

Indianised Design of Automobile Dashboard Interfaces A Case Study

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Keywords:

Automobile Dashboard, Cognitive Prototype, Cultural Dimensions, Metaphors, Cultural Populace

Abstract:

During the last two decades, the automobile has made the transformation from an analogue machine with mostly mechanical and hydraulic control systems to a digital car with a rapidly growing volume of computer-based control systems. This transition will continue for another decade or two as drive-by-wire or x-by-wire systems emerge and eventually proliferate. The addition of sensor-based intelligent vehicle functions will further advance digital technologies in future automobiles.

Some of the most visible recent innovations in automobiles, such as telematics, have little to do with the automobile's operation itself. The inclusion of hands-free kits and multimedia systems have less effect on the automobile's operation and more effect on improving the drivers' and the passengers' ability to do no driving activities, such as having a cell-phone conversation or watching a movie.

Automobile designers have always been aware of incorporating external features that target specific market/geographical segments tastes many of which are culturally motivated. However the Dashboard inside, continues to be based on a universal design template and is well standardized. Regardless of the geographic region or market segment dashboard more or less are similar.

In India, the dashboard and interior of an automobile has always been modified or decorated to reflect local cultural identity and tastes. This paper makes a study of current adaptation of dashboards in automobiles such as cars and trucks. It attempts to derive heuristics for a completely digitized, hands free, multifunctional dashboard in the form a large LCD/Plasma display. Design concepts are suggested to highlight the attributes of a culturally oriented dashboard.

What is A Dashboard?

In information technology, a dashboard is a user interface that, somewhat resembling an automobile's dashboard, organizes and presents information in a way that is easy to read. However, a computer dashboard is more likely to be interactive than an automobile dashboard (unless it is also computer-based). To some extent, most graphical user interfaces resemble a dashboard. However, some product developers consciously employ this metaphor (and sometimes the term) so that the user instantly recognizes the similarity.

Automobile dashboards provide a significant amount of data about the current state of the automobile. Typically what is presented is exactly what is needed and at a glance it is possible to see the state of the automobile. The other function of the dashboard is to provide for control of the automobile. Dashboards facilitate almost attention-less (once learned) control of the automobile.

Dashboard History

The history of automobile Dashboard design has been one of incorporating nonessential features that subsequently became indispensable especially when broadcasting became commonplace, for example, the built-in radio was the feature few car owners wanted to be without. Today, that feature is the car cup holder. Now this feature is considered to be so essential that many consumers wonder why it took so long to arrive.

Riding in the earliest automobiles must have been a bone-jarring experience. Not only were suspension systems crude by today's standards, but also roads were much more unforgiving. The possibility of drinking from a cup while driving may never have entered the consciousness of early touring parties. Liquids were kept tightly corked in the thermos bottle, which was secured in the picnic basket until the car stopped and a blanket was spread out beside the road.

Earlier Dashboards in 1940's usually consisted of a sheet metal piece on which basic equipments like speedometer, fuel meter were mounted as separate unit. One of the safety enhancement of 1970's was the adaptation of padded dashboards. In the 1990's driver side airbags become mandatory and passenger side airbags became widespread.

Digital Dashboard

The notion of an automobile dashboard is directly applicable to the concept of a digital dashboard. It provides the information needed and the controls to operate the "machine." In this case, the "machine" is the business. If the metaphor were completely applicable it would actually be possible to control

a business from the digital dashboard. In reality the "out" communication may be very limited.

Microsoft's Digital Dashboard is based on Office 2000 technology. They currently have available a Digital Dashboard Starter Kit which allows experimentation with some sample Digital Dashboards. In order to install the starter kit, you will need to have Office 2000 installed.

The dashboard interface is built on Internet technology. The dashboard window consists of a number of frames, and each frame contains a particular "information nugget." An "information nugget" is the term used by Microsoft to discuss pieces of valuable information. Each frame contains a different "information nugget." The "container" for the frames that make up the digital dashboard is Microsoft's messaging interface.

Indian Culture and Dashboard – *an analysis by observation*

Following study included various users ranging from those in normal household to taxi drivers based on which the study was conducted in two stages. In the first stage the users were observed without being noticed by the user. Then all the critical factors were charted out based on which the questionnaires were prepared to solve further queries that were unable to be made through observations.

If we talk about India, The relation of the new technology to culture is especially vivid and pressing. For of all modern states, India is the one which has most successfully preserved, and even enhanced, multiple languages and cultures, plural literatures and traditions, extraordinary cultural diversity. The official recognition of eighteen languages is only an outer manifestation of a far deeper heterogeneity, of the co-existence of multiple cultures, each with ancient literatures, valued traditions and historic arts and monuments. The question that arises is whether these rich multiple cultures of India can survive the Information Age. And by the Information Age, It is particularly the age brought about by the new technologies of computation and computer mediated communication, but also television, film, radio, and all of the new media.

Given the widespread fear of a kind of cultural imperialism spread through the new media, one would expect that there would be rich and thoughtful discussions of this question. Yet if we search through books, conference proceedings, and meetings about the Information Age, we find precious little on the subject. The technological challenges of rapidly developing information and communication technologies are so fascinating, so intellectually demanding, that they alone are worth lifetimes of individual effort, to say nothing of countless international meetings. The economic implications of a world of global networks, of instantaneous communication, of electronic commerce, of households "wired" at a rate that doubles every year, of international monetary markets and economies linked electronically. These implications, too, are worthy of and receive intensive study. And not least important are the legal problems of reconciling the standards for the Information Age of more than one hundred

countries, of determining what is right, proper, secret, public, pornographic, militarily dangerous, privately owned, obscene, subversive and so on.

There can be no question about the sophisticated Indian's Indianism or his desire to preserve this precious heritage at all costs. Therefore while designing digitized dashboard interfaces for India cross cultural issues play an important and critical part. Also, Increasing competitions emerging between the automobile industries make these factors a necessity to be included in these interfaces. Some of the many factors that must be considered while developing GUI's for automobiles are:

1. Right hand drive in India :

India is one amongst the few countries that has implemented Right hand drive system in all the vehicles rather than left hand drive which is prominent in US and European countries. This factor mainly affects the navigation system and the alignment of symbols or text into to screen. The GUI must be designed to be easily operated by left hand and also the text that will appear as alerts to the screen must be placed in a position thoroughly checked by user survey to be easily readable just by the movement of the eye to the left without moving the head which is unsafe.

2. Navigation by Language :

If the dashboard is made to be operated hand free by giving voice commands the language also plays an important issue. Though English form the link language of India It is limited only to educated part of the society but the driver who is kept on a pay scale by certain families is often illiterate and is not well versed with the use of English. In India though there is a tendency to adapt to cultures outside in India but there is very less and limited tendency to adapt to other culture within India. For Example a student in UP is ready to learn English but he show reluctances toward learning Assamese or Telugu. Often it is the driver who drives the car and seldom is he well versed with the use of English. But he is fluent with his own mother tongue and also Hindi (not in all cases).If such a thing Occurs the vehicles interfaces must be made customizable in eighteen different software.

Also while considering the Indian context the concept of operating with voice commands cannot be applied in every vehicle and in every place. In certain cases for example school bus, or a taxi or even a vehicle belonging to a family where there are conversation going on every now and then, a voice sensor may malfunction. In such cases another device (may be a hand worn hardware) has to be designed separately which form an integral part of the interface.

Also in cases like this to avoid the cost of making a different controlling device UI designer can simplify the problem by going

against what has been written in the first paragraph by playing with diversity of Indian Culture. He can put up two languages for interacting with the interface. One language is his mother tongue or user selective in which his family member converse which he can use while operating the system and other is a common language (English or Hindi as applicable) which is essentially different from previous one. The main Idea behind this is the user can give commands in different language while his family member converse in different language. Such Interface may also be accompanied with tutorials.

The tutorials must not only be aimed to make the driver accustomed with the commands but It must also be making the system accustomed with the user volume and his/her accent.

3. *Contents :*

The contents of the dashboard interface must be done after studying the user experience of the dashboard. An Indian vehicle dashboard is identified by the deity symbol in form of photograph or small statue paced on the dashboard. Also there are categories of people mainly taxi drivers who are accustomed of pasting stickers related to bollywood stars. Such things must be included and displayed on the interface in the stand by mode.

Apart from these the content must also be formalized by analyzing the need of the user. The content may be user specific. For example a businessman will definitely want to have a car with the current news of stocks while others may just require the current cricket scores.

The content must also be at par with the recent innovations. For example the lane departure warning system which alerts the user if the turn is made without giving indicator, night vision and blind spot detector whose output is beneficial for the user has to be accommodated in the same interface.

4. *Analog features in existing vehicles*

This section covers measures that should be taken in digitizing the existing analog devices in current vehicles that consist of Speedometer, Odometer (that records total distance covered, Fuel meter etc). Recent researches that have done to make these features failed as people did not readily accepted the electronic odometer.

The purpose of Speedometer is to alert the driver of the speed of the vehicle. Converting Odometer into digital one may not be a good option as people are already accustomed to the analog version. Also in India each culture has a vision in which they blame technology for any fault. This problem can be solved by replicating same analog feature in digitized form by displaying the same on a LCD/Plasma Screen.

Recent researches have been done to make the speedometer dynamic that is using a visualization similar to that of the tachometer by visually distinguishing the regions of the speedometer which are higher than the current speed limit. As the speed limit changes, the visualization on the display updates accordingly. This relieves the driver of the task of waiting/searching for a speed limit sign on the road to determine the current speed limit in effect. In such cases these cultural issues are important as driver can better be notified by using metaphors and colors after studying user perception of danger.

5. *Music:*

Playing of music in the car can't be ignored. While driving with the family one likes soft music at low volume as all of them want to pay attention to the conversation which is going on between the family members and when it comes to individual he likes to hear music at little high volume. Youth prefers music at much high volume. While the taxi drivers and truck drivers maintain constant volume during their journey. Volume must be different for different types of music and must be automatically adjustable. This is because different types of music grab different level of attention.

So while designing GUI's these things has to be kept in mind which mainly affects the difference that system has to made between sound of music and voice commands given to it by the user.

Also while making the including features in GUI for controlling play list following thing has to be kept in mind that Indian culture has adapted to the nuclear family system. So often in a family there are four members out of which one is the head, another his wife and then their children who drive together in the car and in the absence of the driver it is the head who drivers the car. But despise of he being the head it his not he who selects what music rather it is his wife or even children who make choices of the songs that are to be played. So while designing GUI's for the car it has to be made equally convenient to operate by other passengers as the driver.

6. *Metaphors:*

According to Marcus (1998), metaphors provide a visual meaning concepts through words and images. Duncker (2002) emphasizes that metaphors have to match the target user's mental model of physical objects. When users feel a sense of representation they are able to benefit from and feel comfortable using metaphors.

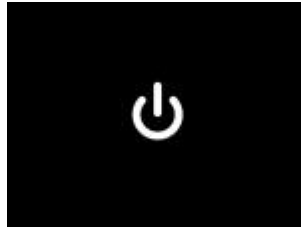
Interface Design relies on metaphors that ultimately must include the culture factors. Also use of metaphors is much more important in automobiles as a message has to be instantly conveyed to the driver without getting much of his/her attention. So text which takes much

time to be understood has to be replaced by metaphors which have to be cultural dependent to be more efficient.

To decide what metaphors have to be used in user survey cognitive prototype test has to be used in place of “choose one of these options” questions. This is due to diversified nature of Indian culture a individual tend to accept what looks attracting which may not be the best choice. For example in user survey when it was asked to depict the word “power” when the survey was made without giving any of the options option 1 was preferred than in the other case both options 1 and option 2 was given equal attention as option 2 which is a geek symbol has already been adopted by human culture and when it was asked that which one of these is better option 1 got highest priority.



Option 1
*Indian power
Symbol*



Option 2
*Geek power
Symbol*



Option 3
*Reiki Power
Symbol*

Customization of Dashboard Interface – *some suggestions based on Heuristics*

Customization is another important feature that has a key role in designing interfaces for automobiles. Though the user survey shows that nearly each of the driver wants customization in some part or the another in his car but the question arises that is it efficient?

When people were asked whether customization is necessary in dashboard interface or not they usually think about their PC's and then decide whether to opt for it or not. But such is not the case in dashboards. India is not a country where an average household has the financial resources to buy a car for each individual in the family. In most of the cases a person drives the same car that his wife is driving. In such cases customization will become inefficient as the changes done in the interface (themes, background etc.) will make it difficult for wife to realize the messages on the interface.

Customization may not be efficient for an individual but definitely it matters when it comes to a cultural populace. For example in contents we said that an Indian car is identified by a photograph of deity or holy signs (Swastik or Om) made with red sindoor. Also there is a tendency in the Indian Culture to procure his cultural heritage. So people inside a populace will accept this new technology easily only when it incorporates their culture. To incorporate the cultural features in a country like India with wide diversity and having different religions like Jainism, Christian and even orthodox religions like Hindu and Muslim Customization provides the only feasible option. If the dashboard is not made customizable it will result in discrepancies as a Hindu will never like theme of his dashboard to be consist of mainly green color opposite to that of Muslim. Even within the same religion a Shavian (Worshipper of Lord Shiva) shows some resistance towards keeping a background of Lord Vishnu. Each populace will definitely like their dashboard customized according to their culture.

So Customizability may be related according to the needs of the family as each member in an Indian family follows the same culture but not according to an Individual. For ex The screen in standby mode may be made customizable but not the overall theme.

When it comes to taxi drivers or bus/truck driver individual customization is more applicable as there are no problems as it is an individual who always drive the vehicle.

Conclusion

India is a place where inclusion of cultural variables is sensitive. While deciding these factors it has to be seen that they does not hurt the religious sentiments of people. In such cases customization can solve the problem.

We contend that while accounting the cultural variables we cannot forget safety issues that constitute one of the most important function of driving the vehicle. It is therefore necessary to think about safety while incorporating cultural factors.

Result of this case study indicates that care must be taken while designing GUI's for vehicle dashboards for India. Though an automobile with digitized dashboard is new in the developed countries and will take much time to reach India, guidelines can be laid for designing a culturally oriented GUI. Though this paper has attempted to lay such guidelines only for the basic features but it may be extended to address other advanced features like GPS as and when the need arrives.

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