Collaborative Scenario Building: The Case of an 'Advertainment' Portal

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Abstract. Based on the ongoing development of a portal intended for use during the upcoming Olympics event in 2008, the portal's main purpose is to allow volunteers, spectators, or any other participants of the Beijing Olympics to upload self-directed video clips and relevant advertisement clips associated with the event to the portal. Previous work has found dissimilar experiences in interacting with the portal – thus the need to use collaborative scenario building as part of the design process of the portal. The paper introduces the main purposes of the portal, and demonstrates how the intended outcomes of the portal and dialogues generated lead to the need for participatory design. The sessions building collaborative scenarios are also discussed, demonstrating how they can be used to guide stakeholder participation. Lessons learnt from the design exercise are discussed as a concluding note to the paper.

1 Introduction

The design of interactive systems has been found to require rich methodologies, with scenarios being one of them [2]. Scenarios specify characteristics of users and their tasks in given contexts. Other than raising usability requirements, they also help stakeholders of an information system undertake task analysis. There are numerous benefits of this method; such as helping designers consider characteristics of their users, their tasks, and the environments in which they will be carrying out those tasks. Usability issues can also be raised earlier rather than later, and realistic project timelines can be set using scenarios. Researchers have also found that this method promotes support amongst developers and can be used to aid in understanding requirements between users, developers, designers, and other stakeholders of an information or interactive system, while at the same time being used to generate frameworks for future evaluation studies – thus consistently employing a user-centred design approach [6], [13], [10], [3].

The fact that scenarios are also affordable and easy to use lead to several methods by which they can be built, such as cognitive walkthroughs [5], participant observations [9], user-interaction scenarios [8], or card-based methods [10]. Scenarios

were also found to be improved by means of elaboration and collaboration with stakeholders [12]. Carroll [2] also reinforced this finding, arguing that generated scenarios of the various use of a system through participatory design helps to integrate many different kinds of knowledge and experience within the same context.

This paper is based on follow-up studies of earlier research conducted in 2005, when a hybrid approach was employed for the usability evaluation of the same portal, intended to be developed for use during the Olympics event in Beijing in 2008. In the pilot study it was not possible to include stakeholders in a participatory design experience due to geographic and communication difficulties. Since then researchers have engaged themselves with the project in an inclusive way, and this paper explores some of the lessons learnt in the participatory design exercise, with a particular focus on experiences gained through the collaborative building of scenarios.

2   Background

Scenarios are generally described as characteristics of users and their tasks in described and specified contexts. They are widely used in both academia and industry, for various applications such as design, evaluation, organizational planning, goal-setting, just to name a few. Because they are not proprietary, there are several methods and techniques that have been developed for the purpose of generating scenarios. Generation of scenarios is only one of the many benefits of this tool. Carroll [2] argues for this tool to be an integral element of user-centred strategies, which he described as scenario-based design and claims analysis.

According to Carroll's [2] work on the task-artifact cycle, design is explained as an iterative process; in other words a design of any system is never completely 'done'. Unlike traditional conceptions, design in this reasoning is never a linear process – with 'design scenarios at one point in time are the requirements scenarios at the next point in time' [14]. Technological contexts will always change, as how social contexts of use and the economic landscapes would also change and shape usage scenarios. Bonner and Porter [1] also found that users have consistently found it difficult to express and communicate ideas and concepts beyond their immediate experiences. It is therefore clear that the translation of user needs and feedback into practical design requirements cannot be satisfied in a linear fashion.

Giddens [7], in the construction of structuration theory, refers to as the 'duality of structure' – and in this case the recursive nature of design based on structuration theory is manifested in the properties of design as being created and changed by human actions. It also both supports and constrains such actions. Reinforcing this point, Carroll [2] highlights the value of maintaining a continuous and iterative view of situations and consequences of human work and activities, so as to encourage appreciation of various structural contexts and to understand how the dynamics of activities can shape such structures – gaining diverse usage perspectives and achieving effective design outcomes.

Learning can be facilitated through collaborative design, using design as a process of emergence rather than one-off purpose, and to propose as its appropriate 'design' methodology a reflexive process of participative, community and action based interpretations. Thanks to the growth of networks and the Internet, the potential for

participation in collaborative design is more inclusive. Perhaps then, knowledge is not just held by 'experts', but whether tacit knowledge [4] is brought into the design interplay.

The use of design scenarios can usually be refined through collaboration with stakeholders. A related previous study [8] involved expert reviewers who undertook usability evaluation and constructed design scenarios using heuristics and scenario-based design. The latter method was found to be more effective in indicating causal relationships between system features and elements of a user interaction scenario. The method was found to be time-consuming which posed one of the major limitations to the project [8]. It was also found that both methods brought different benefits; when scenario-based design is conceived, as mentioned before, as a process of emergence and a reflexive process of participative, community and action based interpretations, it serves as an effective means to generate constructive dialogue and adopt inclusion quickly as one of the features of the project.

Technically a trial of a media content management platform, the portal in development, has been commissioned by the Humanistic Olympics Studies Centre for Beijing Olympics 2008, co-funded by the Chinese Ministry of Education, with support from China State Administration of Radio, Film and TV (SARFT). With the successful bid to hold the 2008 Olympics in Beijing, a team in CUC (Communication University of China), also a member of METIS Global Network (www.metis-global.net), the cross-cultural research organization in multimedia studies, began working on the project of producing an 'advertainment' portal for use in the Beijing Olympics.

The notion of 'advertainment' as the focus of content of the portal presents a portal born out of an age of convergence – as described by Price Waterhouse Coopers [11] -- to refer to the ability of different network platforms to implement different services and the merger of consumer devices. When it was first conceptualized, it was so named because the production of multimedia objects in the portal would suggest purposes of entertainment and advertising, whether or not they were commercial in nature.

The broad purpose of the portal is to allow volunteers, spectators, and other participants in the Beijing Olympics to upload self-directed and self-captured pictures, stories, video clips, and relevant advertisement clips associated with either the event itself or the lead-ups to it, and to interact with one another within the portal. Access to these resources is open to communities and facilitated through a web interface in the portal. Consistent with the theme of 'advertainment', access and use of the portal will also include business sponsors.

The theme of convergence of the portal has led to emphasis on the treatment of rich information objects, perceived to contain layers of meanings and constructions. For instance, each rich information object can belong to, or can be used by more than one person. Earlier studies have revealed that that different observers or users would evaluate the same content object based on diversified experience and knowledge, resulting in inconsistency in the interpretation of content features [8]. Users from diverse backgrounds and cultures, of various religions, and disparate social classes, for example, could view the same colours with very different sentiments. The approach to developing metadata for information objects and resources has been

intricately designed to allow users to define their own tags to the multimedia objects which they create and share, while including them in the description model of the portal's infrastructure, to manage uncertainties in such metadata. This principle also supports the theme of convergence, allowing multiple layers of meanings to be constructed by members of the community. Rich multimedia objects such as videos and pictures have been found to warrant richer representations of meanings [8], which will be constructed by different users in the portal. As a medium of human action, the portal acted as a facilitator and repository where such meanings were exchanged, shared, and stored. At the same time, interactions also result in the shaping of the portal design, where humans act as the main agents.

Since the initiation of the project there have been various studies involving users in the last two years. One of the major challenges of this project is the multidisciplinary nature of researchers, and the fact that they are heavily dispersed geographically. It has been difficult to maintain continuous progress of the project. The researchers have been looking for ways to overcome communication difficulties and backlogs. Digital technologies and the Internet have proved to be very useful as collaborative design tools.

3   Collaborative Scenario Building

The use of scenarios is helpful in providing rich contexts about how and why users interact with any system – indicating usability pitfalls, identifying causal relationships between system features and user actions, or give rise to new functionalities that are missing. The approach of using scenarios in this study has been inspired by Carroll's scenario-based design [2]. In scenario-based design, contexts are generated through what is referred to as user interaction scenarios.

Carroll's work in scenario-based design does not stop at the generation of user interaction scenarios; claims analysis was later developed to enlarge the scope of the scenario-based design approach in order to provide greater focus in its analysis and outcomes. For the purpose of discussion the paper is focused on the generation of user interaction scenarios by various stakeholders. The claims analysis technique is used to aid in the analysis of these scenarios that have been generated collaboratively in the design exercise.

In earlier studies, it had not been possible to involve participation from various stakeholders [8]. Since the previous study the interfaces of the portal have undergone significant revisions, in response to feedback and also changes in user requirements. This study aims to build on previous findings through a participatory design approach to scenario building. According to Carroll [2], such an approach provides the opportunity to integrate many kinds of knowledge and experiences within the same context of use. In addition, this approach is also used as a guidepost for the inclusion of dialogue and participation between multidisciplinary researchers who are faced with distance and disciplinary challenges. Before explaining what this paper means by collaborative scenario building, it is necessary to outline the elements required to define a user interaction scenario. Table 1 defines these elements [12].

Table 1. Elements of a user interaction scenario [12]

Element	Definition
Setting	Situational details that motivate or explain goals, actions, and reactions of the actor(s)
Actors	Human(s) interacting with the computer or other setting elements; personal characteristics relevant to the scenario
Task goals	Effects on the situation that motivate actions carried out by actor(s)
Plans	Mental activity directed at converting a goal into a behavior
Evaluation	Mental activity directed at interpreting features of the situation
Actions	Observable behavior
Events	External actions or reactions produced by the computer or other features of the setting; some of these may be hidden to the actor(s) but important to scenario

These elements were used as a guide to generate scenarios in this study involving selected stakeholders of the interactive portal. An exercise was created and shared over the Internet amongst participants of the study. This is used as a tool to facilitate collaborative scenario building, but it is also explored for its feasibility as a technique for participatory design and redesign. As a start, a website was set up with detailed explanations of the method using examples from the previous study on the same method. This website functions as a learning experience for participants to be familiarized with the method. Selected interfaces that have been revised as a result of feedback from earlier studies [8] and changes in requirements were captured as well, to function as triggers for participants in the course of generating user interaction scenarios.

3.1   Data Collection and Analysis

In this paper the collection and analysis of design actions and statements is discussed mainly in terms of stakeholder perceptions in the ways they would interact with the portal. Attitudes of participants towards technologies, including the use of technologies such as digital cameras, mobile phones and the Web, to capture multimedia objects were also regarded as important to design actions. These attitudes were captured in warm up and introduction sessions for each group of stakeholders. Four groups of stakeholders were included in this study, namely: potential users, designers, developers, and researchers. The last group of stakeholders was selected because of its influence on the design and outcomes of the portal, which connects the portal to a larger picture of international research and development of interactive portals.

Workshops lasting one to three hours were conducted with each group of stakeholders, with facilitators trained in the method managing each workshop with participants. With all three workshops a warm-up session was carried out by the facilitator, using visual triggers and initial brainstorming discussion on the usefulness or functionalities of the portal. These results were recorded by facilitators.

After the warm-up sessions, participants were then guided into creating scenarios by working through the various elements of the user interaction scenarios. They were asked to think aloud whenever possible, and the facilitator also acted as a guide by

asking specific questions relating to these elements. Scenarios were created around three main functionalities of the intended portal: login, view object, and the upload function. Figure 1 shows one example and the goal associated with this functionality. After the creation of these scenarios, discussions were also generated around the main portal interface. All interactions were transcribed by the facilitators in the workshops, and debriefs between researchers were also held face-to-face and online on the design experience and lessons learnt. Transcribed scenarios in Chinese were also translated.
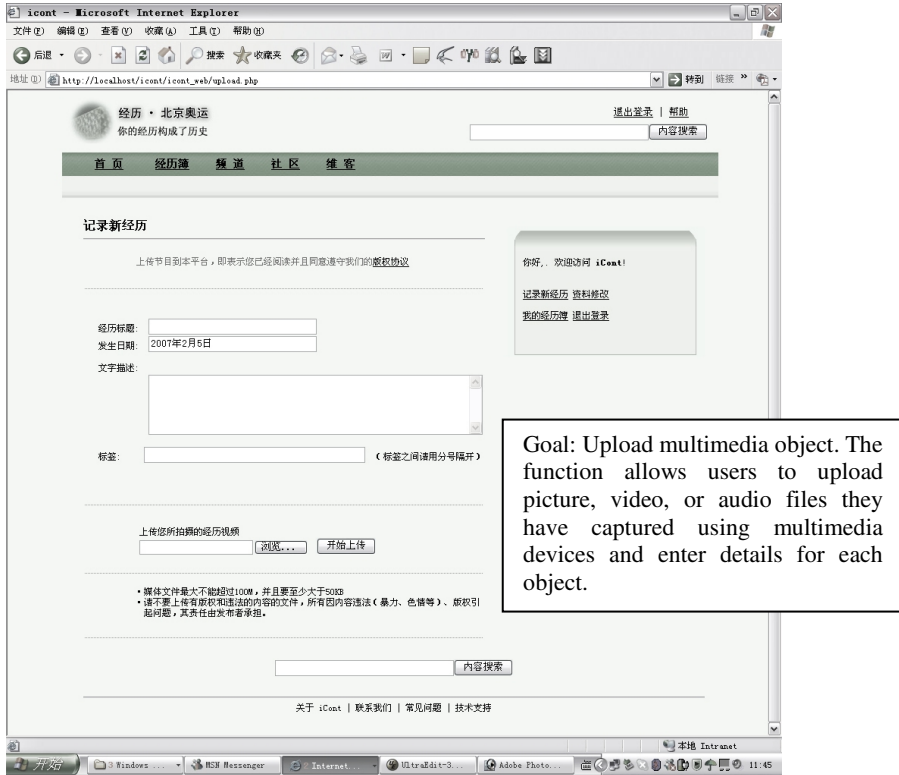

Fig. 1. Upload functionality and associated goal

3.2   Results and Discussion

The collaborative nature of the scenario-based design experience highlighted the importance of stakeholder roles. In addition to the purpose of building pragmatic usage scenarios for the portal, the study has been interested to study the impact of such roles on the outcomes of the design experience.

The building of each scenario involved at least one participant from each stakeholder group: users, designers, developers, and researchers. After the initial briefing participants worked separately on various workstations; building their own

scenarios before coming together again for post-workshop discussions. The results were transcribed and analyzed with regards to stakeholder roles while building a list of functional and design requirements as contributed by various participants. Due to space constraints we are not able to display all results here. Table 2 shows selected extracts of one scenario using claims analysis [2], and grouped according to the four stakeholder roles: users, designers, developers, and researchers.

Table 2. An example of an analyzed interaction scenario, summarised according to roles

Function: View		
Role	+ Claims	- Claims
Users	Clear user options on the right menu trigger goals	Isolated user options (logout and help) and search function in white space on top – easy to miss
	Simple layout and frames gives clear indication of goal	Lack of control over multimedia object
	Annotations and associated comments increase interactivity	Post and reply comments function not clearly visible
Designers	Text annotations and comments provide context while user waits for multimedia object to load	User options in text - inadequate knowledge of the Chinese language would lead to confusion
	Annotations and associated comments increase interactivity	Post and reply comments function not clearly visible
	Clear user options on right frame trigger goals	Viewing pane is too small for larger clips
		No function to link/recommend associated clips
Developers	Viewing pane on left helps to trigger goal to upload clips	No tags/categories to browse related clips
	Buffer progress bar and playing progress bar aid in visibility of object/system status	
Researchers	Indication bars of page and clips help provide feedback on system status	Users used to reading from left to right may not find user options on the right usable
	Standardized control buttons of video aid users in understanding key functions	Table display (two options in a row instead of a list) of user options could be confusing
		Some functions not clearly visible, such as search

Not surprisingly, participants noted rather different potential difficulties with regards to interface scenarios. The actions and events noted by participants in their respective scenarios also differed significantly, with the designers and developers expressing greater expectations in the reactions of the interface upon the completion of certain actions. This is not unexpected, since the designers and developers involved in the study had been studying the portal for some time. These reactions were not

noted by other participants in the users and researchers group. These participants, however, found more usability problems than the designers and developers, while more functional changes were suggested by the latter two groups. More than one participant also noted various factors influencing design process and outcomes, such as the level of experience with media technologies, time spent working on the portal, literacy, education, and attitudes also significantly influenced the degree of comfort with the interface and the kinds of changes that were suggested.

Such results demonstrated that there was no clear information processing by participants, and it is imperative that multiple stakeholders must be considered in design exercises. The collaborative scenario building method used in this study served as a technique to guide the involvement of multidisciplinary participants. Together with the visual triggers, stakeholder roles served as a ground to help participants create assumptions about the portal and expected usage scenarios. It must also be highlighted that past experiences of participants with regards to using technology and their involvement in the portal project further shaped their building of scenarios. The impacts of roles on generated scenarios were clear in the design process.

As earlier suggested, there were also other effects working to influence the developments of interaction scenarios. Past experiences with portal technologies, media types, and web interfaces were important factors as well as the levels of involvement in the project by participants. At the same time, cultural and demographic factors such as language literacy and educational levels were raised by participants. These factors appear to be shaping stakeholder roles. As it was not in the scope of the study to address such multifaceted influences on interaction scenarios, they have not been addressed at this point. However, it is of interest to frame such factors and take them into consideration in future design processes.

The collaborative scenario building exercise has been extremely helpful in demonstrating how the involvement of diverse participants can assist with pragmatic project outcomes. Simultaneously, it has also been beneficial in guiding stakeholder involvement and the generation of dialogue between stakeholders – an originally uphill task due to communication and disciplinary challenges.

While many benefits have been gained from this exercise, it is not without challenges. For one, scenario-based design can be time-consuming especially when it involves multiple stakeholder-participants. Because of the richness of the method, it was also found to be difficult to orient participants who were new to such exercises. The presence of facilitators was crucial to overcome such challenges.

The results provided evidence that past experiences and technological literacy had significant impacts on the design process and outcomes. Future improvements to the design method could include systematic consideration of such knowledge by participants. The challenge in this lies in the depth of inclusion of these factors and assessment of knowledge by different participants. These factors were implicitly revealed in the briefing and debriefing sessions in this study – which provided rich contexts to the design sessions but there needs to be more methodical integration of such knowledge – a working design framework – by participants in future collaborative design exercises.

Although participants worked independently to generate interaction scenarios, they were also able to discuss their results with each other during workshop debriefs. This was, however, not possible if they were in different workshops. Distances and time

differences also posed hindrances to such collaborative discussions. Real-time recording, reading, and discussions of scenarios are desired to encourage greater interactivity and collaboration between participants. This will be looked into for future studies.

Other issues exist, challenging the effective development and usability of the portal. Huge quantities of heterogeneous media objects will make manual annotations and indexing of content objects almost impossible; yet the current media processing technologies, especially content feature extracting and retrieval technologies are not providing satisfactory performance for effective automatic annotations of media content objects. Moreover, in the intended open environment of the user-contributed content, the nature of user behaviors, content, and annotations are greatly diversified and thus difficult to predict and manage. Naturally, issues with digital rights management are also prevalent in the project.

4   Conclusions

The study has demonstrated how a collaborative design exercise can generate benefits for the development of an interactive portal. Other than achieving practical design outcomes, it was also useful as a guide for stakeholder involvement. Challenges remain, however, to both the design process and method.

Through the study, the importance of roles and other factors such as attitudes and past experiences on the design process and outcomes were also implicitly revealed. More work needs to be done to improve the depth and inclusion of knowledge by participants in the design process.

The two institutions engaged in this study had been working together since 2005 in multidisciplinary fields. Research teams from both institutions have been interested in the study of collaborative models to guide the design and development of interactive systems. While the Chinese team has been studying how such workflows can be integrated with technical frameworks of media management platforms, the team from Australia has been concerned about inclusive user studies and the development of methods and techniques to drive the development of local communities.

These research interests are also in congruence with the overall theme of the 2008 Beijing Olympics event – with the rich integration of event experiences through open access, the portal signifies the convergence of new media and humanity in the global community.

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