Pangmangi: Exploring Situated Aesthetics and Awareness
Information

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ABSTRACT
In this paper we present qualitative findings on a design study about a new awareness and media space system, called Pangmangi. We were interested in what does it mean to successfully combine aesthetics with information. From our focus group sessions, we found that the participants' views about appropriate uses, as well as the appropriate relationship between aesthetics and information, were deeply situated in the participants' sense of place, or situated location. This sense of place was affected by one’s institutional roles and institutionalized expertise. Finally, these contextualized views played an important role in understanding and interacting with our system.

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Awareness, media spaces, aesthetics, design, information design, interaction design, privacy, computer-supported cooperative work

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H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION
“Does it go with the couch?” [11]

HCI studies, as they move into pervasive and domestic environments, have begun to reengage issues of aesthetics and design as part of usability and usefulness.

This study began as a design study about a specific application, a new awareness and media space system called Pangmangi (to be described below). Its goal was to have a display that was aesthetically pleasing but also informational. However, in order to design this application, we needed to more fully understand the basic design requirements for what we believed to be a new point in the design space of awareness and media space systems. Should we consider the aesthetic components of our system in terms of user requirements? This paper presents our findings about this exploration, principally around the interplay of aesthetic experience and information interaction. In short, we found that the "appropriate" aesthetics for users was deeply rooted in their sense of place and in their "appropriate" uses. The required aesthetics or artistic desirability was often very situated.

Our paper proceeds as follows: We briefly review the HCI research into aesthetic requirements and a method that might be used to uncover them. We then present our system, Pangmangi, as well as our research method and data collection techniques. We then present the findings from the qualitative study we performed. We conclude with future work.

LITERATURE
This work engages two important considerations in HCI. First, HCI has always needed to successfully consider the aesthetic experience while designing for usability and usefulness. As Fogarty et al. [11] argue, this will become a larger and larger issue as systems expand away from desktop computing into everyday artifacts. Second, we also need to uncover design requirements and dimensions of analysis when similar applications do not yet exist. This is critical issue in the design of, for example, pervasive systems. In this section, we briefly review the existing HCI literature on these two questions.

First, there is a growing belief within HCI that we must move beyond usability and acknowledge desirability [11] and aesthetics [6, 7, 14, 17]. Until recently, aesthetic perspectives have been subordinated under functionalism, and aesthetics have been seen as the icing on the cake [17] or an added bonus [11]. System designs have focused on the technical and cognitive aspects, lacking in bringing in contextual factors and aesthetic dimension to the design process and evaluation.

A handful of studies, however, have combined aesthetics as an important element in designing systems and
information. Some studies focus primarily on creating the artistic aspects of information display. For example, Redstrom et al. [13] introduces Informative Art, their term for computer augmented or amplified works of art. These art works not only are aesthetical objects but also information displays, in as much as they dynamically reflect information about their environment. Redstrom et al. distinguishes informative art from information visualization in that it is a kind of slow technology that encourages moments of reflection and concentration in order to understand it. Similarly, the Kandinsky system [11] provides a toolkit to create aesthetically interesting displays, conveying information as an added bonus. Information-bearing images are produced using artistic templates to match the properties of the artist’s aesthetic expression.

Other HCI work has largely used aesthetic considerations in creating usable systems, often as a part of HCI practice. For example, standard design methods in web-site work emphasizes the emotional or aesthetic appearance of the site as well as the technical aspects [10]. Shneiderman as well emphasizes the need for aesthetically-pleasing design in HCI work [21].

Pangmangi builds on this practical work in that it tries to combine information with aesthetical considerations. Other research work is similarly constructed. Mynatt and associates' Digital Family Portrait [8] aims to support awareness of dynamic health and activity information of senior adults living by themselves. A picture frame that incorporates this information can be hung on a wall or propped on a mantle, blending with other household decorations. Thus, the Digital Family Portrait must combine information with an aesthetic consideration in order to fit within a domestic environment.

In a similar manner, Hudson’s Information Percolator's [12] goal is to create an aesthetically pleasing object. The Information Percolator is an ambient display formed by air bubbles rising up through tubes of water. Any small black and white image can be displayed through the air bubbles by properly controlling the release of air.

The Digital Family Portrait, the Information Percolator, and Pangmangi, as well as many other HCI systems, attempt to combine aesthetics and information in a pragmatic manner. To return to the quote at the beginning of this paper, they all attempt to investigate how to fit in with the couch (or in our case, the wall). They create identifiable and pleasing objects from which the users may get information.

However, to understand how to create aesthetic components and to understand their role, we had to engage our second HCI question: If we were engaged in designing a new point in the design space for awareness and media space systems (in fact, combining them), we needed to understand how to explore the design requirements with users who would have never seen a similar system. In this, we found Crabtree's [1] discussion of breeching experiments very insightful. Like Garfinkel [9], Crabtree argued that situations that disrupt people's everyday experience (and how they create their everyday accomplishments) would serve to illuminate what participants considered to be their "appropriate" arrangements. Crabtree used this method to examine mobile requirements; we use a similar method to examine aesthetic requirements in media spaces.

**SYSTEM**

The Pangmangi system was born in the peculiarities of the University of Michigan campus, but it generalizes to many situations. At Michigan, many faculty members...
have joint appointments and more than one office. In addition, the offices are often spread across geographically distant buildings (and indeed, campuses). Fellow faculty members, students, and staff have little or no way to know where any given faculty member is, even if that faculty member is in another of his or her offices.

To ameliorate this issue, Pangmangi combines awareness and media space systems. Media space systems, such as [5, 15, 19, 20, 24], provide for computer-mediated communication between two or more geographically distributed points. Awareness systems allow people to know what others are doing. Media space systems have often included some elements of awareness. For example, Portholes [19] allowed users to determine whether other users were available or busy.

Figure 1 shows how we envision the system being used. (This picture was also shown to the participants in this study.) As a media space, Pangmangi consists of a flat panel display installed outside the user’s office. It also includes a camera with a microphone supporting conversations between a visitor and the occupant of the office who may be away at the time. As an awareness system, the display shows information on the availability of that person. As noted, it attempts to provide information with an artistic sense of style.

In our study we also wanted to examine several potential features for the Pangmangi system:

- Pangmangi provides limited information about the user's availability. Visual feedback is provided when the user is available for conversation, and also when the user is listening and about to engage in a conversation. This awareness information, however, might not be interesting to everyone walking through the hallway. We wanted the display to be aesthetically pleasing for everyone, and to permit the awareness information to be gradually understood by people as they needed it.
- Pangmangi is designed to be installed in a semi-public space, for example a hallway. This also allows the user to listen in on public discussions in the hallway; hence, the need for visual feedback in the listening condition.
- The user may be in any number of locations, including mobile. Thus the Pangmangi wall display gives a fixed point of contact for people trying to reach the user. For others, for example people walking down the hallway, it is merely decorative.
- Pangmangi also includes a simple notification toolkit to allow users to tailor their installations, for example, to include artwork of their own choosing.

**RESEARCH METHODS AND DATA COLLECTION**

Before the installation of the system, we wanted to explore how people would think of this relatively unfamiliar interactive experience. We wanted to evaluate prototypes of the system beyond their usability, looking at how the users might think about this unconventional interface as well as their interaction with the system.

Focus groups seemed to be a good fit for the purpose of our study. Focus groups are known to be a strong method for finding out why people feel as they do and how they

![Figure 2. Example screen shots from the prototypes shown to study participants.](image-url)
arrive at these feelings, or finding out the reasons behind some complex behavior [4]. Focus groups have been extensively used in marketing to evaluate products and to assess client satisfaction [18].

Since our project involves aesthetics as a major part of the system, we also wanted to get diversely distinctive opinions. University staff and graduate students from Computer Science, the School of Information, Art and Design, and Architecture were recruited for the focus group discussions. We added the latter two groups because we hoped that students who study art, design, or architecture would have differing opinions from the others.

Five focus groups were conducted, consisting of two to four participants each (for a total of 14 participants). Each group was homogeneous with regard to a department (e.g., Computer Science and Architecture) and their occupational role (e.g., staff or student). In an hour-long session, we let the participants freely discuss the prototypes that were shown to them. Conversations were audio-recorded.

At first, the only information given to the participants was that there would be a LCD screen with a camera and a microphone hanging outside one’s office in an academic setting. We also gave the focus group participants an example image (see Figure 1) of Pangmangi's use and potential installation. As an attempt at a breaching experiment [1, 9], we required that the participants slowly work out Pangmangi's functionality. In order to guide the discussion however, as the discussion went on, the focus group facilitator (the first author) gradually provided additional information about the system's use as well as additional prototypes. After the subsequent discussion of the general interface, the facilitator added that people could video-conference through the system. After additional discussion, she allowed that the system conveys information through the images shown in the prototypes.

By gradually increasing the amount of information about the system, we structured participants’ exploration – how they worked out the potential uses of this unfamiliar system, how they weighed the aesthetics versus the information content of system, and generally how they approached media spaces. This attempt to create a breaching experiment worked surprisingly well: We were able to uncover many of the users' dimensions of analysis and requirements by watching them work through the goals and uses of the system.

Figure 2 shows the screen shots from the prototypes that were shown to the participants. The prototypes were built with Flash and are animated. Only one prototype was shown at a time. The order of the prototypes shown was same for all five focus groups (left to right, starting with upper left).

The analysis of our qualitative data proceeded through the careful examination of the transcripts. The transcripts were coded [3]; the initial categories were determined by our focus on understanding the users’ reactions and attitudes toward the system. We were also particularly interested in any confusion that might have been caused from the art-work-resembling information display. Detailed codes were iteratively added and deleted as we explored the analysis. This process helped us to unveil contrasting or prevalent views from the participants.

All data discussed below have been made anonymous.

**FINDINGS: UNDERSTANDING THE SYSTEM**

In general, given that the participants had not previously seen or used the Pangmangi system and that we purposefully withheld our understanding of the system initially, unsurprisingly our participants struggled to make sense of the system. (Remember, we wanted this in order to understand their requirements and dimensions of analyses.) Most of the clues they used were familiar to HCI researchers: Two standard ones were the technical features and aspects of the images themselves. In this section, we briefly survey how participants made sense of the system and prototypes in relatively routine ways.

Participants were first presented with a screen that showed an abstract painting (see Figure 2), which seemed to be non-representational and "non-informational". It did not look like a work-oriented computer screen with either windows or text. At first, again, participants were not informed about the media space or awareness aspects of the system. When asked for first impressions about Pangmangi, the participants, unsurprisingly, often had the reaction "it looks like art":

AJ: I guess it’s a piece of artwork that the professor is particularly fond of? (questioning tone)

Ben: Yeah, and it reminds me of those things that Bill Gates has in his house, big TVs in all the walls that show the artwork. And if you walk by it, I think you can ask it if you know what is a < inaudible >, what’s the artist, but that’s sort of what I would guess if I would see that on the wall, some kind of a living arts display panel.

But quickly, participants questioned this view. Seeing the digital screen, camera, and microphone led them to wonder about Pangmangi's purpose:

Beth: So the first thing I notice is the camera. Is it on? It might be watching....

The other technical features puzzled participants, and they felt discrepant in a piece of art. (The ' in the following transcript indicates a speaker's speech following
Immediately after the other, which usually indicates agreement.

Anna: It looks just like an electronic display of artwork...

Brian: I’m not sure I’d thought of it as art. Like it’s interesting, seeing the camera and microphone might be a little bit-

Anna: =yeah exactly (laughing). When I first saw the picture up on the screen is that of the picture of the screen on the wall, I just thought it was an electronic display of art.[...]

Another group puzzled through similarly:

Adrienne: Well that’s my question that, what’s the camera for. I... I... I guess when I first saw the camera I thought there was going to be a connection kind of thing. And I thought there was going to be someone else on the other side of you see. And when that’s art, I wonder what’s the camera is for.

However, another group’s participants, more oriented towards media spaces, immediately were able to jump to the intended uses. (This group was from the School of Information, and may have been exposed to CSCW applications in their coursework or in research projects).

Archer: It looks like art=

Bill: =It does.

Charlotte: It kinda looks reception system at the same time.

Interviewer: Reception system? What do you mean by that?

Charlotte: A way to interact with the person in the office without actually going into the office yet? Well cause of the microphone and the camera. ...Or perhaps they’re able to see you and you can converse with them

Even after the intended use of the system was provided, participants struggled to understand potential scenarios of use. Pangmangi’s intended use was still very foreign; we will discuss this at length below. In their attempt to understand, however, the participants used many features of the system (LCD versus monitor, webcam versus high-resolution camera) and images to work through their understanding. Indeed, for participants in the Art and Design and the Architecture groups their interpretations were very dependent on the representation in the image itself or even the image’s features (especially the level of polish):

The grey makes it through the grey on the side of the image: it seems to me that it’s intentional negative space.... I don't understand the cropping.

In summary, participants used the details of their past experience in ways that were well known and well studied. We have covered them here largely to indicate that participants engaged in normal, everyday reasoning about Pangmangi. However, we were surprised by other ways they had of viewing the system: place and art as information. The following section introduces what each group thought of place, and how they connected their views of place into their understanding of the system. And then, the following section will discuss how participants viewed the connections between art and information.

**PLACE**

Harrison and Dourish [22] pointed out that "place is the understood reality" of users and a place is "invested with understandings of behavioural appropriateness." (p. 69). In other words, users bring their understandings of the appropriate activities and behavior to any situation, including a space.

For all of our participants, Pangmangi defines a space to use. Figure 1 (above), shown to the study’s participants, defined Pangmangi in terms of a hallway. Participants, however, viewed that hallway differently, depending on the assumed context and the appropriate scenarios they read into that prototypical hallway.

This section discusses the diverse views the participants held of situations that are connected to that prototypical hallway, especially a hallway outside faculty members’ offices. Our findings here resonate to those of Barkhuus and Dourish [2] about privacy attitudes: appropriateness and understandings about place were very dependent on institutional role. We also saw, in addition, concerns resulting from the culture and expertise of the participants differing institutional affiliations.

**Research assistants and advisers**

Students had slightly differing views of Pangmangi. PhD and research students approached Pangmangi from the viewpoint of having detailed, often intimate conversations with faculty advisers. For example, AJ is a Computer Science graduate working as a research assistant, and Ben is a PhD student. To Ben and AJ, a faculty member’s office is a place, and may be the only place, where they are allowed to communicate with the faculty.

AJ: Well, I figured that the unit is some type of messaging, like you wanna leave a message for a person, a professor if he weren’t there. Or, some, who walked up to the unit and the professor has a message for he would leave to the student that he was expecting.

If the faculty member is not present, the direct communication with the faculty may not be possible or desired. Some students were very concerned about “bothering” their adviser. This might be the result of a very hierarchical arrangement between adviser and research assistant:

AJ: You know I don’t want to bother my advisor you know, whether they’re available through this device, whether they weren’t... I would never call my advisor on her cell phone. I would never do something like, that <active> uh, when they're not in the room.
This was also echoed in:

Ben: I don’t know if it was Debra’s, I mean Debra’s a busy woman and I don’t wanna bother her no matter where she is, she’s in her office. I would just email her or some kind of non-intrusive communication.

**Students and office hours**

Danielle is a graduate student that does not work for any faculty member. Thus the interaction and experience that she has with the professor is different from research assistants. She has less interaction with the faculty, mostly meeting with a faculty member during office hours. As Barkhuus and Dourish [2] note about their undergraduates, these students do not have fixed locations in this place and they are not of this place. Thus Danielle's perception of a faculty’s office door is a place where she only visits during office hours:

Danielle: if he’s in the, if he’s in the professor’s office again I would just be like why am I not in his office talking to him. Like I would wonder some kind of like actually he doesn’t want me to come and talk to him?

Her initial perception of the system was a public information display that does not involve interaction between the faculty and the visitor, in contrast with a messaging system or an awareness display. After Danielle was told that Pangmangi is a two-way communication device, she still imagined a professor talking inside an office through the display with the student outside.

Danielle: Well, I also wonder if say we went to Professor Smith’s office hours, and we’re standing out there and the purpose of this is like he’s like looking at you and talking to you, why wouldn’t you just go into the office where he’s sitting there?

Other students imagined the faculty holding office hours:

He’s like, you know, if he’s just not there and you want to see him the whole regular office hours and it could be a way for him to hold office hours.

In all of these views, the hallway is a place that is largely a location for faculty offices, and the "appropriate" situations for this hallway are office hours and student-faculty conversations about coursework. As Josh, an Art and Design student, said:

Josh: And you are expected to go to this video monitor? And then like, public space where people are walking by and be like, “oh oh, professor Ackerman you know I’ve been really struggling in this class, and I wanna be better, and I got a 70 but I.. it’s just I need help..” and that just seems horrifying. Right?

In fact, the Art and Design and the Architecture students saw Pangmangi potentially creating a space that was similar to their hallways, a semi-public location where everything could be heard easily throughout the space.

Josh: [I]t'd be so awkward that it's just in the hallway.

The student's separation of hallway and office mirrored their separation of public and private interactions with faculty members. In the next quote, Emilee sees the faculty member's office as a private place where students discuss their personal difficulties or any kinds of 'nitty details'.

Emilee: That doesn’t mean that they see everything that you’re doing, but it’d be really strange I think to be like, to have people walking through the hall way or like hearing your conversation about like you know nitty details about your dissertation.

The hallway, in contrast, is a public place where private conversations will take place only carefully and if necessary, since people walk by and can hear the conversation. Inside and outside the office are private and public worlds that are distinct from each other. Since these participants view Pangmangi as supporting conversations that would occur inside the faculty office, it becomes “awkward” and contentious to have part of that place move outside the office into the hallway.

**Students and studio spaces**

The Architecture students also saw this hallway differently. For them it was not only a place to meet with faculty but also a design and collaborative space. These students have semi-permanent locations in their studios. Their interpretations of the system were not confined to an office door or any other given place, but in fact extended to the design of the hallway and the whole building.

Brian perceived the hallway as a narrow hallway in their architecture studios. The Pangmangi installation became a name plate, a way of announcing oneself. Architects often tack pictures and sketches that express one’s interests:

Brian: yeah, I can, the hall is too small for I can uh, it’s, in a sense I can see it as being as a name plate on the door. ...if you are in the little hallway in the gallery, the architecture studios where there’s a really small hallway, but people put stuff on the wall. ...And what it reminds me of is something that’s people are interested into or, what this particular person wants to show to the world. I don’t know.

Anna, somewhat in contrast, saw Pangmangi as essentially decorating the hallway:

Anna: um, personally the hallway is too small to have anything. ... So it seems to be ... art particularly interactive art on the wall.

She also looked at the hallway as a functional space manipulated by the artifacts in it as well as by the social interactions occurring within the space, in other words, as its own place. In her view, an artifact such as display can add a new functionality to the space. The place affects
how people interpret systems, but the system can also change the place.

Anna: ... we recently installed a television in the architecture department. And ... it’s huge. It definitely attracted crowds, but a different kind of crowd was already gathering there. ... they’ve taken a functional public space and changed it, where it didn’t really need change. Like, so why not [put that TV] for down the hall, where there’s you know that other ... space that is never used.

This view that aesthetics, interaction, and artifacts combine to make a space into a place was very pronounced for these students. We will return to this below.

**Staff and the workplace**

The final group consisted of staff. These staff members had a strong notion of their place. In their view, the specific setting was an extension to both the professor’s workplace and their workplaces. (In some sense, the hallway could be seen as an intermediate space between the two workplaces.) A faculty member communicates in person only when the faculty is working in his office.

Appropriate use for Pangmangi, then, is to know when a faculty member is available or absent:

Adrianne: you know, she’s physically in another place. Like another city. I mean I think it would be useful to know if she’s traveling but she might be able to reachable versus, she’s not in right now.

However, Adrianne does not think it is within her role to know the details of the faculty's whereabouts or activities:

Adrianne: It’s not kind of our business of where she is right now.

Because of the way the work is arranged, when the faculty member is away, staff no longer feel the same urgency.

Cindy: I need clarity to know when you don’t see her does that mean that she’s gone? Does that mean she’s unavailable, she’s, you know what I mean? Some kind of key, something to tell me ...

In the staff's minds, staff are also responsible for the hallway. Visitors who do not understand the system will come to them.

Adrianne: I still feel bad about those people who don’t know. ... Even though you know how to use it, and it’s not a problem for you, would you still be worried about those person who doesn’t ..... Once again I don’t like the idea of having people come into me confounded who have absolutely no idea.

We will see below how these differing definitions of place affected aesthetic requirements, but first we need to unpack participants’ differing viewpoints of how aesthetics, art, and information could be linked.

**ART AND INFORMATION**

Participants had a number of very different opinions about the interplay between aesthetics and information in a system such as Pangmangi. The following explains each viewpoint with excerpts from the participants’ interviews.

**Art as a purely decorative component to the system**

As mentioned, for some participants, their place was about the efficiency and effectiveness of communication. For these people, aesthetic considerations were appropriately subordinated to effective communications and work. For example, AJ thought that artwork may be a fun exercise, but not a very good medium to convey information in terms of efficiency:

Interviewer: Why do you think it’s a poor way to convey information through pictures?
AJ: Because... it’s a fun exercise, for artwork. But it’s not very efficient.

For others, art is something good to look at, but not connected with the work of the system. Below, Ben said that the images could work as a screensaver, but not a main method to convey information. Also, he says he doesn’t "get" most art, so art that looks random is meaningless to him.

Ben: Because, it seems like, I mean it seems like it’s an art thing and it’s a conference or video messaging thing. ... So I was thinking you know, sort of like it’s a screen saver, it’s something to do while nobody leaves [a] message. And once somebody tries to leave a message this screensaver or whatever takes off you know and lets you do your thing and comes back on. So I would think of it as totally unrelated purposes of the device.

[...]

Ben: ...[it's a] screen saver, or it’s a meaningless art. I wouldn’t make an attempt to try to incur information from those images.
Interviewer: Mm.. Why is that?
Ben: It’s just too random. I mean the guy in the chair is creepy. The flamingos and the fish it’s just it just seems all unrelated, and very, uh.. It’s just, it’s just very artsy. So I would just assume that it’s an art thing that I don’t get. Cause I don’t get most art....

To these participants, art is not the main focus of the system. It is only an adhesive component of the system, like a screensaver, with some decorative characteristics. A staff member thought along similar lines:

Adrianne: I would never ever (emphatic tone) guess that it was an interactive thing that I should touch or talk to. I would just think that it is something interesting to look at.

Here, Adrianne argued that the art is interesting to look at, but it didn’t really help to figure out the system or her interaction with it. Participants like Adrianne did not take the artistic elements of the system into account while trying to understand the system. As with Adrianne, they separated out the aesthetic as just "interesting art".
Art can be informational
In contrast, other participants considered how the artistic components of the system could also be informational. In this, they considered the interplay of the aesthetic and the information display.

There were several ways that the aesthetic could be informational. The simplest was to consider the artistic components again as decoration, but as also providing information about the office's occupant. In this view, the artwork was customized by the user and was an expression of that user.

In Pangmangi's scenario of use, many participants saw that awareness information about the user could be provided symbolically:

Cathy: I think it's this, a, screen saver type thing that, that's trying to you know, convey the idea this is, this is more symbolic than screen saver, "she could be in the office she could be somewhere else." That's what this video conferencing is all about!

However, participants also noted inherent ambiguity in the more abstract artistic displays. There was a tension between the demands of art and the need for detailed information. In this view, direct and concrete representations of the awareness were preferred:

Danielle: but to me what makes it more obvious is when the person being in the picture versus not being in the picture because if you're physically in the picture you're physically there it's a more direct match and in my mind, this is like, I can make an inference, but if I was wrong, I'd be kind of frustrated=
Charlotte:but it is also art at the same time.

Because of the inherent ambiguity in what constitutes the information (and the details of that information) as the artwork becomes more abstract, Danielle noted that she would become frustrated if her guesses turned out to be wrong. However, in contrast, Charlotte accepted the unexpected flavor of art, and she saw that as part of an interesting experience.

One can see a similar exchange between Josh and Emilee. In this exchange, pink flamingos were shown in one of our prototypes (Figure 2), and Josh talked about what pink flamingos meant in American society.

Josh: When you think of John Water's film "Pink Flamingos", the pink flamingos mean sorta but [these are] not pink, which is weird in its own right. I mean that's kinda <machinery>. ...And so I'm like, is he in Florida? Is he [trying to be] catchy? Is he watching a John Water’s film. What are those flamingos saying to me now?
[...]
Emilee: But like, I don't know, they're cute. Don't you think this makes it a little, like we're saying with the other one, a little more inviting or little more quirky?

Not only there were views of trying to find out clues of information from the art, but also possible attempts to change the art – interact with the art and build up some experience with the system.

Aesthetics and interactive experience
The artwork does not have to be separate from any interaction, of course. As in Krueger's Videoplace [16], Archer said he would try to raise his hand or use body motion to see whether he could change the color in the display:

Archer: I’m just saying that what if I ... raised my hand or like my motion and if I was seeing film fed into something and it changed color. So if you raise your voice, I say [the] color changes.

Another participant, Josh, wanted to snap his finger in front of the display to see whether it would change anything. Their more active views about Pangmangi implied their acceptance of art as an interactive experience and their concern that the aesthetic component in the prototypes was non-interactive.

In fact, Brian was even more active in his requests for interaction. He wanted to talk to the user’s surrogate in a picture than the real video image. Brian appeared to be someone who is entertained by experiencing something new:

Brian: In my studio right now we’re dealing with the idea of cinema. So it’s interesting to me because of the idea of the living pictures, the idea of the displayed images. And um, I find it interesting just, how the different medium affects you. Like I think the fact that this is moving is different than if it was a still image. And it’s about how like the evolution as different mediums changes the way you think.

Aesthetics and transcendental interaction
Brian's perspective on interaction and change was taken further by some participants. Anna and Brian looked at Pangmangi as something that might change its surroundings and thereby the entire user experience.

Anna: I see it as art and it’s on the wall because it’s nice to have art on the wall. It changes the state [of the space], it changes the way that people interact with the <state>. Um, and, particularly being in the building that has a lot of art on the wall, ...aspect of that to me I think. Or whereas if it was in this building, that'd be different.

Brian: it's like every time you... by a television screen, whether it's on the street. At a bar or whatever. Most likely you’ll look at it. But if you were in a in a room with, regular pictures that are on the wall you might not look at it at all.

As mentioned, both of these students saw a place including a space, art and artifacts, and social interaction. In other words, Pangmangi would be installed into a
specific place. It would necessarily interact with and change that space and its social interaction. That, in turn, would change the perceived aesthetics of the system and space. In many ways, they expanded the co-evolution of a system to include not only users but also spaces and aesthetics [23].

**Aesthetics as socially situated**

This sense that Pangmangi would co-evolve with a place and its social interaction was deeply intertwined with a sense that Pangmangi's aesthetics were socially situated. This could best be seen in participants' questioning about how many Pangmangi displays would interact:

Cindy: And you know twenty different faculties with twenty different screens, and they all look different, then you know, trying to figure out how do their's work. You know too much time.

Or, talking about using many Pangmangi displays:

Charlotte: ... it's a way of encoding it further. You have to break the code each time for each person's way of representing presence.

This sense of socially situated aesthetics, based in specific types of interactions with others, also appeared in participants' concerns about talking to abstract displays:

AJ: Uh, if there were people around, I would make sure that somebody's <gone> before I started talking.

While this viewpoint was best articulated by the architecture students, we note, however, that all of the participants reflected this viewpoint to some extent. We discussed above how participants' sense of specific places were heavily tied to their views of appropriate uses and appropriate aesthetics. Many of these viewpoints were, indeed, also socially situated. For example, we noted that some participants felt that a brisk interface with minimal aesthetic distractions was required for effective communication with an adviser or faculty supervisor.

**CONCLUSIONS AND FUTURE WORK**

In summary, we found our participants to consider the Pangmangi system in a situated manner. Appropriate uses and interactions were rooted in the participants' sense of specific places (and these places differed according to the participants' institutional roles and affiliations). The aesthetic dimensions of Pangmangi were no different. It was clear that all participants saw Pangmangi in terms of its artwork and aesthetic characteristics. They differed, however, in what they considered to be appropriate aesthetics, which again seemed to be rooted in their specific senses of place, role, and expertise.

As with any qualitative study, we cannot say whether this sense of situated aesthetics generalizes or whether it is peculiar to our groups. It does seem to be an everyday reflection of the concerns of Pragmatic Aesthetics, a philosophical school that considers aesthetics as socio-politically situated [14].

As well, we do not know whether our use of focus groups facilitated the participants' consensus about place, appropriate uses, and appropriate aesthetics. Focus groups have the known problems of first-speaker effects and confirmation bias; perhaps, these helped tease out similar viewpoints for us. More work will be required to know whether this is a useful method for finding requirements for new and relatively unknown design spaces.

The participants brought up a number of important design considerations for Pangmangi. Enabling more private conversations will be required for some scenarios of use. As well, we will need to find additional mechanisms to facilitate learning about the system and its information. Nonetheless, we were greatly encouraged with most users' acceptance of Pangmangi and the central role that aesthetics played in our conception of it.

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**REFERENCES**


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1 Pangmangi is a name of any ogre’s bat in Korean folk tales. Ogres carry their Pangmangis and hit places to get jewelry, food, or doors to new worlds.

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APPENDIX: Additional screenshots from the prototypes shown to the participants