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EVALUATING THE ROLE OF USER-GENERATED, ONLINE RESOURCES IN CONTINUOUS PRODUCT DESIGN DEVELOPMENT

ABSTRACT:

User research is commonly perceived to be a pre-market process in relation to product design. With the advent of ubiquitous broadband, it is now understood in terms of the feedback of post-market, user-generated information into a design process continuum. Previously such feedback was confined to single product, or discontinuous, design. Increased online access has stimulated the growth of communities of interest around products and services, which is changing the way that consumers control and ultimately perceive them. The paper therefore seeks to define generic online user interaction and compare it with traditional design models. The findings of an

evaluation of online user-driven websites are used to construct a taxonomy of representative archetypes. The paper concludes by discussing the changing online relationship between product users and design and proposes methods for optimising this relationship, within the context of continuous rather than discontinuous new product development.

KEYWORDS

design user Internet

INTRODUCTION

Today we live in an information age: information has become a commodity, and every second thousands of new records are created. This explosion of massive data sets created by businesses, science and governments necessitates intelligent and more powerful computing paradigms so that users can benefit from this data. This information needs to be summarized and synthesized to support effective problem solving and decision making. (1. Eds. Zhong, N. and Liu, J. 2004)

'On the surface, it looked like a dream come true. Television, radio, magazines, books, records, all media known to humankind were being incorporated with a single encompassing communication space, the World Wide Web.' (2. Bruinsma, M. 2003)

'Another, and deeply cultural, consequence of the Web's ability to link is that websites hardly ever stand alone – they cluster. Visitors gather not around single sites, but through portals, link lists, webrings, blogs, online clubs; in short they form communities.' (3. Bruinsma, M. 2003)

In product design, user research is traditionally perceived to take place primarily at the pre-market, design stages as a means of informing the brief, clarifying consumer needs, distilling aspects of consumer life-styles, or at a subsequent stage testing, obtaining feedback on and refining prototypes. Whether quantitative or qualitative, such research is normally limited to underpinning the design process as it progresses, rather than obtaining information for future product designs once the current product is on the market, so that evolving user experience could inform and be applied to future iterations of a new product, or its replacement. Whilst post-sale marketing information is sometimes collected, there are well documented reasons why this does not happen in design terms, ranging from the traditional discontinuous progression of new design entirely replacing old, where information about the former is not relevant to the latter; to a subconscious reluctance to engage with what might be seen as a post-mortem process, perhaps revealing unpalatable truths; coupled with a suspicion that such information might not be relevant to

innovative thinking, or might even inhibit it. There are also the costs and complexities of obtaining and verifying such information and the fact that it is not easy to cost the gathering of post-market information into the current project budget. However, manufacturing companies often have unique if untapped access to their post-market customer base (through guarantee records for example) to gather the informed views of experienced users.

This lack of post-market appraisal can, to a degree, be justified in a traditional design world where new product development is viewed essentially as a discontinuous process, in which new products are propagated one after another, with little iterative overlap between designs. In contrast with the more continuous processes associated with contemporary product development, where there is every reason to assume that post-market user feedback can have a consistent impact on long terms product cycles. Traditionally testing a discontinuous concept with surrogate 'users', in a mock environment to gauge hypothetical responses to an emerging concept, does not compare with the potential information gleaned from a genuine user, using an actual product, in a real environment, for the next generation of products.

As recently as 1995, Baxter outlined the primary market research sources which previously prevailed (without reference to the use of the nascent Internet):

'Market needs research can be based on four main sources of information: In-house market intelligence, Library research, Qualitative market surveys, Quantitative Market surveys' (4. Baxter, M. 1995)

It is unlikely that any of these four sources addresses research into existing product use.

NEW INTERNET OPPORTUNITIES

Communication has increased exponentially through widespread access to the Internet which Tesler (1997) describes as a bridge that connects people, organisations, vendors and customers, suppliers, and others. "The Internet is about ubiquity and interoperability. It's about everybody, everywhere, being able to communicate through standards, which are essential". (5. Tesler, L. 1997)

Interactive access to the Internet has connected the global village (6. MacLuhan M. 2001) through a virtual cyberspace world, with international communities sharing common interests, swapping information about [private] passions; multi-user communication experiences sharing information with other users. The Internet has also started to stimulate the growth of communities of interest

around products and services, which is changing the way that some consumers identify, control and ultimately perceive products at all stages of the long term lifecycle (7. McDonough, W., and Braungart, M. 2002). Indeed one of the side-effects of brand loyalty might well be an extended network of brand enthusiasts with a commitment to continuous rather than discontinuous new product purchase. Burgeoning public access with the advent of dot.com's and informal communication through virtual chat rooms, webcams, wiki's message boards, blogs, social networks and events in cyberspace enabling file sharing and the development of a 'netiquette', has brought about a significant change in the choice and selection of goods. For example user generated product reviews are being recognised as a powerful tool in converting browsers into buyers and almost everything can be found in the virtual dimension, which anyone can contribute to, from a basic manual such as www.instruction–manuals.co.uk:

'Step forward the primitively designed but invaluable instruction Manuals UK, a directory of missing manuals for almost everything from motherboards to lawnmowers. Manuals are either scanned in on-site or linked to manufacturers' websites, and if you can't find the one you're after you can leave a request on the wanted list.' (8. www.instruction–manuals.co.uk. 2007)

To www.shinyshiny.tv:

'Shiny Shiny is designed to be accessible to those interested in the latest gadgets – whether that be a vacuum cleaner or 42 in LCD screen – without being desperate to know the tech specs. Shiny's chief attraction is its video reviews, which are full of personality, enthusiasm and cosy amateurishness.' (9. www.shinyshiny.tv**.** 2007)

'Still not everyone is happy with the brave new world of user-generated content. Only recently, Arthur Frommer, founder of Frommers travel guides, questioned whether user-generated sites were the real deal or possibly "part of a calculated campaign to either promote or destroy the reputation of a particular hotel or cruise ship". The European Union shares this suspicion and from January 2008 companies caught posting bogus reviews will face prosecution. Sites that hold user-generated content are tightening up their procedures to verify their reviews. All filter out libellous comments and swear words, but each differs on how it ensures that its users' reviews are from genuine paying customers.' (10. Dodson, S. 2007)

The scale and content of social media user generated content is vast, it is revolutionising the way that businesses operate (11. Nielsen//NetRatings 2007) and the resulting information can be harnessed to inform product development; and effectively become a design utility. 'Communication is becoming a form of media consumption in useful and re-useable information'. By their very nature users actively inputting and contributing to virtual discussions have a potential value for professional activities such as design research although 'right time and right place'

issues are significant. Thus freely available user generated content can be applied to inform the design iterations of a product, to both source and drive product design for the future.

The Internet is an increasingly wide ranging source of user generated content and currently there are over 3,690,000 web pages of user discussion. (12. http://www.e-consultancy.com/ 2007)

Beattie poses a contemporary consumer dilemma:

'Whether it is a laptop or new HD Ready TV or the latest DVD player with all "essential" add-ons, how does one decide just what is best or even high quality and good value?'

And Schofield provides a counterargument:

'All purchases have an element of risk. Today, however, there is an unprecedented amount of information available online, from magazines such as PC Pro and Hi-Fi World, and from web-only sites such as Trusted Reviews and Digital Photography Review. Some shopping sites carry user reviews: this is one of the attractions of Amazon, for example. AV Forums is often useful when it comes to researching video and home cinema products. When it comes to finding out what the problems are, the best sources are often company help forums. In some cases, you can find useful external sites by searching for the company or brand name with either "sucks" or "hell". At the moment, this category seems to be led by Talk Talk, rather than NTL or AOL.

Clearly, any product with a large user base is going to throw up some problems. Dell, for example, is shipping almost 40m PCs a year, so even if 95% of its users are happy, there could still be 6m or so with significant gripes. Still, I think you are much more likely to get a realistic view of a product by searching thousands of opinions via Google than the anecdotal evidence from a bloke in a pub who heard about it from a friend. And even if you don't get the best product, you can probably avoid the worst.' (13. Schofield J. 2007)

Table 1. provides an overview of the primary forms of consumer product information.

Table 1. The Historical and Contemporary User Information Context

	TRADITIONAL PRODUCT INFORMATION	CONSUMER INFORMATION	ONLINE USER INFORMATION
EXAMPLE	Product brochure, manual	Which?/Consumers Association	Product blogs
TYPE	Promotional, positive, selective	Objective, formal, measurable	Ad hoc, broad ranging, subjective
USER CONTEXT	Passive recipient	Consulted recipient	Active participant

TRADITIONAL AND CONTEMPORARY USER RESEARCH

As discussed earlier, traditional, pre-market user research has self-defined limitations, relying as it does on predictions of perceived 'needs' and 'preferences' in advance of a fully resolved product or service, often carried out in relation to crudely modelled pilot concepts. Both quantitative and qualitative techniques are employed for such purposes but there is an increasing emphasis on the latter in the guise of focus groups. There is little doubt that such techniques in the hands of experienced researchers, can yield illuminating results which can stimulate and inform the design process and broaden the design approach beyond the personal knowledge and preferences of the design team. However, it can be argued that at best such research, relying as it does on the vagaries of concept models as opposed to the realities of functioning products, yields results that are speculative rather than substantiated.

The emergence of the Internet with the subsequent widespread adoption of broadband across the UK, has spawned notable innovations in consumer behaviour, ranging from online shopping and the consultation of detailed product information, to product reviews and price comparisons. More recently the emergence of interactive technologies has offered new opportunities for consumers to voice their interests, experiences and views in relation to other consumers and sometimes directly with companies. Table 2 provides examples of generic online consumer information sites.

Table 2. Product/Service Review Sites

FORM OF INTERACTION	ONLINE FORMAT	EXAMPLES
Pre-purchase information	Internet sites	Comparative price systems: pricerunner, froogle, kelkoo
User consultation of professional services	Portals	Google, Mozilla http://www.productsifter.com/ www.which.co.uk
Shared knowledge	Wikis	Wikipedia http://en.wikipedia.org/wiki/Review_site

User-driven content & interaction	Blogs, message boards	http://groups.google.co.uk u-tube, shinyshiny

The main online technologies that have facilitated this date from the pre-Internet days of the early 1990's, when discussion lists emerged. However, these were used by a tiny minority of usually technologically sophisticated users. Nevertheless, there is evidence that discussion frequently focused on products, albeit primarily computers. Real growth occurred in tandem with broadband expansion and the recent emergence of 'web 2' applications, with a widening of the demographic profile of users such as an extension of the age profile, a narrowing of the gender gap and a widening of the social spectrum; alongside the parallel emergence of social network lists and more recently blogs. This meant that the potential for consumer interaction lies well beyond an exclusive focus on ICT to embrace more representative consumer products, such as cars and consumer durables. Mailing or discussion lists, blogs and more recently wikis offer highly dynamic but often subjective content providing consumer interaction that, for design-related areas could be harvested as an essential element of the continuous design process.

Blogs for example were designed originally as interactive diaries allowing authors to position regular, autobiographical entries, sometimes with images, in the public domain and record chronological responses from readers. Like many Internet technologies, applications have multiplied in unpredictable ways as users experiment. A typical blog now combines text, images, and links to other blogs, web pages, and media related to its topic', the main element being the ability for readers to leave comments.

One important function to emerge latterly is the notion of the blog as a developing repository for basic information provided by individuals who share a particular interest. Some of these have thus become repositories of information and discussion around products, which can attract a range of user information which is not necessarily available through tradition channels. This can include the identification of problems, new uses, operational tips, company information, technical information, information about international product issues, discussions around the merits of competing products. The results of a MORI research study:

'….demonstrate that blogging and user generated content on the internet is already having an impact on business. More than 25 million adults in Britain, France, Germany, Italy and Spain having changed their minds about a company or its products after reading comments or reviews on a blog. A third (34%) of Europeans say they have not purchased a product after reading comments on the internet from customers

or other private individuals. Even more, 52%, they are more likely to buy a product or a service if they read positive comments from other consumers on the internet.' (14. http://www.finfacts.com/irelandbusinessnews/publish/printer_1000article_10008207.shtml Finfacts Team Nov 24, 2006)

Such resources provide the consumer with information to enhance the selection, purchase, use, upgrade and/or disposal of products and could potentially provide an investigative design resource unavailable elsewhere. This phenomenon, when appropriately applied, has the potential to change the nature of the virtuous circle relationships between production/consumption, and design/use (Figure 1)

Figure 1: The User Data Continuum as Part of Product Lifecycle Management
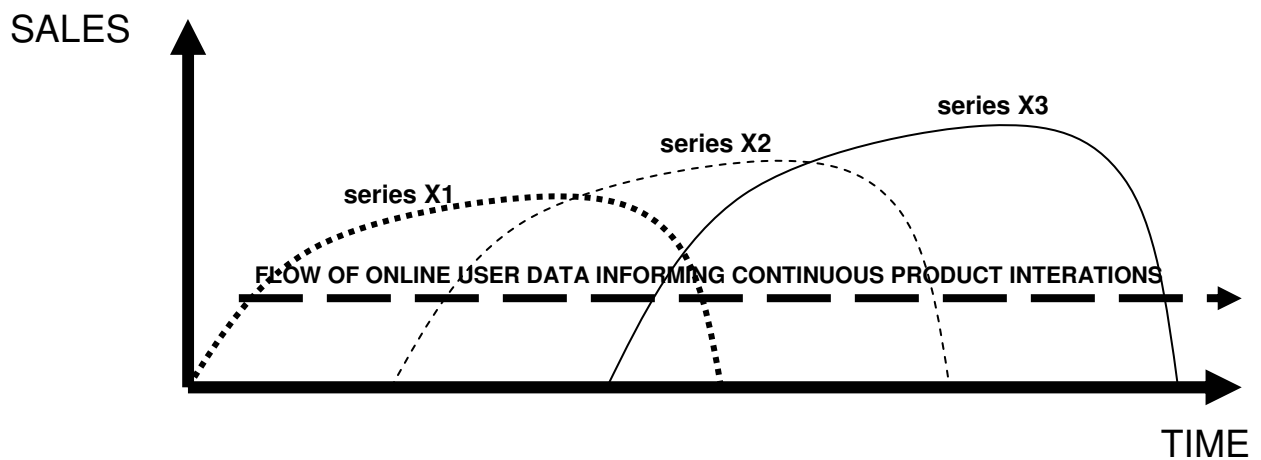
PRODUCT LIFECYCLE MANAGEMENT

The core of PLM is in the creation and central management of all product data and the technology used to access this information and knowledge. PLM as a discipline emerged from tools such as CAD/CAM and PDM, but can be viewed as the integration of these tools with methods, people and the processes through all stages of a product's life. It is not just about software technology but is also a business strategy. (14. Stark J. 2004).

There is a common pattern to the take-up and use of the Internet as a means of communication, for like all new consumer trends, it is dominated by early adopters (15. Rogers, E.1962). Lists and discussions have tended to focus on information technology, communications and digital media, rather than the wider field of consumer goods and services. There is evidence however that as

broadband has become ubiquitous; the content range has become encyclopaedic. It is further argued that not only has this had significant impact on patterns of product consumption and use, but it may also have become a valuable design resource and a unique repository of data that cannot be obtained in any other way by designers.

Currently, user/product discussions tend to be related to issues such as complexity, brand loyalty, technological and operational features and the iconic status of the product. The focus is usually on those items that are prominent in the user environment (foreground goods) such as electronic goods, entertainment products, cars and gadgets, rather than background goods such as white goods, heating appliances and built-in furniture.

EVALUATION OF ONLINE USER-DRIVEN RESEARCH – SITES, CONTENT, STRUCTURE, FUNCTION

A study of online product user discussion systems including message boards, mailing lists and blogs, revealed that coverage is patchy, unpredictable and difficult to explore systematically. For example, it is far from the case that all products have their own discussion groups, in practice it is only a select few. Apart from the prominence of the product previously discussed, the reasons why some products attract discussion groups is complex, probably multi-factorial and may include one or more of the following factors:

Commercially successful products – with a 'fan base' which likes to share it's own enthusiasms

Failing products – users who wish to share complaints and sometimes to mount a campaign for change

Complex products – such as ICT products, where complexity presents many different user options and/or challenges and where unpredicted opportunities can emerge through use

Products with a strong service provision – where users interact around service/hardware issues – such as MP3 players, mobile phones

Products with specialist functions – 'professional' or 'semi-professional' or high performance products which involve committed enthusiasts sharing information, knowledge and skills

Rapidly developing products/technologies – where early adopters wish to discuss among an informed community; the discussion can include prediction of new product development.

Highly customisable products

Products with a high level of brand status

Highly innovative or unique products

Historically significant products

The types of discussion can be divided into one, or more, of the discussion areas listed:

/ Product applications – normal and extended

/ Product selection/purchase

/ Product comparisons/competition

/ Product complaint

/ Product celebration

/ Product maintenance

/ Product technology

/ Company information

/ Future product discussions

/ Product history

/ Product performance

BEYOND THE LIMITS OF TRADITIONAL USER RESEARCH

User research is often perceived purely in terms of pre- rather than post-market research. In reality improvements to the design process could just as easily, be perceived in terms of the feedback of post-market user information (although there are identifiable reasons why traditionally companies have failed to embrace this). Prior to the advent of the Internet, such information could be difficult to come by and of limited potential. This has changed and over the past decade and communities of user interest have grown up around products which point the way towards a major change in the way that consumers learn about, evaluate, utilise and think about products. Whilst this might be assumed to have initially focussed on a limited range of 'cult' products, there is evidence that this has implications for consumption as a whole. Not least the fact that this covers both successful and unsuccessful products. As a result, there are already examples of emerging research into the field of product user Internet discourses, their focus and future development with a discussion of the ways in which they might inform the design process and supplement more well-established user research. A map of user information territories, for which the initial list of items above is the beginning of such an analysis, should be one of the outcomes.

CASE STUDY OF AN ELECTRONIC COMMUNICATIONS PRODUCT

'The Nokia E61 is a smartphone from the E series range, an S60 platform third edition device with qwerty keyboard targeting business users in the European market. As of Q4 2006 Cingular and Rogers Wireless have deployed a similar yet restricted version designated the E62 in the North American market. This model is substantially similar but without an 802.11 WiFi chipset or W-CDMA (UMTS) 3G support. On 12 February 2007 Nokia announced the E61i as a follow up product.' (16.)

The Nokia E61 mobile PDA was introduced to the European market as an extension to the existing E series mobile phones and was marketed as a direct competitor to the Blackberry range of push-email products. It established itself as a significant market success attaining the renowned PC-Pro Magazine 'A-List' since the November '06 edition. The phone is aimed primarily at business users, with 'office' type software using the Symbian operating system, which has traditionally been regarded as more stable than Windows. The E61possesses sufficiently broad functionality for an extended user spectrum and rapidly developed a committed and articulate online following around mailing lists, discussion groups and blogs. Monitoring these online resources listed in table 3 for a period of six months the user interactions have been collated in terms of their generic characteristics and resulted in the identification of a list of generic responses drawn from an analysis of product user listings:

/   The sharing of favourable perceptions and experiences of the product

/ Drawing attention to new software and advising on applications, operation and maintenance

/ Information about the development of the product line, introduction of future products

/ Individually drafted reviews of the products including both strengths and weaknesses

/ Complaints about the product

/ Difficulties in operating the product / seeking advice

/ Information about competing products

/ Discussions of design, style, visual attributes

Table 3. Nokia E61 – online user information

TYPE	WEBSITE EXAMPLE	NOTES
Company information re product	http://europe.nokia.com/link?cid=PLAIN_TEXT_118979. http://europe.nokia.com/A4344018	Company specification
Independent product comparisons	http://www.gsmarena.com/nokia_e61-1322.php	User voting system on performance, design
One site providing all	http://www.phonescoop.com/phones/p_forum.php?p=834	Reviews, shop, forum
Review site of operating system software (Symbian)	http://www.allaboutsymbian.com/reviews/item/Nokia_E611.php	User images oof interactive capabilities
Software	http://www.allaboutsymbian.com/software/Nokia_E61/	
Review	http://www.mobiletechreview.com/phones/Nokia_E6	Editors rating

	1.htm	
Product review	http://my-symbian.com/s60v3/review_e61.php	User-driven software
Product blog	http://www.nokme.com/	Contains user predictions of upgrade models
Product reviews	http://www.trustedreviews.com/mobile-devices/review/2006/06/28/Nokia-E61/p1	
Product reviews	http://www.trustedreviews.com/mobile-devices/review/2006/06/28/Nokia-E61/p1	has user grading design section, comment
Product reviews	http://www.reghardware.co.uk/2006/08/21/review_nokia_e61/	With user comments
User blog	http://www.e-series.org/nokia-e61-themes/	
User tips	http://3lib.ukonline.co.uk/tipse61.htm	
Wiki	http://en.wikipedia.org/wiki/Nokia_E61	Has additional links
Symbian overview	http://www.symbian.com/phones/nokia_e61.html	
Youthful blog	http://jake61.wordpress.com/	
Site that searches e61 blogs	http://google.com/coop/cse?cx=001216421019566702744%3Axy74tg-7dpg	

ONLINE USER CONTRIBUTIONS TO A MORE SYMBIOTIC DESIGN PROCESS

A summary of the proposed relationship between the online user domain and the design process might take the form of:

/ continuous new product development + user-generated product information = a symbiotic design process

/ A series of starting points for further research :

/ Are there parallels with the online music industry – with the interaction between fans and musicians cutting out the middle man – this is simplistic perhaps, there is still need for sophisticated marketing – the band has to become the record company.

/ User generated reviews – flights, resorts, holidays e.g. tripadvisor.com – can we learn from service-based reviews like this, to inform the process in relation to design research product terms?

/ That such a symbiotic design process would not be design by committee (17. Bowie, J. 2004)

CONCLUSION

It is proposed that design development and forecasting should include the concerns addresses in the user generated discussion lists and blogs and that there should be a wider transfer of product-based discussion lists, which could take place with the active and direct involvement of designers in such lists. This would encourage growing standards and improvements to the lists and there should be a financial incentive provided by companies for consumer involvement. It would be possible to create different models for this, which should include models for creating real-time consumer/design dialogues via the Web.

To supplement this informal information flow, companies could further develop qualitative research techniques to steer online discussions and obtain more carefully targeted data on occasion. This could even involve the equivalent of beta-products for piloting with real users on an interactive basis.

In conclusion, the availability of web-based discussion lists has provided new opportunities for product users to interact with each other, to develop and share information. Whilst this phenomenon is not yet common, consistent or even coherent in terms of the wide range of

available products, there is sufficient evidence of patchy occurrence in certain key product areas to suggest further opportunities as the Internet develops. The form that such information can take has proved to be extremely wide ranging.

In the case of products that are technologically innovative, consumer-generated information can provide more useful and extensive resources than those supplied by the producer or manufacturer. Taken to its logical conclusion, this suggests several possibilities in relation to the design process, indicating that:

/ the lists provide information about how products are viewed and used, which may not be known by the design team

/ such information might be usefully monitored over time to contribute to the continuing design process for evolving product lines

/ the value of directly in discussion

/ if the above is successful, discussion lists could be established by the producers to bring user-generated and producer-generated information together

/ this model could provide a sophisticated basis for user-centred product developmentsuch information might be usefully stimulated or augmented by designers participating

To a degree the above are already happening in specific areas of service (rather than product) provision, for example the rollout of broadband facilities to the UK public over the last three years has not been without problems or controversy. Perhaps stimulated more by frustration and complaint than positive feedback, a plethora of discussion lists has evolved, with some featuring the direct involvement of industry employees. The content of such lists is broad, ranging from the simple sharing of technical information to sophisticated political lobbying for changes to related legislation. For example, when the ISP 'E7even' decided to not honour its consumer obligations the strength of feelings by the users of injustice created a head of steam that lobbied for and achieved strengthening British law in favour of the user (18. Athow, D. 2006). There is evidence that the industry has begun to monitor such resources in order to diagnose emerging problems and to gain informed feedback about its services that could not be gathered in any other way. Some of the more advanced services in this area are not the established companies such as Sky or BT but those companies that have emerged from within the Web itself as web-based services. Skype, the online telephone company has several connected discussion formats and even an

interactive journal 'Skype Journal' http://skypejournal.com/, which provides 'Independent News, Views and Service' in the form of a blog that provides informed comment on all aspects of the service together with an ability to record comments and discussion – both positive and negative. A recent example of the way the blog is used to collect design information was the 'Skype Driving Contest' which sought to elicit speculative user views on the ways in which the service might be transferred to in-car use:

Table 4. Example of the Questions Used to Elicit User Design Feedback

'What UI and features would you want for a car-based Skype?
What Skype Status states or mood text would you set and share?'
Assume:
displays in the central console
cameras pointing inside the car
cameras pointing outside/around the car
wireless broadband
bluetooth
access to whatever electronic information your car produces
Be the first responder in your time zone to leave a comment and win a Skype wifi phone bundle.

The above effectively represents a low-cost, rapid method of obtaining informed user opinion across An international group of Skype users, data that would be much more difficult to obtain using traditional market research methods. Further possibilities to generate user feedback are available by using the result of this pilot on the internet for further discussion amongst the journal readership.

'WIKID' DESIGN RESEARCH APPLYING ACTIONABLE KNOWLEDGE

The notion of wiki collaboration could also be applied to the user/industrial design research domain, in the form of 'Wikid' processes. Thus 'Wikid' Design Researchers could link-up, work with and alongside, those involved in the latest developments taking place across all sectors with an interest in user generated interaction. Key areas where diffusion could be highlighted would be business, marketing and particularly computing, where knowledge generated by researchers developing the technologies to capture and improve two-way researcher/user which can be applicable to design research:

'Everyday websites attract millions of visitors. These visitors leave behind vast amounts of Websites traversal information in the form of Web server and query logs. By analysing these logs, it is possible to discover various kinds of knowledge, which can be applied to improve the performance of Web services. A particularly useful kind of knowledge is knowledge that can be immediately applied to the operation of the Websites; we call this type of knowledge actionable knowledge**.' (19. Yang, Q. Ling, C.X. and Gao, J. 2006)

Hypertext visionary Ted Nelson observed: 'Once we leave behind "two-dimensionality" (virtual paper) and even "three-dimensionality" (virtual stacks), we step off the edge into another world, into the representation of the true structure and interconnectedness of information. To represent this true structure, we need to indicate multidimensional connection and multiple connections between entities.' (20. Nelson, T. H.1990) Nelson proposed 'wormholes' for his Xanadu project but as Davis observes: 'the fact that it remains vapourware after decades of research, indicate that such representations are still something of a holy grail.' (21. Davis, E. 1999) However great strides are being made in capturing, tracking and Web mining, which informs the system designers for their next system improvement; it would be appropriate to harness and apply these skills to meet the requirements of the 21st century product designers. Wikid Design could investigate and apply the latest thinking and applications available to refine and enhance accuracy in gathering information including web: 'mining techniques to help users navigate and explore the Web by building taxonomies, directories and portals' and ' use mining to help build information processing systems, which allow users to make targeted queries on the Web. Examples of such systems include search engines, comparison shopping sites, data integration systems, data warehouses, and the emerging peer data management' (22. Yu, H. Doan, A.H. and Han J.W. 2004)

Wikid Design Research could also include the principles propounded by McDonough and Braungart, in 'Remaking the Way We Make Things Cradle to Cradle' their approach to product design being that after their useful lives the product provides nourishment through 'biological nutrients' or 'technical nutrients' 'that will continually circulate as pure and valuable materials within closed loop industrial cycles rather than being down[re]cycled' (23. Mc Donough, W. and

Braungart, M. 2002). So, gathering and applying user generated information a virtual/virtuous circle is created as a never ending source of cyber information. Wikid Design Research, like the variation on a management virtuous circle below, is based on the take-up of goods, satisfaction, competence, service delivery, loyalty.

Figure 2. A user discourse virtuous circle
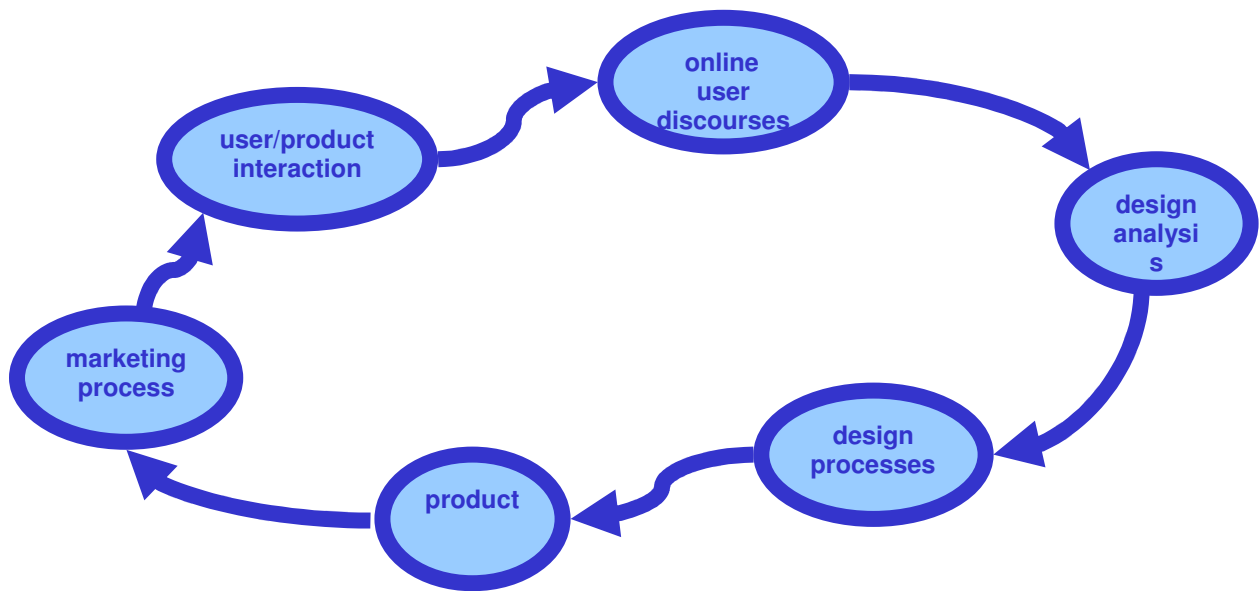
An example of the way that such thinking might be incorporated into commercial practice can be seen in the case of the global player IDEO, with a professed 'buccaneering spirit and radical instinct' IDEO is one of the largest and most successful design and development companies due to its culture of innovation, which includes transferring the best practice from business strategy to product design. Tim Brown CEO states that 'IDEO has gone down a new road, bringing disciplines together in new ways, creating entirely new disciplines, reinventing the whole notion of what industrial design is all about. As far as I'm concerned, that process will continue and accelerate over the next few years.' (24. Myerson, J. 2004)

Finally, Katz neatly summarises the new potential afforded by improved design/user communications:

'The most significant aspect of the transformation of design has been the growing recognition of the partnership of designer, client and end user in the success of a product. This continuum is where the greatest strides have been made and where the greatest challenges are still to be found.' (24. Katz B. 2004)

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