

# A Research Design of Potential Application of Public Screen in Student Vicinity

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## ABSTRACT

Public digital screens are increasingly distributed in the urban cities. There are diverse technologies and services carried out for the interaction between users and the digital displays. Additionally, the desire and needs of applying interactive displays in students' village rather than constraint in the modern cities arises in recent years as well. Thus, we conduct a study of the potential application of public screens for students concerning technology, services, content type and merchandizing. We also investigate in the different desire of other shareholders such as shop owners and community developer in order to gain a leveraged overview of public displays in student vicinity.

## Keywords:

Public screens, student community, user experience, urban informatics, interactive screens, ambient media

## 1. INTRODUCTION

Public digital displays are widely used to broadcast advertisement or local information in urban cities. With the emergence of innovative technology and more powerful mobile devices such as mobile phones, tablets and so on, the interactivity becomes an inevitable feature of public screens in the foreseeing future. The content and services in the public displays vary in conjunction with the creative technology. Although advertising is still the dominant application of public screens and yet some functionality with innovative technology is constraint in using, myriad of new types of applications are taking place.

Public space is the medium to deliver information in the city [18]. The public screens offer a significant opportunity to engage residents in the public space and argument the local atmosphere. Rather than in the big urban cities, the situated digital screens are also increasingly applied in relatively smaller vicinity such as students' community. In order to understand the particular requirements of the young generation, especially students in campus vicinity, we conduct a study relying on two student vicinities: Kelvin Grove [12] a northern suburb of Brisbane in Australia, and Hervanta [10] a suburb of Tampere in Finland. To better integrate the virtual and physical world seamlessly through digital displays, it is also essential to start from practice. Thus, the perspectives and

expectations of business shoppers and community developers as shareholders are also essential for bringing digital displays in business world. The design of public display should not only depend on the local activity of the community, but also cater and leverage the diverse desires and expectation.

This paper is an extended version of the paper [5]. We extended it by [2][9][3][4][5][20][21][22]. The purpose of this paper is to investigate in the different preferences and visions from the different users and business perspectives toward the public screens in students' village. Departing from a trade-off demands and expectations from both sides, conducting a framework and prototype of the application of public displays which enhances the user experience and argument the social atmosphere is also one objective within the scope of the study. The rest of this paper firstly provide a brief overview of the theoretical background and introduced our analysis of the current status of public screens. Therefore, in question of the potential application of public digital displays in the student neighborhood, we have a brief description about the research design to present our ideas of this study. And a brief discussion relevant to our study is brought out in the final part.

## 2. RELATED WORK

Public displays are widely spread over the urban cities in recent years and play an important role in the creation of smart environment and engagement of residents into the public space. For example, *City-Wall* [14] is a large multi-touch interactive display situated in the city center of Helsinki, Finland where large population passes by every day. It enables multiple users at a time to interact with the screen and operate the images and content.

With the increasingly advanced technology and the improvement of the mobile devices such as smart phones and tablets, the interaction with the situated displays varied in many ways. Various researches concerning the application of digital interactive displays in public spaces have been carried out. Bluetooth is an attractive way to engage users because the interaction method is easy to use and it enables the synchronization between devices. Rui Jose et al [11] developed the *Instant Places system* utilized Bluetooth as the key technical enabler. Besides, RFID is another Near Field Communication technology which has been brought in to implement the interactive

functionality in digital displays as we can see from the study in [16]. SMS is also commonly used for interaction with digital displays. MAGICBoard [17] is an example of public display which enables users to vote and present opinions via SMS. Other advanced technology with interactive capability widely utilized in ambient public screens such as WLAN-based sensing, GPS, eye tracking, web-based technology can be found in [15] [17] [13].

The application of digital displays with interactivity arises in the campus as well. One example is *E-Campus system* [8] which is a network built by 40 electronic displays with Bluetooth and API operations in the campus environment of Lancaster University in UK. The displays broadcast the content based on the location such as the change of lecture schedule and users can access to some web-based content such as map, Flickr, YouTube and Google through the connection of the Bluetooth on their mobile devices identified with the device name. The interactive activities with screens foster to create a better campus atmosphere and help to tight up the social connection among the students, as examined in [1] [6].

### 3. RESEARCH DESIGN

With the objective of investigating in the potential application of public displays departing from the substantial desire of students in the local community, we will conduct a study concerning several questions as below:

- What are the characteristics of students and how their behaviors can have impact on the community environment?
- What would be the core interactive technologies applied in public displays for students?
- In conjunction with the advanced technologies, what content type and services should be carried out to fulfill the particular desire and requirements of students in the local community?
- How to engage the students in participating and contributing to build a more communicative environment in the student vicinity?
- What are the different considerations of the business entity and the users with different potentials and how to leverage between different desires from both perspectives?

To cope with the questions above and have a comprehensive evaluation, we relied on approaches of Action Research [2] [9] and Design Thinking [3] [4]. The overall study comprises four stages [5]: *Observation & Evaluation, Interview with Business Owners, Student Questioner and Follow-up Inter-*

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*views*. In the first stage, we evaluated the background of current status of the public digital displays and existing technology, services and content types. To have a better view, we also observed how local residents in Hervanta interact with the digital screen located in the shopping center. The second stage included some interviews with the business owners in the campus environment of Kelvin Grove, which is presented in [5]. The business owners are the significant shareholders of utilizing the digital screens with commercial purpose. Their expectation from the usage of public displays differs from the students' in the way that benefit and commercial effects are the core aspects in their considerations. The third stage of the study devoted a survey for students aiming at figuring out the expectation and requirements of students toward public screens in the campus and local vicinity. The web-based survey is conducted via Google Docs and delivered by mails. We have targeted 400 students and currently over 100 out of them have responded. However, we still expect more responses and further on to the next stage. In the questionnaire, demographic data for the respondents are included. The questionnaire contains 36 questions of both fixed questions with five balanced scaled responses according to Linkert Scale and open questions which enable participants to present their opinions directly. Four categories are taken out within the overall survey: Interactive Technology, Content Type, Services and Advertising & Merchandising. One example question of each category is presented in following table (*Totally Agree = 5, Partly Agree = 4, I don't know = 3, Partly Disagree = 2, Totally Disagree = 1*):

Q7. Bluetooth or short range communication should be used to have interaction with public screens.	1 • 2 • 3 • 4 • 5
Q12. Users should be able to update information and content on public screens on their own.	1 • 2 • 3 • 4 • 5
Q20. Restaurants should have self-order services, which enable consumers to read menus and order dishes on public screens.	1 • 2 • 3 • 4 • 5
Q29. Micropayment should be included in public screens.	1 • 2 • 3 • 4 • 5

Table 1. Sample Questionnaires [5]

The questionnaire can be found on-line with this link: <https://docs.google.com/spreadsheets/viewform?formkey=dGxYQzFzVl9DUE0tTm5nT0xuZ0tValE6MQ>. The result will be analyzed by the statistic tool for survey SPSS or R and it shall bring out the consideration and insights of students toward the application of digital displays in public space of campus neighborhood. The follow up stage will involve the in depth interviews with some students who participated in giving opinions in the questionnaire and business developers. It shall help us to have a closer insight toward diverse needs of different roles and bring all considerations into account and bridge them together on top of it.

## 4. DISCUSSION

This paper is an extended version of the paper [5]. In this poster paper, we present a preliminary study outline concerning the potential application of public displays in the student village and attempt to promote the idea in order to bring more insights and discussions toward it. The overall study process is not fully accomplished yet. The achievement obtained from the first and second stages has been stated in [5]. Further discussion will be carried out soon in the future.

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