A paradigm-shift towards user-centred methodology in interaction design: the case of an icon-driven interface product

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1 Introduction:

Interfaces are the fronts that facilitate technologies to disappear into the background while still remaining operationally useful. And since, by definition, interfaces could quite easily represent "the interposition or bridge over the boundary between man and machine" (Harida,'92) the faces donned by these technologies would have to remain considerate to the user if the products behind their interfaces were to succeed. Hence, the task at hand today would be to undertake the task of designing interfaces only after visualising a smooth flow of the interaction process between these two principal operative elements of 'man' and 'machine'. The stated emphasis in this paper will remain on the factor of industrial design and the pathway to interface-creations as industrial design applications.

2 An industrial design perspective and the inevitable paradigm shift

The obvious case for industrial design arises, of course, from the designer's stated role which is "to suggest relationships between people and things" and to reorientate these equations within their appropriate social contextualisations. However, there are reasons outside of these that call for an industrial design perspective as well, arising as they do from an increased

incorporation of computing devices into products and product-systems as obvious concomitants of the advancement of microprocessing technology. What is not always obvious, however, is the renewed set of challenges and responsibilities that these developments set up for industrial design - a role that may be likened to that of the trouble shooter's. The task at hand for the industrial designer would now include having to trace the most efficient, least-resistant paths for interacting with given products over a given period of time, creating in the process a kind of dialogue flow that is considered so crucial to the idiom of interaction design. This paper, therefore, references a paradigm (for looking at products) in a decided shift away from the earlier ones, and one that is increasingly becoming part of the product development axioms of the future. The paradigm enables a shift of focus on the product's interactivity with its user rather than on the product's material or its processes as such, so that the emphasis eventually comes to rest on the user, alongside all its natural concomitants of what could be facilitating or alienating the user from the product. The suggested focus-shift is critical especially because it forces the designer into new concerns about: (1) the quality of such interactions; (2) the reasons for such interactions; and (3) ways to make these interactions as transparent as possible. Such determinations, thereby, providing fresh impetuses as well as an alternate approach to product development. Of particular interest to us here, as a direct offshoot of this renewed focus on users, would be the recent use of microchip technology to imitate human sensory capabilities under the assumption that the given products will then interact with the user much in the way the user would have done with his own environment. This perspective opens up creative opportunities for the designer to conceptualise newer applications with added functions; and which could result in an increasingly newer generation of sophisticated interfaces. But obviously, this would also begin to call for an informed use of certain

methodologies. We will highlight one such, by means of a conceptual prototype of an interaction device developed as an experimental-developmental interface product.

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Interface for what kind of user-environment?:

For the design of our interface, we had wished to address the personalised information environment, which over the last few years has emerged considerably enlarged consequent to the "informationizing" of homes - a situation arising from the incorporation of high-technology communications and transmission technologies into household facilities. This increased familiarity with information equipment within the realm of the general user as a direct function to rapid developments in data processing and semiconductor technologies begin to place the added responsibility of having to devise interfaces that are adequately suited to and conversant with home automation. Whereas earlier on, computing technology hardly found widespread applications in products of every day use. And arising out of this new development, therefore, the challenge of being able to design personalised information equipment with the right interfaces. Under the circumstances, "if computer technology were to become more central to our everyday lives even as a means of mediating communications among people" we would need to relocate some of the essential qualities of human to human interaction back into the available computing experiences (the Interval Research Corporation's University Workshop Project brief to its 1997 batch of participants).

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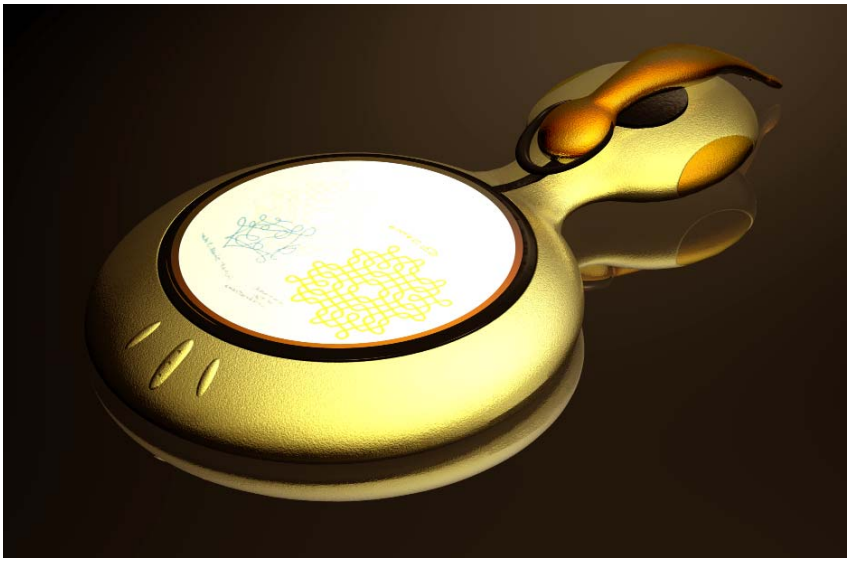
The boundaries for the conceptual prototype:

With this stated emphasis on the user, and with our own focus on personalised information equipment, the proposed category of interfaces would then likely have to be "the intelligent entity

between several functioning subjects (and yet) one that only incompletely understands the mutual knowledge of information communication". (Hancock and Chignell,1989)). And quite needless to say, the focus of our interface design would itself begin to rest on a user-product-user interaction with every intentions of making this interaction/experience as ubiquitous, transparent, convenient and as enjoyable as possible, as an obvious function of the designer's stated role that consists of his "proposing ways for the users to relate to their environment". The prototype featured here to demonstrate our approach is an exercise that comes from our ongoing pedagogic activity that seeks to conceptualise a new generation that have products with computing devices integrated/embedded into their functionings..



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'Samas' - the conceptual prototype:

Our experimental-developmental prototype called 'Samas' which means in Sanskrit 'to connect up' is an interactive communication device meant to tackle the "waiting" needs of its users. 'Samas' addresses the commuting community of suburban Bombay in India and factors-in on the inevitable periods of wait that have come to be featured as an essential part of the daily commuting regime of

this segment of the metropolises' population. It must be mentioned here that most of the thirteen million of Bombay's (now called Mumbai's) population have to commute anywhere between two to five hours or more for work everyday. A situation immediately comparable in size and intensity to that of metropolises such as Sao Paolo in Brazil and, therefore, holds potentially wider universal applications for our product. The aim of the interface device was to convert this daily experience of having to wait for the various connecting modes of transportation through each cycle of commuting into a valuable one, under a situation where such commuting could neither be obfuscated nor reduced as it has come to rest as a matter of 'fait accompli' for its people.

Hence, the intentions for the product really start at the their broadest levels of abstraction, viz., to improve (one's) quality of life through better social interactivity in spite of the daily loss of time through such commuting, and to then move on towards the more immediate intentions of enhancing the quality of interactions between the people, the product and its given interactive environments involved under these stated conditions of commuting. For this paper, the endeavour will be to outline the iterative process involved in our methodology that would start with (1)the construction of interactive scenarios based on a thorough understanding of the user and his environment as well as the identification of the specific needs of these users, leading in turn, to (2)an understanding of the product(s) or system(s) that could conceivably solve some of their problems; (3)followed by the testing of the user groups, (4)followed by the modification, wherever required, of the originally-conceived ideas in order to give final shape to the interface-device being designed. The approach adopted has been largely analytical, allowing the project to remain focused.

An initial study of the user-situation had given us to understand that we needed to focus on the design of an interface that respected the following intents and purposes:

(a) an interface that would enhance social interactions by helping to connect up with people - even with those unknown to each other;

(b) an interface that would help to extend human emotions, in particular the aspect of humour, in deference to the nerve-racking thanklessness that can be induced by everyday commuting. Computers with their usual predictability, on the other hand, tended to be ‘dull’ and ‘impersonal’ - and as attributes - scarcely likely to alleviate any tiresome situation;

(c) interactions that would make use of our physical capabilities where ordinarily computers tended to concentrate only on the use of the fingers. This situation, critically addressed by Bill Buxton(1992), stands at complete odds with the actual reality of the human anatomy which has the built-in capacities to interact with the real world much more physically than the present computer-interfaces would have us believe. Quite reasonably, therefore, this threw up for us the challenge and the opportunity to fill in an element of physicality/kinetics that seemed entirely missing in our interactions with the present generation of computers. An obvious choice was, therefore, to incorporate the movement of the hand as an important element of dependency while selecting and navigating through the interaction process of the interface device; and finally

(d) it was considered imminent to incorporate an element/factor of interaction across the language barriers given the context of our multilingual society which has over twenty-six official languages and over a thousand dialects. Bombay, the national melting pot, would quite conceivably require an interaction device that could shortshrift the use of any particular language, given the fact that many of India’s major languages continue to remain in active use in this city.

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The icon-driven interface:

Having outlined the anticipated boundaries for the product under design, the goal was then to communicate and interact (through this device) with those that were 'waiting'. The conversation we designed as the key to interaction was decidedly not verbal but iconic, and made use of images. This iconic conversation was meant to become engrossing and humorous as there would remain a deliberately in-built measure of ambiguity and potential reinterpretational or even misinterpretational quality surrounding the use of these icons. While in the initial stages the intention was to enable its users to construct their own icons from a compendium of basic elements made up of arcs, lines, dots, etc., upon testing these with the users it appeared that people in general were reluctant to construct images, with an expressed concern in their ability to be able to put together their own customised sets of icons that could match up to the given tasks. Which is when we decided to provide the user with a data base of about twenty-five object-icons that would reasonably well reflect the reality-context of Bombay as a composite or a collective of its artefacts and its environment. From this given vocabulary, the user would simply have to add up the iconic elements in various combinations in order to create the intended meanings. For example, while the combining of the icons of a wine glass with a three-wheeler (such as an autorickshaw) would literally construct the image of a 'wine glass on top of an auto' this could, in actual terms, be interpreted as a 'drive-in-restaurant', or something perhaps entirely different depending upon the user's frame of reference and/or the context of the conversation built up so far. The combinations could be infinite and the possibilities of expressing thoughts and situations quite unlimited since much of the language build-up would remain subjective - attached as

these would be to perceptions of situations - which themselves would obviously differ from person to person.

As we progressed into the vocabulary, it now became necessary to include expressions to these objects icons. These expression-icons would go to articulate happiness, sadness, surprise, doubt, bewilderment, anger, and so on. In the event, one could now drag and drop expression-icons on to the object-icons selected for communicating a given thought and the resulting object would immediately imbibe the quality of the intended expression. For example, combining a 'house' with the icon of a 'smile' would turn the house into a 'happy house'.

We persisted further to improve the quality of communication by incorporating the factor of animation within the computer environment. For this, an additional set of action-icons were now conceived. Which meant, that once an object-icon combined with an action-icon, the end-product would begin to animate itself. For example, combining a 'house' with action 'move' would make for an icon that would show a 'house with wheels' which would then set itself to animation to articulate the following thought 'shifting home'.

We user-tested this vocabulary by having people converse with each other using these icons. For the purpose of user-testing, we had the basic icons drawn on paper cards which then made it practicable for the test-user to select the ones intended for use in his conversation. The user studies were based on a set of ready-made drawings of the icons as well as icons drawn out spontaneously at the scene of user-testing spurred by user responses. This obviously helped to validate our premises more satisfactorily, since the icons actually available with us would facilitate all the necessary manipulations through the adding of objects, expressions and the suggested actions into their intended thoughts, before these could be exchanged back and forth between the conversing partners. Indeed, the user-studies conducted by us would seem to suggest that the process of

interaction in actual practice could end up generating fun and excitement - resulting as they would from the users being left more or less to their own devices to interpret the icons without having to observe a rigid structure or protocol of do's and dont's regarding the icons communicated to them in the course of their conversations. The user studies also demonstrated a certain level of anticipation for such conversation, leading up to an urge for future build-ups, resulting in turn, in tangibly newer and further combinations, which in its own turn allowing for engrossment into and expectations towards future interactions. The interaction pattern itself, in fact, facilitated an element of continuity since the factor of time had been structured non-linearly in order to allow for a discontinuance as well as a renewal of conversation almost at will, as well as for new partners to move in and out, once again without having to take recourse to any rigid sets of protocols.

'Samas' uses the already available technology of mobile telephoning and its concept of base stations from which to access connections. It has occurred to us that this technology in India still remains a prerogative of the upper middle class in its economic affordability. But the hope remains that with time, the technology will become more economically viable and hence allow for wider access. The hardware for 'Samas' itself was modelled from 3-D renderings on the Alias and then set for prototyping and tooling on an FDM (Fuse Deposition Modelling) facility which derives itself from the cutting edge technology of Rapid Prototyping and Tooling. However, this technology was used more in its spirit of experimentation rather than as an imperative, particularly swung by the fact that the technology of rapid prototyping and tooling is exactly tailored to prototyping individual or small number of pieces. While in actual reality, any conventional modelling and tooling would remain perfectly acceptable.

Conclusion:

If 'Samas' could provide an alternative to the passivity of "waiting" by inducing its users to cultivate social interactions, it could then become a model for creating social spaces right in the midst of domains that would otherwise seem to carry all the signs of alienation and even potential hostilities. 'Samas' could become a home away from home - a kind of a club or a social watering hole for commuters - quite conceivably braced to spend a large chunk of their lives outside of their homes leaving them, thereby, with little time at the end of the day to interact with their extended families, friends or relations. To that extent, 'Samas' as an interactive device could fulfil a major objective of today's goals of computer-human interactions, viz., to "invent the future through new ways of learning, working and enjoying life"(to reference the theme for the CHI'98 conference - 'Making the Impossible Possible'). And given our particular context of a developing country, it would not be an exaggeration to consider 'Samas' as a signal for a new generation of interface products born out of socially-relevant situations and concerns in a further triumph of the much-neglected ethos of 'design for need'.

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