than communities that do not have this type of members. Similarly, recent study by Nielsen et al. [23] shows that community structure determines the level of impact social software can have on intra-community cohesion. Their study revealed that communities with a (1) loose organizational structure, sufficient number of weak ties, and a number of key members that will drive the system usage in the beginning are more likely to adopt technology that tries to increase community interaction than (2) communities with a number of strong ties and steady organizational structure (the strength of a social tie is determined by the amount of time, emotional intensity, intimacy and reciprocal services that characterize the tie [7]).

Although the above mentioned technologies didn't include public displays we can find evidence of similar findings within public display realm: Izadi et al. [10] point out the

need for a number of strongly motivated initial users that will spark community interest in the system's use, while McCarthy et al. [14] indicate that users with strong feeling of belonging within unorganized community are more likely to adopt the technology.

However, so far community structure has not been considered as a factor for technology adoption in studies on public displays that foster community interaction. Some deployments were made in settings that should have had enough number of weak ties, e.g., academic settings [9, 10, 15] and working environments, [5, 8, 13, 26], while for the other settings like neighborhood and rural village community hubs [27, 28] and 'third places' [4, 14] like coffee shops, the number of weak ties could have been lower.

RECOGNIZING COMMUNITY ETHOS

Defining a community and its needs is a challenge: as Obst et al. [24] note in 2004 there were 94 definitions of 'community' in 1955. The same can be said for public display systems that support community interaction. The importance of co-realizing the (public display) system with the community for whom the system is being built has been stressed throughout prior research [10, 11, 27, 28]. Without gaining insight and understanding a particular community's needs and *uncovering their ethos* [2, p. 2], the system is not likely going to be supported by the community. The plethora of ethos may vary from valuing community's history [11, 28], staying in touch with activities inside an organization [5, 8, 13, 26], learning about the world outside the community boundaries [11], or bringing people closer in a leisure spaces [4, 14].

FINDING APPROPRIATE COMMUNICATION CHANNELS

Bacon [2] and Wenger et al. [29] best capture the importance of finding appropriate communication channels in their books. Even though they are discussing the channels through the practitioner's perspective their insights are highly valuable: it is of essence to find the best communication channels for the community's prosperity.

Current public display research points out that these systems need to be built *on top of existing behavior and practice* [22]. Getting community members to learn a new pattern to perform an existing habitual action will most likely not work. An alternative solution would be to offer direct and indirect interaction with displays that also supports a variety of techniques and devices, thus allowing users to choose the interaction technique that they feel most comfortable with [9, 10].

Offering a wide range of communication channels goes along with the research of Wenger et al. [29] who mapped community communication channels according to nine community ethos. Indeed, it may seem that the solution lies in covering a variety of devices and techniques thus offering freedom to users to choose the channel of their

choice. However this may very well leave the community members wondering which channel to use.

Even with the appropriate channels in hand it may be necessary to promote these systems with an event explicitly organized around it to help to jump-start its acceptance [28]. The promotional event could help people overcome their fear of embarrassing [3] themselves by knowing that it is new and that others also do not know how to use it.

CREATING A COMMUNITY BEACON

By showing community ethos at a public display the display becomes a *community beacon*, i.e., a central place where community values are displayed. It serves as a beacon to community members emitting their values in the space.

This is very similar to Beacon's [2] notion of *outgoing channel* that is used to share the community news or stories of success to the outside world, i.e., to spread information indirectly. The community beacon also allows what Wenger et al. [29] call *Legitimate Peripheral Participation*, i.e., learning about community and their ethos and activities from the periphery (without direct involvement). LPP is similar with online 'lurking' [12], a behavior of visiting sites that are social in nature without getting engaged in them *but* discussing their content offline. LPP gives an opportunity for non-community members to acquire information about the community from their own comfort zone. Also people who remain on the periphery can spread the word about the community in a similar fashion as people do by 'lurking'.

One thing to be noted is that in the case of public display systems *community beacons* have to come already filled with content [28] to avoid ambiguity [16] and pose clarity of what can and can not be published on the display. They should also have the ability to transform and adapt dynamically to present communities.

CONCLUSION

To assure the prosperity of the novel communication medium - networked public displays - We analyzed literature on current public display systems and communities in order to uncover factors that lead to adoption of this technology. We find that these factors are (1) community structure, (2) recognizing underlying community ethos, (3) finding appropriate communication channels, and (4) creating a community beacon. The four factors can be used to inform the design of networked public display applications that aim at stimulating community interaction.

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