

# Like Solving a Giant Puzzle: Supporting Collaborative Scheduling at a Film Festival

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**Abstract:** In collaborative scheduling tasks, large surfaces are often crucial. Pin&Play is a novel technology that combines physical and digital information on an interactive pin-board, which can improve collaborative scheduling. In order to explore this and to develop a prototype, we conducted observations of the scheduling of a film festival program. We found that several tasks in the scheduling are demanding and time consuming, which could be improved with technology. More findings as well as some design implications will be presented below.

**Keywords:** Pin&Play, field study, augmented surfaces, ubiquitous computing, tangible user interfaces, CSCW

## 1 Introduction

Many tasks are not suitable to perform on a desktop computer. An example of this is collaborative scheduling. For instance, the annual Göteborg Film Festival ([www.filmfestival.org](http://www.filmfestival.org)) shows about 500 films during 12 days. The scheduling of the program is a non-trivial task, done by the festival team in two rooms where walls and notice boards are turned into large matrixes, displaying the entire program on colored paper notes (see Figure 1). All items (films, panels, receptions, seminars) of the program are stored digitally in a database but are represented by handwritten notes during the scheduling. The final schedule is manually transferred back into the database. All films are scheduled in the same room, whereas for example, the seminars are planned in other rooms by other team members. We have conducted a field study to find out more about how this work is performed and eventually can be supported by a novel technology called Pin&Play.

## 2 Working with Large Surfaces

Large surfaces are crucial in several workplaces, especially when working collaboratively. They are used to give users control and overview of information, which facilitate tasks like scheduling. The information attached to the surfaces is often in paper format (Bellotti and Rogers, 1997). However, as e.g. Moran et al (1999) mentions, physical

surfaces have disadvantages in terms of being limited to one location and they lack electronic advantages. Much work has therefore been done to examine how to make use of the physical benefits of such surfaces and combine them with digital information.



**Figure 1:** The festival team in process of scheduling the 2003 Göteborg Film Festival program.

One solution is to use large touch-sensitive displays (e.g. Streit et al, 1999), where digital information replaces paper and users manipulate information on the screen. Another approach is tangible user interfaces (e.g. Moran et al, 1999; Jacob et al, 2002), which support the manipulation of physical objects connected to electronic information and events. A common method is to use

computer vision technology to project electronic information on physical objects and/or to identify them and their movements. This has been done in combination with e.g. paper notes tagged with data glyphs on ordinary walls (Moran et al, 1999) and magnetic tags augmented with RFID on Senseboard (Jacob et al, 2002).

However, there are work situations where the techniques and solutions mentioned above are too limited or not suitable. Large displays are still expensive and are often limited in size, which makes them inappropriate when users need very large augmented surfaces, e.g. entire walls. Furthermore, it might not always be suitable to replace physical paper. Tangible user interfaces try to preserve users' reliance on physical objects (such as paper). Technical limitations such as camera angles and light conditions, may however constrain the system (Moran et al, 1999). The size of the surface is also dependent on the number of cameras used, as one camera covers only a limited area.

## 2.1 Pin&Play

The Pin&Play technology (Laerhoven et al, 2003) offers a novel solution to combining physical and digital information on large surfaces. The technology consists of interactive and networking pushpins, that keeps the familiar interaction of pinning notes (see Figure 2). The surface serves as a physical medium for both communication and power. The interactive pushpins are independent entities that can hold information, be programmed and communicate with each other.

Pin&Play can turn an entire wall into a network



**Figure 2:** The Pin&Play technology consists of a conductive surface serving as a network and interactive pushpins that can communicate through the surface.

where users can post notes, which are aware of each other's content. In contrast to the systems mentioned earlier, which project digital information on physical notes or objects, the physical notes in Pin&Play hold their information in digital format (stored in the pins). The conductive surface is cheap, flexible, can take any appearance and supports large-scale

networks. It is also possible to connect several augmented walls or surfaces into a larger network.

We wanted to explore if and how the Pin&Play technology can support the film festival team. In the following we present our studies, which will inform the design of a prototype system to support the scheduling process.

## 3 Interviews and Fieldwork

Which aspects of the scheduling work well today and which do not? In what ways could the process be improved with the use of existing technology? To find out, we made observations during the scheduling process and interviewed team members, before and after the scheduling.

### 3.1 Interviews

Two interviews were conducted before the scheduling. One was held with the manager of the film festival, the person in charge of and also active in the scheduling process. The other interview was held with the team member in charge of the current database system. Both interviewees argued for the importance of large surfaces. The scheduling was almost viewed as a handicraft where one needs both certain practical skills and a deep knowledge of the field of cinema.

After the observations, we interviewed the manager via e-mail about our findings. She gave comments and explained scenarios in greater detail, which made our results more comprehensive.

### 3.2 Observations

Two observations were conducted during intense scheduling sessions and lasted for approximately three hours each. The number of team members who were active in the scheduling varied from two to five during the sessions. The manager was experienced within the cinema field but participated in the scheduling process for the first time. She was always present during the process, while learning from another person with several years of experience, who explained and clarified the process. Most of the time we observed and took notes without asking any questions, but occasionally the members also gave us explanations about activities during the process.

As the members collaborated they spoke out loud which made it possible for us to get a good understanding by observing.

## 4 Results

A suitable metaphor of the scheduling process would be to think of it as a giant puzzle where each "piece" has several constraints. The team has to fill fourteen

cinemas that each have eight shows a day with films. The team starts with easy decisions, such as films that deserve the best auditorium and show time. Then the team deals with the difficult pieces, for example films that get a late accept. A new note can quickly be created anytime. The team also uses temporary notes such as Post-Its or torn pieces of paper to “book” time slots.

#### 4.1 Overview vs. detail

The colors of the notes indicate different categories or groupings of films and give an instant overview of trends or patterns. As one person put it: “I think it looks very blue here”, indicating that they might want to reconsider the choices of films for that particular day. To track down a film however, can take several minutes, especially at the end of the process. When the manager expressed “Where did I put that note?” she had to go through several sections of notes before she found the intended one.

Simple rules make it possible to keep the flow in the scheduling and to display different status of the films. When a note is fixed to a certain time slot, it is put neatly at the top border of the time slot. If a note needs reconsideration, it may be attached to a time slot, but roughly and sometimes even askew. However, films can be neatly attached, but still be



**Figure 3:** Colored notes are handwritten and then attached to the schedule. They give an immediate overview of the distribution of the film categories.

movable.

A closer look of a certain film reveals facts that the participants need, but do not want to keep in mind all the time. Collections of small notes representing short films can be attached with paper clips on a note, allowing a person to look up related information for that note.

#### 4.2 Facts vs. experience

Which auditorium is suitable for a film? This is a matter of film format (e.g. beta or 35 mm), but does also rely on an experience or “feeling”, which can predict whether a film is a success or not. The team deals with a heavy cognitive workload during the scheduling process. Both fact-based information as

well as their own experience have to be used. Some facts are handwritten on the paper notes, (such as the title, film-id, show number, category, format and length of a film). Experience-based information must be recalled and discussed, for instance to work out in which order to show a series of films.

#### 4.3 Digital vs. analogue information

The team keeps all relevant information in a database. Before the scheduling, the team goes through the database and writes a paper note for each film. Later, when the scheduling is finished, the team proofreads the physical schedule several times before entering all details back into the database. The manager stressed, “Exporting wrong details into the database would be a disaster” and explained that such mistakes are difficult to correct.

### 5 Design Implications

Our aim is to build a working prototype that can improve the scheduling system, without taking away its current benefits. It is not intended to cover every aspect of the scheduling, but to explore ways of supporting the process and reduce the cognitive workload. We have initiated the work by sketching design implications that encapsulate important considerations. A selection of these will be presented below.

#### 5.1 Keeping the flow

The flexibility and simplicity that paper notes constitute, works well in the current scheduling process. Using Pin&Play to improve the scheduling makes it possible to keep the paper notes, and the familiar interaction of pinning them. It will still be possible to perform current actions such as quickly making a temporary note and attaching it to the surface. A pin can represent a film on the surface, and will then contain the same and additional information, as the handwritten note does today. Pins can be used to support anonymous, temporary notes as well, e.g. by having a temporary film-id.

In order to digitally locate the pins on the surface, some kind of positioning system is needed. With location information, each pin (and its corresponding film) will be able to receive values such as date, cinema and start time. This information will be provided whenever a pin is attached to the surface. In order to decrease the current gap between the analogue and the digital information, the augmented surface can be directly connected to the database. This way, the transfer of the final program would not have to be manually entered into the database.

## 5.2 Supporting overview

If a pin represents a film, it holds information that can be tracked digitally. Thus, with Pin&Play it will be possible to search and display information directly on the schedule. The pins that correspond to the requirements given by the user can then light up. This will allow users to get an overview with more options. For example, groupings other than the film categories (now indicated by colors) can be formed.

## 5.3 Connecting several schedules

Pin&Play makes it possible to connect several surfaces to a larger network. This could be useful in order to support and connect the scheduling of other items, such as seminars. This can facilitate an instant feedback on how each schedule match the others.

## 6 Future Work

The ideas described above are still work in progress and only a few examples of possible improvements. Future work includes developing the design implications further in collaboration with the film festival team. It also includes building a working prototype with the Ubicomp group at Lancaster University that can be tested by the festival team.

## 7 Acknowledgements

The Pin&Play assessment project is funded by the European Commission (contract IST-2001-37007). We wish to thank the Göteborg Film Festival team

and the Ubicomp group at Lancaster University, for their great support.

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