

# Smart Meetings: Experimenting with Space

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**Abstract.** During May and June 2011, motivated by the need to improve techniques for recording the processes and outputs of research, we ran two workshops under the auspices of the e-Science Institute. The theme title was “Smart Spaces for Smart People”. Although our initial intention was to explore interactions between the physical and digital worlds, the emphasis changed to the productive exploitation of spaces ascribed as *smart*. We explored the quality of *smartness* in the context of *smart meetings*, which led us to conclude that the role of hardware and software technologies is to *confer capability*. For a *system* to achieve smartness, we deem certain components to be essential, most notably people. However, we also consider the role of both technological and traditional techniques for capturing meeting outcomes. We learned lessons that are applicable not only to meetings about research but also in the more general knowledge transfer context. We conclude that the way forward for exploiting smart spaces relies on design and on empowering the users of such spaces in that design. This paper is the first in a series of three, each dealing with different aspects of the workshops and how they influenced our thinking about knowledge transfer meetings, particularly in the context of sharing research outputs.

## 1 Introduction

One influential outcome of the e-Science and e-Research programmes that ran from the year 2000 onwards was a perceived need for improved and more dynamic techniques for recording the processes and outputs of research. New technologies, for example sensors and mobile devices, were developing at the same time, and some of the more mature technologies were becoming more sophisticated. Interest grew in exploring novel methods for recording both procedures and data in the context of the research or teaching activity.

We obtained funding from the e-Science Institute (eSI) to investigate interactions between physical spaces and personal digital technologies, and look for innovative ways to ‘mashup’ the two worlds. We established the project as a mini-theme entitled “Smart Spaces for Smart People”, intending to consider smart environments in general, but with specific attention to research, teaching, and meeting spaces. As was the practice for other eSI themes, we organised facilitated workshops that had specific objectives.

This paper describes the organisation of the workshops and the overall experience so running them. We wanted our range of recording methods to be

complementary while allowing a comparison of their relative merits. Our intention was always to explore interactions in various forms, trying to make the supporting technology as unobtrusive as possible. Reviewing the published literature about smart spaces reveals a strong tendency to describe the enabling technology, so our focus on interaction was to some extent novel, but we believe that knowledge transfer depends much more on human interaction than on technology. We explore that point in greater depth in the second paper of the series [5] and consider how best to apply our workshop experiences to knowledge transfer in the third paper [1].

When reviewing the first of the two workshops, it became apparent that the emphasis had changed from the anticipated exploration of interactions between the physical and digital worlds to the productive exploitation of spaces ascribed as *smart*. These changes came about from the discussions in the first workshop and from considering issues that came up when assessing the detailed technical aspects of holding the workshops in different venues. Although much of the focus was on *smart meetings*, we remained aware of the continuing need to consider other environments, such as learning and research. We developed four sub-themes and three key considerations as a basis for the successful planning and conduct of smart meetings. In our paper about exploiting smart meetings for knowledge transfer [1] we examine the principal ideas associated with each sub-theme, and some of the questions arising from the three considerations, and propose strategies for the effective utilization of smart meetings for knowledge transfer.

## 2 Workshop Methodology

Themes organized under the auspices of the e-Science Institute [2] focus on a specific issue in e-Science that crosses boundaries and raises new research questions. In our Theme description [3], we stated our objectives broadly as follows:

- To investigate the interaction between the use of Smart Spaces in the physical world and smart personal systems both technological and software;
- To explore and define best practice in enhancing the utility of the link between the physical and digital worlds.

We ran two workshops, the first at the e-Science Institute, Edinburgh, in May 2011, and the second at the University of Southampton, in June 2011. As we shall discuss later, the differences between the two venues provided valuable evidence regarding the influence of the space itself on the extent to which it can be ascribed as *smart*.

We began the first workshop very much with an open mind, so invited participants with a range of interests, albeit constrained by availability at what was fairly short notice. Similarly, although motivated more by a desire to make a fresh start to exploring the potential impact of *smart interactions*, we did not do a literature survey beforehand. With hindsight, that break with the past probably assisted both workshops to focus on the exploitation of smart interactions rather than the smart technology itself.

In the opening session of each workshop, we asked participants to introduce themselves briefly, and to focus on how they perceived the future for Smart Spaces, adding that ideas were what we were looking for. Complying with the original objectives of the Theme, we considered the workshops themselves to be experiments in using smart technologies (although we did not say so openly at the outset).

Rather than attempting to monitor interactions between equipment (subsequently termed instrumentation) and people, our attention was mainly on recording methods. In particular, we did not deploy any embedded sensors. The meeting rooms for both workshops contained audio-recording devices and offered wireless access to Twitter: we used the tag: *#smartspace*s. For the first workshop, we also used video recording and had access to the eSI Theme Wiki. Note-takers kept written records of each session, focusing on capturing key points, ideas, and remarks that redirected the discussion. For the second workshop, we had neither video recording nor an official note-taker, although one participant did make notes and provided a copy afterwards. For the second workshop, we also projected the Twitter feed onto a screen.

The same person (CB) acted as facilitator for both workshops, using flipcharts to capture the key points raised during proceedings. Subsequently, we assessed these traditional capture methods, notes and flipcharts, for both intrinsic usefulness and complementarity with the other recording methods.

It was during the planning stage for the first workshop that using the workshop itself as an experiment in running smart meetings emerged as a meta-objective. Technical limitations also became apparent at this stage. Equipment that we had initially envisaged using to support the workshops had performance limitations and long lead times and other options that might have offered satisfactory solutions were significantly more expensive than would have been reasonable in aid of a comparatively small workshop.

### 3 Results and Discussion

During the final sessions of the first workshop, it became very apparent that the emphasis had changed from the anticipated exploration of interactions between the physical and digital worlds to the productive exploitation of spaces ascribed as *smart*. Moreover, despite our continuing awareness of the need to consider other potentially smart environments, the workshop participants had focused very much on meeting spaces. The second workshop continued in the same vein, albeit concentrating on different aspects of meetings and the meaning of *smartness* in the context of meetings.

Reflecting the shift in our discussions predominantly towards how we might exploit *smart* spaces to enhance the conduct of meetings, the following additional goals (which we came to regard as meta-objectives) came into play:

- To gather requirements for a *smart meeting log system*, and to prepare a draft specification for the specialist supporting software required for such a log system.
- To evaluate critically the influence on the success of a meeting of the following tactics: using a facilitator; having the facilitator keep a visual record (on

flipcharts, for example); using an independent note-taker; maintaining an audio and/or video record of the proceedings; and emphasising discussion over prepared presentations.

- To investigate voice-to-text transcription, giving particular attention to: (a) whether individual participants can be identified from a single track; and (b) investigating the most useful and appropriate methods for searching and tagging the transcribed text, with a view to ensuring effective cross-linking with the meeting log.

Shortly after the second workshop, we began a survey of the literature relating to previous smart spaces work. Although we hope in due course to publish the results of that survey in the form of a review, we include in this paper some pertinent reflections arising from the survey, because they inform our discussion of the outcomes from the two workshops. Our observations are as follows:

- The smart spaces paradigm (or meme) emerged as a result of advances in ubiquitous computing, also known as pervasive computing. To some extent, this device-centric view accounts for the dominance of environments with capabilities driven by the technology available, some of which is embedded.
- The word *context* appears in most recent publications about smart spaces, but almost all authors interpret the term as user status, for instance location, mobility, and preference profiles. Reports about context-aware meeting systems adopt that interpretation at the expense of the context of the meeting itself.
- The majority of systems concentrate on what the technology can do for the user, rather than what the user can achieve. As an exception, Waibel et al, referring to the capabilities required for “interactive, integrated meeting support rooms” note with regret that “the technologies that provide such capabilities are as obstructive as they are useful – they force humans to focus on the tool rather than the task.” [4]
- Adaptivity, logging, and trust management have all received some consideration, but not to the same extent as, for example, configuring smart environments.

The opening session of the first workshop turned out, in a sense, to be seminal. The facilitated discussion that followed the brief introductory presentations by each participant brought out four sub-themes as a basis for the successful planning and conduct of smart meetings:

- Joining up
- People
- Decisions and Provenance
- Capture and Retrieval

We explored the issues associated with those sub-themes and developed three key considerations that underpin the productive exploitation of smart spaces and smart technology:

- Designing
- Capturing and Analyzing
- Selecting and/or Exploiting

In our paper about exploiting smart meetings for knowledge transfer we examine the principal ideas associated with each sub-theme, and some of the questions arising from the three considerations [5]. Drawing on the experience of the two workshops we consider three aspects specifically related to knowledge transfer:

- Bringing the knowledge into the meeting space;
- Maximizing the benefits for the people in the space;
- Enabling people unable to be in the space to share the transferred knowledge.

Because we did not know at the outset of the first workshop the areas on which the participants would focus, we did not address remote participation specifically. We did however inform several people unable to be present about the Twitter feed, a small number of whom did use this means of making remote contributions. We are conscious that the calibre of human interaction will influence the effectiveness of knowledge transfer, as discussed in the third paper [1] and one of our goals for future work will be mechanisms for facilitating distributed knowledge transfer meetings, particularly in the context of sharing research outputs. The requirements for a *smart meeting log system* will include provisions for remote monitoring and contribution.

One issue that emerged from exploring the sub-themes was the meaning of the term *smart* and how we might distinguish a smart space from a ‘dumb’ space. The first workshop did not really tackle this issue, so we included it specifically in the agenda for the second workshop. A full discussion of the quality of *smartness* is beyond the scope of this paper, but in the following synopsis conveys our basis for regarding smartness as *conferred capability*.

No space is, or can be, inherently smart. Indeed the term could be regarded as an example of jargon that is acceptable because everyone thinks they know what it means. Without prejudice to any conclusions that we might draw in our planned review article, the overwhelming majority of the existing definitions express *smartness* in terms of technology and the capabilities it can confer: intelligence; assistance (to humans); and adaptivity (including mobility). A Smart Technology Research Centre [6] poster provided by Katarzyna Musial, one of the participants at the first workshop, lists five attributes of smart systems: adapting, sensing, inferring, learning, and anticipating. All five are associated with *key technologies*. The capability of a space ascribed as smart is infinitely variable, according to how that space is instrumented and configured. The *instruments* can be hardware or software, where the characteristics of the latter can range from passive service to intelligent agent; for a *system* to achieve smartness, we deem certain components to be essential, most notably people.

This view of smartness as *conferred capability* casts technology in a supportive rather than a controlling, or even mediating, role. What then of the role of the traditional capture methods, notes and flipcharts, and the use of a facilitator?

As well as the traditional methods, our methodology for capturing records of the workshop proceedings was based on recording technologies and social networking (Twitter). We hope in due course to evaluate fully the relative merits of all data capture methods used, both technological and traditional, but the following list comprises our provisional assessment of the key considerations:

- A comprehensive record of any meeting is arguably unattainable, given that individual video recording of every participant would be too intrusive.
- Audio recording alone misses the non-verbal communications that can sometimes be influential.
- A contemporaneous Twitter feed is beneficial, but can be distracting.
- Subsequently, the value of a meeting record depends upon a means of extracting points of interest efficiently and effectively. However, if the extraction process involves editing, the interpretation is likely to be influenced by the editor's perspective.
- Similar concerns arise with regard to the potential influence of the chairperson, the facilitator, and note-takers. Both workshops provided indicators of how the flow of a meeting might depend on such factors. Capturing a range of records, annotated with semantic links, is capable of providing an accessible and reliable resource.
- Emphasizing discussion over prepared presentations is beneficial. However, an explicit facilitator can influence both that discussion and the nature of the outputs, as indeed can the chairperson. It is clear that such roles include an editorial function, much like that of the editor of the final deliverables, but the influence of a facilitator can be much more subtle and less obvious.
- Any of the technologies we did or might have used has the potential to have an impact on the success of a meeting. For example, technology can assist the facilitator in enabling all participants to participate fully, which is a positive influence. On the other hand, technology can simply provide more routes for the loudest person to dominate and so reframe the discussions. Supporting technologies can remove barriers to participation but raise other new ones.

The rooms we used for the two workshops differed in several respects, such as: aspect ratio, openness, table layout, and – less tangibly – ambience. The Edinburgh room was square and spacious, whereas the Southampton room was smaller and more confined, particularly in its width. The facilitator (CB) was particularly conscious of the restriction, because it prevented him from engaging with all the participants at the same time. Such observations led us to recognise the potential significance of the physical space and the manner in which humans configure that space; humans who run meetings can exploit the characteristics of the physical space to influence both the conduct of meetings and their outcomes. We intend to explore this issue further when considering the human aspects of smart spaces [5].

## 4 Conclusions

With the two workshops we have experimented with space in the context of meetings that could be ascribed as smart, despite the lack of pervasive technologies. We learned lessons from these workshops that we intend to explore further to achieve improved and more dynamic techniques for recording the processes and outputs of research, particularly meetings about research.

With regard to the additional goals that we came to regard as meta-objectives, we believe it to be both necessary and appropriate to continue our investigations

into the infrastructure required to support meetings in general, but particularly for research, and by extension learning environments. All three meta-objectives are highly relevant to such studies.

The two workshops bring out the point that the use of computers and technology in general are not ends in themselves. What we need is to find smarter ways of doing things that reduce the human effort and maximize the beneficial outcomes of meetings and discussions. We believe that the insights we gained from these workshops can influence strategies for exploiting smart meetings for knowledge transfer.

In the longer term, we believe that the current tacit acceptance that smart spaces somehow just happen can, and should, be replaced by an approach that relies on design and on empowering the users of smart spaces in that design. That, we hope will be the legacy of the Smart Spaces Theme, and not only for e-Science.

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