

# Understanding Awareness Information

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**Abstract:** People have a large amount of information that they wish to maintain awareness of, but yet forget to check or are too busy to check it on a regular basis. Examples of this information include weather forecasts, stock quotes, traffic reports, and financial accounts. This information can be quite important, but monitoring it is not properly supported by existing tools which focus only on the user's primary tasks. This research investigates the intricacies of awareness information, develops systems to aid users in monitoring it, and proposes principles for future systems.

**Keywords:** awareness information, InfoCanvas, peripheral displays

## 1 Introduction

People increasingly use the Internet to perform their jobs as well as to manage their personal affairs. The means by which we find and manage the information that is critical to our daily tasks is well understood. However, the Internet also presents us with a large amount of information that is not directly utilized in our work tasks, but is still important to monitor and maintain a certain level of awareness of. For example, a person might want the latest traffic report and an overview of their stock portfolio's performance before leaving work everyday. This is what we call awareness information. It is important enough that it can make a real difference in person's day, reminding someone to bring an umbrella for a late-afternoon shower, alert them to a price-drop on a sought after product, or change the route they drive to get home.

However, users do not always check this information on a regular basis. Awareness information often goes unchecked because the user simply forgets or is too busy with other daily tasks – despite the difference it could make. Furthermore, current methods to check often interrupt or disrupt a person's normal activities. Users are forced to rely upon their memory to trigger them to check a variety of data sources. It forces data from the periphery to the user's center of attention, interrupting any other task. A user must specifically seek out the

information every time they wish to check on its current state. The cognitive overhead of monitoring awareness information arguably reduces the amount of data that the user feels that they can successfully monitor, and may even restrict the user to performing checks only at the start or end of a workday.

In short, information exists that the users would like monitor, but yet they do not have the time, memory, or ability to maintain a particular level of awareness. What is needed is a way to help users monitor this information in a peripheral manner that requires little or no interaction on their part other than the initial setup. The monitoring should not distract from the user's primary tasks, but yet should provide the user with a general sense of awareness of their information world. Some systems have been developed to integrate information into the physical environment such as the ambientROOM (Wisneski et al, 1998). Others have sought to enhance the virtual desktop through a sidebar (Cadiz et al, 2001).

The aim of my research is to study the nature of awareness information, discovering its role and importance in our daily lives, and ultimately help people maintain their desired level of awareness of a wide variety of information with ease. This research will delve into finding ways to represent information by unobtrusive, peripheral means that convey the most important attributes of different types of awareness information. I will produce a set of design principles for monitoring information will be

derived and a toolkit to ease the creation and exploration of further awareness displays, based upon an evaluation of these systems and how people utilize them. The principles will be combined into a toolkit, easing the creation and exploration of further awareness displays.

## 2 Understanding Awareness Information

The first step in my research was to learn about the types of awareness information and the role that it plays in our daily lives. To approach these questions, an informal survey was conducted about awareness information. Twenty-five participants were selected that varied in age, background, and profession. Each participant was asked questions about the types of information that they check regularly, when they check it, and what is important to them about it. In general, we found that there was a core set of information that was common among participants in monitoring, along with a wide variety of more personalized interest related sites. For example 80% said that they check news and financial web sites on a regular basis. Other information typically monitored included weather, entertainment, and even non-work related email.

More importantly was the great diversity in the web sites that were used for the same type of information, and which aspects of the information were most important. We propose that awareness information is highly personalized in terms of both its source and the information presented – thus any system designed to support monitoring awareness information would have to be highly customizable by the end-user.

Most participants reported that they would check a set of web pages once a day or so. Others checked repeatedly throughout a day, or as a break between work tasks. A majority of people used some sort of “start page”, such as MyYahoo. The most common reason cited for using these pages was to view a large quantity of information quickly. Thus we propose that consolidating a variety of awareness information into a single representation is of great benefit to the user. Awareness displays should strive to assist the user by allowing a highly customized, consolidated representation to be constructed.

Upon reviewing the types of information that people monitor, we noticed that some are of a highly personal nature, such as a bank account balance. Thus it is important that an awareness display incorporate a method for concealing or encoding sensitive information such that a co-worker passing

by is not able to monitor the user’s bank balances. Once these conclusions had been reached, we set out to create a display that would be peripheral, highly customizable, consolidated, and secure.

## 3 The InfoCanvas

The first system that we developed to aid users in monitoring awareness information is the InfoCanvas (Miller & Stasko 2000; Miller & Stasko, 2001). The basic concept is to place a piece of information-driven artwork in user’s environment, allowing them to glance at the artwork and quickly obtain a general sense for the status of a variety of information. A user would ideally hang their InfoCanvas like a painting on a wall, or situate it like a picture frame on a desk. Elements in the scene depicted on the canvas would be visual abstractions of the data that the user cares about, such as a scene shown in Figure 1. Most importantly, the user would be able to paint whatever scene they desired, in terms of both graphics and information.



Figure 1: Example of an InfoCanvas

For example, the user who painted the canvas shown in Figure 1 decided to have the height of birds flying in the sky represent the performance of different stock indices, the color of the woman’s bathing suit represents the current traffic conditions, the appearance of a seashell on the beach indicates when an email from their significant other arrives, and the weather condition shown in the scene is the forecast for tomorrow. Other users might choose to create an entirely different painting that suits their own personal preferences and information needs. The abstract, graphical nature of conveying data used in the InfoCanvas increases its peripheral nature as a picture can easily blend into most home or work settings. In addition, the abstractness makes difficult for someone passing by to determine

exactly what is being portrayed. This contrasts from other work such as Informative Art which utilizes existing artwork, modifying it in a pre-determined manner to represent a single data source (Redstrom, 2000).

## 4 Usability Study

Currently underway is a study of the InfoCanvas being used in actual work environments. The goal of this study is to increase our understanding of the issues surrounding awareness information. The three-part study is being conducted with five participants of various backgrounds and occupations. The first phase is an initial interview, that is conducted to gain a better understanding of what role awareness information plays in the participant's daily work life. Each participant is asked about the information they monitor, how often they check, the means by which they view it, and the motivation for checking.

In phase two, participants use paper cut-outs to design an InfoCanvas to represent some of the information discussed in their initial interview. Currently, we have not created an authoring tool that allows users to paint an InfoCanvas, so a simulation using printed materials substitutes for now. Participants are given a selection of five different potential themes from which they can design an InfoCanvas, such as a beach, desert, or aquarium. With the aid of the interviewer, the participant selects images from a collection to represent their awareness information. Objects are placed on their canvas, and the participant decides how each object will change with the data it represents.

In phase three, we create an interactive InfoCanvas for each participant's based upon their design and mapping. After installation, the canvas is left to run for the user to interact and monitor their awareness information with. Each week, a short interview is conducted with each participant. The interview focuses on assessing how much the user has utilized the display and any difficulties they've had in interpreting its representation. It is also a chance for participants to voice changes that they would like to make to their canvas, since in a fully functional version of the software, users would be able to repaint information representations at any time. Phase three will run for approximately six to eight weeks to allow for sufficient data collection and for any "new toy" effects to dissipate, where the

user pays more attention to the display just because it is a novelty for them.

## 5 Status and Future Plans

Currently I am in the process of writing my thesis proposal under the guidance of my advisor John Stasko. My thesis will focus on awareness information and conducting an investigation to learn as much about it as possible. Additional projects are in the early stages of development, and will be presented along with the InfoCanvas as means for providing peripheral awareness.

Moving forward, I believe that as more information becomes available on the Internet that awareness information will increase in importance. This will drive the need for future peripheral awareness displays. However, building these systems can be quite time consuming because of the number of issues that must be confronted in harvesting data, creating representations, and interfacing with the user. Future awareness displays could be rapidly prototyped via a peripheral awareness toolkit which I will build, encapsulating my research findings.

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