Directly Proportional

Design And Technological Advancement

Stephen T.F. Poon

Taylor's University

sfsunlimited4all@netscape.net

ABSTRACT: This paper unites directly proportional aspects of technology relevant to the present and future of the design industry by considering several standpoints. First, the changes to design, user experience and user interactivity wrought by new technological imperatives; second, the challenges of designing for multi-platform technologies; and lastly current issues affecting the design industry's competitiveness via members' perceptions of innovations, for instance, software applications (apps). Situational analyses, a survey and illustrated case studies were used to better identify capitalisation of user experience and user interactivity, and how user imperatives create favourable conditions which supports the industry's own virtuous cycle. By tapping into the mind-set of the new generation of designers, the paper points out the design industry's adaptation to new media, digital and 3-D technologies, underlining what designers themselves perceive of the importance of user experience and user interactivity. Key findings may urge designers to re-evaluate their current position and innovate in staying vital and viable for the longer term. With the prospective technological onslaught, opportunities for greater audience engagement presents itself, pushing designers to acclimatise themselves to the range of possibilities offered by new visual technologies such as augmented reality that seamlessly blends entertainment, self-invention, and immersive screen experiences.

Keywords: Technology, Design, Software, Augmented Reality, Digital

1. INTRODUCTION

With rapid proliferation of media technologies in the post-liberalisation era, every aspect of life has undergone considerable change. Current technological possibilities are redefining our way of living and communicating and just as significantly, changed the face of design. Society continues its symbolic embrace of such changes in the name of ease, speed, portability, affordability and efficiency.

The design industry emerged during the Industrial Revolution and expanded from there. Significantly, the progress of design as a cultural art form had taken off in untold ways with the introduction of computers in the 1980s. Simply, the digital revolution electrified designing. Much of the data and artefacts that once were captured, produced, published compressed, retrieved and distributed using print, is now digitalised, saving resources, time as well as physical storage space.

Too, design is now primarily outsourced to the computer via software made available by Adobe Systems. Knowledge of Adobe Photoshop, Illustrator, InDesign, etc., gives designers endless possibilities on what they

wish to create. From colour correcting a photograph to book layouts, digital technology makes it possible to undertake processes previously performed in manual fashion.

Media too has gone digital. Magazines and newsprints begin life on computers today; some are published digitally on the Internet. As design and technology mutually intertwine, software development has spawned advanced programmes that allow porting over for many types of new media. As commercial new media flourish, sustaining audiences' attention is pivotal.

Without a doubt, technology and design must saunter hand-in-hand in the age of rapid advancement. With the boundaries of once-inaccessible resources removed, a global digital information storehouse exists where much of what designers seek to know is now readily available and easily shared among professionals, some who leverage on it to self-publish their profiles or discourse on their works, or to seek better job opportunities.

The next stage of graphic design and interactive design – is likely to be way forward. While message and content remain critical, the very experience of interacting with design would make media and cultural products attractive and inherently valuable. As new media producers battle to stake their claims on consumers, spatial interactivity is the new kid on the block. Three-dimensional and augmented reality software is two such design technologies which enable designers to communicate and bring different experiences to audiences, although wider implementation has yet been achieved.

This paper discussed the directly proportional relationship between technological advancement and design, and the implications of technology on design. The incessant need for pragmatic, web-based user interface, as will be argued, makes design an imperative. For upcoming designers, the battle lies chiefly in the challenges they encounter when designing across multiple platforms, and to consider whether current visual technologies such as applications and augmented reality could really sustain consumer and commercial interest in the future.

2. LITERATURE REVIEW

This section provides a pragmatic framework to discuss some aspects of technological applications in the new media sector. Computers were a supreme inspiration upon the face of design. Even early on, the use of a computer to aid in designing was both simple and precise (1). Consumer-grade computers entered the scene in the late 1980's. A plethora of new technologies were being introduced at that time, including 3.5-inch floppy drives (which paved the subsequent way for DVD's and Blu-ray discs) and Apple's Macintosh. Portable hard drives are now capable of storing up to three terabytes of data, saving on physical storage space.

Similarly, data can now be compressed into very small space; it can be accessed at very high speeds and in non-linear ways. At the same time, it can be manipulated far more easily than analogue forms (2). Complementing this development has been the relentless invention of storage devices which enable users to be more flexible about distributing and archiving their works.

Manovich identified new media as comprising the Internet, web sites, multimedia, games, CD-ROMs and DVDs, virtual reality, as well as computer-generated special effects (3). Other cultural products which use computing for production and storage but not for final distribution – chiefly television programmes, feature films, magazines, books and other paper-based publications, etc., are not defined as new media.

Designers started using computers to reach visual perfection even as they scouted for new methods for improving work efficiency. The computer is a very precise tool. As software suites such as Adobe Systems'

Photoshop, Illustrator and InDesign came into play, designers happily welcomed these tools, which are akin to a digital darkroom that functions in multiple modes - image editing, vectoring, software publishing, performing menial documentation tasks, and more.

Computers aid in work processes once wrought by hand. With app tools enabling experimentation, designers are not expending long hours as they once did in a darkroom developing photographs or adjusting leading by hand. Limitless software settings and programme options mean designers now have digital technology as a tool and ally (4). Software used on computers gives designers the means to create, manipulate, erase and experiment with. It is not news anymore that more and more designers are coming up with "something distinctive, or useful, or playful, or surprising, or subversive or somehow memorable" (5).

Other than the invention of the computer, the Internet also plays a large part in design. Created initially for military purposes in the late 1950s, it didn't gain public face until the undertakings of British scientist Tim Berners-Lee, working for the European Organisation for Nuclear Research (CERN), who created the World Wide Web in 1991 (6). The Internet itself is considered a new media, being digital, interactive, hyper-textual and virtual, networked and simulated (7). With this symbolic shift towards the production of user-generated content, designers seek to heighten their inventiveness in more ways, with various inspired schemes and permutations: creating sites or blogs, mash-ups, motion graphics videos, or apps.

Virtually every creative endeavour becomes an experience-sharing platform as the Internet is a veritable resource haven for downloadable articles, free images, tutorials, etc. Top designers now blog about their work and share them with their peers, advancing the learning process (8). The Internet spawned blogs, websites, social networking, video sharing sites and more, all which require user interfaces. User interface isn't just about simplicity in terms of functionality; it is a tangible experience encompassing pleasing design aesthetics.

User experience, on the other hand, is the key to commercialising a product, as evinced in some of the best-selling gadgets today. Smaller technology such as smartphones and tablet computers had proven over a short time in the market, that in many cases, the small things do matter. American company Apple, Inc., by creating revolutionary products, has changed the face of mobile technology, fuelling the growth of application (or app) design for gadgets. The Apple i-Pad, a portable, multi-touch tablet computer which was released in 2010, is decidedly one such contrivance. Mingling admiration and adulation, consumers are drawn to its simplicity and convenience. Its level of interactivity – the use of one's fingers to lightly touch the screen – gives it a certain intuitive, enjoyable depth in the sense that users feel they are part of the app.

Motion graphics and interactivity are natural attention-grabbers. This connection was explored by Preston E. Lee in *"Will the i-Pad change the way you design?"* (9), producing intriguing responses. Designing for apps may involve a different set of rules of design today, but these apps do not adhere to a static orientation such as found on normal computer screens. The tool allows flipping from vertical to horizontal viewing and vice versa, changing orientations as designers adapt apps to improve on readability as well as functionality, and to fit multi-platform functionality. Two instances would be the i-Pad and the iPhone. They share similar app features between them, even though one is an 11- inch tablet and the other, a 3.5-inch smartphone.

Consumers craving for visually immersing experiences perceive 3-dimensional (3-D) design as a dream come true. The popularity of this format has seen the advent of movies which are filmed and rendered in 3-D.

Televisions and computer screens are following suit. It generates lively discussion among those who are interested to see what graphic design will evolve into, as 3-D technology becomes *de rigueur* for a variety of purposes. A series of new communication design experiences cannot be far off. But while 3-D technology is still nascent, an often-cumbersome experience with the use of special glasses, augmented reality is not.

At Obscura Digital, technology that involves video-mapping the entire façade of a building, or an immersive video dome that allows viewers to step into a colossal virtual environment, have garnered massive responses. The audience experiences an all-encompassing sensorial stimulus via this video installation.

The video dome has been described as an idealised vehicle of audience capture: a "360-degree, ultra high-definition visual experience combined with surround audio, projection and interactive capabilities" (10). One other selling point of the video dome is that content is generated live. Video streams, images and the like, are elevated for viewers' pleasure, thus the media enables design to surpass space limitations. An illustration of the implementation of the video dome is found in the *YouTube Symphony Orchestra* (YTSO) performance series (11), with Carnegie Hall in New York decked out with 8 projectors, covering the entire inside of the hall. Visuals, projected onto the walls and ceiling while the orchestra plays live music, signified a departure from classical traditions, offering a new way of appreciating classical music with a touch of technology. Such absorbing interactive technology to promote, say, a tourism campaign, is a most appealing idea.

With live design possibilities in the near future, an abstraction of this form of still-unfamiliar technology is already seen in large, multi-touch screens, featured in the 2002 film, *Minority Report*. These multi-touch screens are already implemented in shopping malls, public spaces and at home as custom-fitted interactive walls. For designers, the marketing, technical and social implications of these large-scale interactive units are immense, as the notion of borderless design takes grip.

Similar to multi-touch screen technology is Microsoft Surface, offering a host of multi-touch functions, along with the ability to pull out information from Windows-based smartphone. Placing the phone on the touch screen surface, one can drag and drop data onto the screen. Obscura Digital's experimental works involve the use of real time presentations, and the presenter interacts with graphics projected in front of them. To the audience, the graphics are indeed floating in front of the presenter. Others try to demonstrate its capabilities, as exemplified by the edutainment TV series *Science of the Movies* (12). However, it has yet to enjoy categorical acknowledgement as true hologram technology; for now, it is deemed as nothing more than an optical illusion.

Augmented reality is a term for a "live direct or an indirect view of a physical, real-world environment whose elements are augmented by computer-generated sensory input" (13). It offers the novel experience of interacting in real time with computer graphics.

A case study example is Esquire magazine's *Augmented Reality* issue. Readers purchase the magazine in order to access the augmented reality app available for download at Esquire's website (14). The two-dimensional Quick Response (QR) Code, a square grid with encoded data on the magazine's front cover is scanned with a smartphone or tablet to activate the app.

Feature editor of *PC Mag* Eric Griffith serves as host in this interactive, digital form of the magazine. Tilting the front cover marker causes the app to change views and reveal different content depending on the tilt angle. Griffith himself is depicted in an augmented reality environment. Readers may immediately respond to

the content, as QR codes are strategically placed with articles, directing the browser to video links, music attachment, commercial links, or additional information.

According to Esquire (15), apps range from advertising to architecture and gaming to pizza companies, but no one had taken advantage of the technology on any kind of editorial scale until they thought of it. The uniqueness of turning a magazine into an interactive app confounds as much as it startles. Is this the end of printed magazines? A virtual magazine has several advantages over one printed on paper; music tracks, music videos, video commercials and other types of media that require motion graphics can be brought to the viewer with little hurdles. Furthermore, a virtual magazine saves on paper and printing costs.

As these discussions and cases illustrate, screen technologies and augmented reality have come full circle into the realm of respectability. They are being accepted as media in their own right. However, with every effort of technology-based industries to differentiate through innovation, new media has a long way to go in spite of exponential growth, and thus much research and development is cut out for content producers and hardware designers alike, to augment their knowledge and find more resourceful ways to engage users without compromising the core objective of business, i.e. profitability and returns.

Some hypothetical questions are put forward here: How much will designers have to adapt to evolving new media technologies that seem in a state of transient haste to mature and gratify? Will this transformation be for the better or the worse? Finding answers to these would help provide a deeper understanding of the role of technology in drive design innovation practices. The following section on methodology of research enumerates the specific information sought in order to generate insight from among local designers.

3. RESEARCH METHODOLOGY

The findings in the following section were based on a quantitative study conducted among 20 junior graphic designers and interactive designers between the ages of 20 to 24 years. The survey was carried out electronically via surveymonkey.com. While respondents may represent a limited skew of perspectives, the researcher's intention was to overall understand designers' views regarding the proportional relevance between design technology, user interactivity and user experience. The opinion-based skew of questions asked in the survey draw directly on their perceptions of where graphic design could be heading. Survey questions focused primarily on the views of graphic designers and interactive designers on the indicative implications of technology on design. Participants were required to answer eight questions. The response rate was 100%.

For the first question, viz. *"Do you think user interactivity makes a difference in design?"* and the second, *"Do you believe user experience is important in design?"*, 100% of the participants replied yes, respectively. Responses substantiate the author's leading argument that user interactivity and user experience are linked when birthing design concepts for technology products. Both these elements contribute to an experience that endures. Including the audience in design interaction makes them feel part of something special, retaining their attention. Whether it is a product, a website or an advertisement, a similar approach to audience engagement can be applied and customised**.**

The third question asked in the survey, *"Do gadgets such as Apple's i-Pad change the way we approach design (for example, in designing for interactive apps)? If no, why?"*, 100% of respondents answered yes, with one giving a reason for concurring. The respondent said that since Apple's i-Pad and iPhone products were

launched, other brands - namely Samsung - have sharpened their own designing capacities, with a well-groomed range of tablets and smartphones. This adaptation demonstrates the influence held by leaders of design simplicity, where customer experience and user friendliness of a leading producer are copied by its competitors.

To prove the veracity of such opinion, a comparative analysis is seen with Figure 1 below. Samsung released an Android-based smartphone, the Galaxy S II to rival Apple's iPhone 4. At first look, we are presented with tangible, stark similarities between the two. The Galaxy S II follows the same candy bar layout of the screen front of the iPhone 4; a single physical button nestles at the bottom of the screen. Other similarities include a similar-sized capacitive touchscreen display, with a clean rectangular chassis design robing the sleek black glossy exterior.

To explain this reverential imitation: Apple, conceded the brand leader in the smartphone and tablet market, becomes a singular model of all that impeccable design should be; thus, rival brands trailing closely behind may adapt or borrow similar elements and design features from successful products in attempts to emulate the former's success.

Figure 1 Matchup – Samsung Galaxy S2 vs. iPhone 4

"*Do you agree designing across multiple platforms poses a challenge to designers?"* was the fourth question in the survey, of which 100% of respondents concurred. Multiple platforms require different layouts depending on how large the display screen is. Apps running on an i-Pad which feature a significantly larger display than an iPhone, for instance, will require higher resolution graphics as well as larger onscreen controls.

In the author's view, the added challenge presented is that of making layouts look pleasing in both vertical and horizontal viewing situations. A layout that works in the vertical setting may not work as well or as comfortably as it should when viewed horizontally. Moreover, the difference in operating systems would involve much thought on planning and decision-making for the designer and technical engineers as well.

The Figure 2 below is based on question five from the survey conducted. Respondents were provided the following statements: *"Technology keeps advancing and has given birth to new media such as augmented reality. It combines both interactivity as well as an immersing visual experience*. This was followed by the question: "*Do you think that augmented reality will be the next big thing?"*, it was found that 80% of the designers surveyed agreed, while 20% disagreed.

As had been stated, the notion of augmented reality as they next trend in new media design seems imminent. Though this line of inquiry is subject to the individual's understanding of augmented reality and how

it works, a majority of respondents concurred that augmented reality is waiting on the wings to become 'the next big thing' in visual experimentation, in the footsteps of 3-D.

In spite of its charms, 3-D is nevertheless limited to a strict screen experience, while augmented reality allows audiences to walk through and immerse themselves in the semi-virtual environment. Certain types of augmented reality do not require special glasses or head gear in order to view the projected visuals, as in the case of Obscura Digital's video dome and video-mapping tactics mentioned earlier in the literature section.

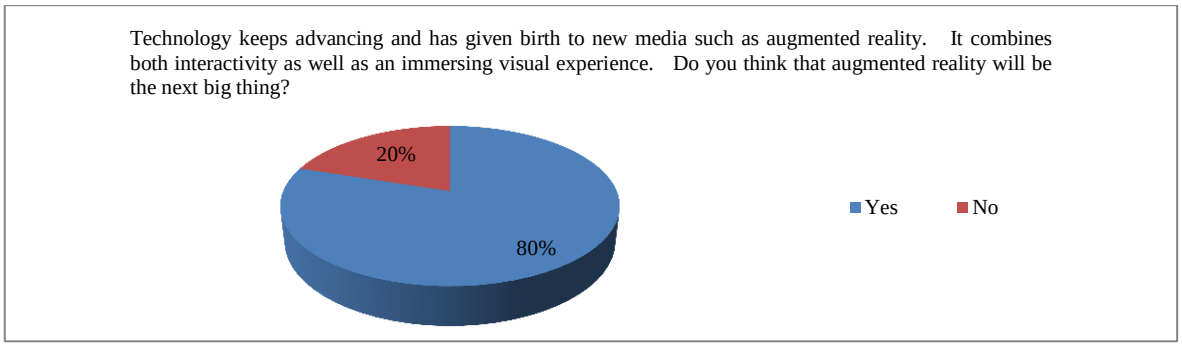

Figure 2 Shown Above is a Pie Chart 1 of the Survey Results

Question six invites respondents to take a stand in their perceptions about the potential for augmented reality among target audiences. The question posed as follows: *"Do you think augmented reality will bring a new experience to the audience?"*, 100% of respondents answered that it will. Being relatively new, this technological innovation has not been fully developed. Computer-generated graphical environments that can be integrated with other solutions to enhance sensorial perceptions are on the verge of creating new types of visual and display experiences, and augmented reality looks set to serve its audiences better.

The seventh question was aimed at the designers' view on the evolution of graphic design in general. *"Graphic design has evolved from print media to digital and new media. As it advances through the years, do you agree that it has taken a turn for the better?"*, 100% of the respondents agreed it has indeed taken a turn for the better.

From this survey, it may be remarkably apparent that the new generation of designers are geared towards preferring forms of graphic design that have evolved and integrated into digital and new media.

This finding correlates with the psychographic segmentation of the current generation, and is borne by previous research. As a demographic whom Marc Prensky has referred to as digital natives (16), younger designers exhibit certain observable, evident behaviours and traits, the most obvious being their perspicuity towards, and appreciation for, the digital language. As "native speakers" (17) of computing semantics, video games and the Internet, digital natives are born into the information age, raised with computers, and have a high degree of intuitive familiarity with the Internet and all aspects of digital culture. This characteristic differentiates digital natives from "digital immigrants" (18) - those who were not born into the digital world but have, at some later point in their lives, become fascinated by, and adopted many or most aspects of, the new technology. Inevitably, however, the latter will bear many comparisons to the former.

Figure 3 below relates to the eighth and final question presented to respondents. To the question, *"Do you think graphic design will survive as it is now or will it adapt into something new?"*, 90% of the respondents said that graphic design will adapt itself while the remaining 10% disagreed, stating that it will survive in its current form. While opinions derived from respondents may be viewed as counter-optimistic about the industry's survivability, it nevertheless shows that where digital natives are concerned, a majority of designers believe that graphic design would be constantly evolving, and although future evolutions present ambiguous opportunities, the fields of practice for both graphic designers and interactive designers would demand a shift in mind sets for the changing times ahead.

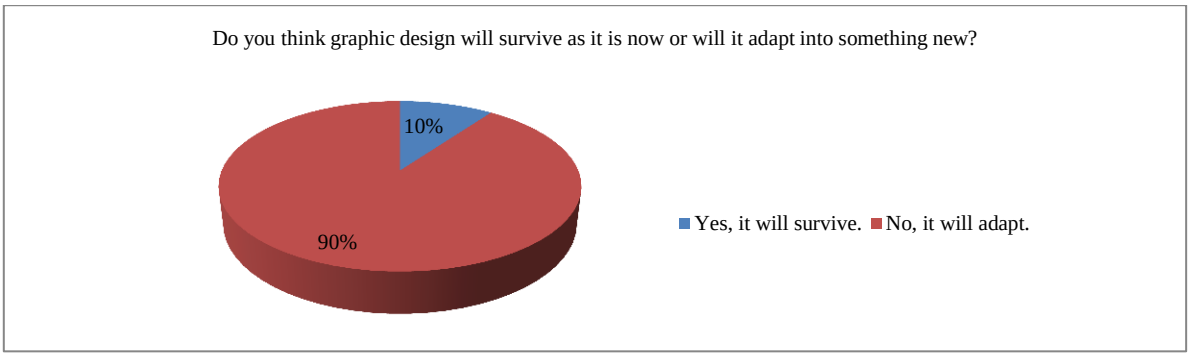

Figure 3 Shown Above is a Pie Chart 2 of the Survey Results

4. FINDINGS AND DISCUSSION

Technological advancement has arguably pushed design forward. Design adapts itself through each trial and revolution within media practices, from print to digital and new media. Apps attain recognition and respect from users, clients and reviewers alike when the design element is a part of its core appeal. To help uncover the imperative of this appeal, a small sampling of young designers in our survey yielded clearer insight about the link between user experience and user interactivity.

Analysing the data from questions one, two and three, it was observed from survey findings that user experiences have a bearing on user interactivity imperative. To further discuss how apps allow real time interaction between users and the media, we now present case studies on two virtual book apps, namely *Alice in Wonderland* and *The Fantastic Flying Books of Mr Morris Lessmore*; the former which has transfigured from an ordinary children's print classic, while the latter, an i-Pad app based on the short film. This is followed with a discussion on a game app which has enjoyed frenzied success: *Angry Birds*.

By cleverly capitalising on user experience and user interactivity, i-Pad books enchant its audiences, young and old. Storytelling aside, the audience participates in the events and witnesses them happening. Figures 4.1, 4.2 and 4.3 are screenshots of the *Alice in Wonderland* app in action (19).

To engage with characters on the page, readers touch various objects or toggle their i-Pads, enabling views of different pictures and scenes. *Alice in Wonderland* was launched to good reviews: the entertainment element that came with user experience and user interactivity worked well together.

Figure 4.1
An Interactive Scene from the Alice in Wonderland i-Pad Application

Figure 4.2
The illustration of Alice Grew Larger in Accordance to the Story

Figure 4.3
Alice's body Collapses or Elongates Depending on Which Way the i-Pad is Tilted

Another media noted for interactivity between user and app is *The Fantastic Flying Books of Mr Morris Lessmore*, based on the illustrated picture book and award-winning short film of the same name. With Alice, different illustrations are nudged around, stirring and moving all over the screen. *The Fantastic Flying Books* app uses scenes from the film itself (Figures 5.1, 5.2, 5.3).

The interactivity element of the book characters is more direct and explicit to users. Figures 5.1 and 5.2 shows the effect of swiping across the screen to make the character's books 'fly away' in a hurricane-like wind; the character simultaneously reacts to the gust, his hat flies off with the books, and he struggles against the wind through realist body language.

Figure 5.3 provides a view of how the app includes a small section of piano keys along with the recognisable music score of *Pop Goes the Weasel*. Readers play on the keys as part of 'reading' the book, heightening the effect of its stunning art direction, a throwback to the art style of Pixar's feature animations (20). Creatively blending an illustrated picture book and animated short film, the app for *The Fantastic Flying Books of Mr Morris Lessmore* is at once a sublime treat for its audience, and a testimonial of design's ingenuity.

Figure 5.1

Figure 5.2

Figure 5.3

The i-Pad has changed the way e-books are designed. The effortful labour of fitting words onto printed media is passing; today, moving graphics and interactivity is the narrative, giving a new twist to the adage, 'a picture is worth a thousand words'.

As these apps prove, lengthy paragraphs and traditional rules of literacy could soon evolve, as e-visuals tantalise readers into self-interpretation. Merely appreciating design is not enough: interactive design focuses more on behavioural aspects to satisfy the needs of its users.

From these e-book apps, we could deduce that perhaps we are in the midst of the latest stage in a virtuous cycle of cultural product development; technology innovators, designers and content creators must now abide by consumers' wishes for greater user interactivity.

Whether this progression is gainful was one of the questions asked the sample group of young designers in our survey, and they believed the case was so. While this conception may be biased, the evidence is emerging that design has taken a turn for the better.

From a researcher's point of view, print media which has played substantive past roles would need to keep step with technological advancement. Print media and publishers who refuse to adapt to changing times and embrace new communities may perish; and thus, adaptation and assimilation is necessarily applied to design in general, and particularly with interactive-based technologies. Design's survivability is higher if it successfully transcends different mediums, as it has done through the ages, from art to sculpture to product development and architecture. 3-D design and augmented reality themselves were once far-fetched notions, but have gradually proven their worth.

A majority of the surveyed designers believe that design will adapt, and the author avows this assertion. Interactive design, interactive sites and apps demonstrate the vitality of design culture, but with lesser attention span, nevertheless, the need arises to enhance user interaction to capture their attention.

One highly successful and impressive app which has been lauded around the world is *Angry Birds*. Along with a basic game play, the birds are endowed with different abilities. As each level increases in difficulty, the solution complexity (finding the green pigs' hideout) increases, whiles the number of birds drastically reduces.

Exactly why is *Angry Birds* so addictive? The answer lies in its distinctive, easy to learn, yet engaging interaction model. Users quickly develop a mental model of the game's interaction methodology, core strategy and scoring processes (21). Mischievous little birds packed with clever behaviours are used to expand players' mental model. The game strategy component produces incremental increases in problem/solution methodology as the game level complexity increases (22). The birds' flight trajectory could have been quickened, but this does not occur. Instead the birds are shot across the sky at a leisurely pace, heading for the pigs' glasshouses. With slower response time and a carefully crafted flight path, one huge problem for user interfaces is solved: error correction.

A majority of software user interfaces have little consideration for how users can be taught by experiencing the system to improve their scoring performance (23). In *Angry Birds'* game play, the pigs take a long time to expire once their houses are shattered to bits. In some sequences, seconds are consumed as the pigs teeter and roll off planks or are crushed under slow falling debris.

Although at first players maybe frustrated, they plunged into the crucial stages with high anticipation. The developers created a smart response time to allow players to deliberate and plan the next shot, the bottom line being: fast is good, clever is better. Gripping players' attention is a clever strategy, borne of analysing user behaviour. Avid *Angry Birds* buffs spend hours focusing on the game. Who could have known a game about birds and pigs would be so popular?

5. CONCLUSIONS

In progressing, designers have to embrace new forms and create more unique experiences. The boundaries of design need further debate and contemplation as users seek greater interactivity. New media gives audiences opportunities to feel like they are a part of something bigger. Via apps, for instance, users could change the course of the narrative, interpreting and inventing as they went along. New visual engagement tactics – for

instance, blending graphics with gestures, once an unthinkable feat that resided mainly in film fiction provide new vistas of technological design that will produce a new generation with unique skills of adaptation to indefinitely changing modes of design work and design function.

They are part of the larger transformation of the design world, a process which embodies the concept of the global village in its core practices, the consequence being greater degree of inventiveness and an open collaborative spirit between the two fields – a requisite for the betterment of both.

Augmented reality marks a new paradigm for the design world. Differing from virtual reality, which is simulation that substitutes for reality entirely, augmented reality offer full visual immersion. The stage is set for a revolution in communication design as augmented reality bring audiences into the narrative via video feeds and surround sound audio in a spatial environment, reality is altered, not replaced.

It is already in use on television: sports and news channels utilise this feature to relay scores or stream live news footage. This nascent technology may soon be the fourth dimension of human visual experiences, with interactivity as the added element. It enables a larger configuration of persons to experience it, with a few projectors and proprietary software. From small screens and even onto building façades, stunning visuals can now take the shape of the entire edifice or building.

The study reviewed how the Internet changed the face of design, the user experience and user interactivity imperative, as well as the challenges of designing for multi-platforms. A discussion on future technology and design raised questions on where new media technologies could be headed, shaped by design. The prevalence of the former will continue to inspire designers to adapt, as they share an unfettered bond of mutual reliance.

Design and augmented reality are already merging to create novel interactive concepts, signalling the centralising role of the designer as producers of these cultural art-forms. Apps render fresh challenges: designers must discern market factors: for whom apps are designed, and for what purpose. Over-complicated designs and impractical interfaces would obviate the potential success of these products.

With consumers racing each other seeking for "what's new", we are moving towards technological applications as envisioned in fiction; a case of life imitating art, indeed. In time to come, more interactive design embracing newer modes of technology such as interactive holographic displays would be evident. Some believe that spells demise for graphic design and designers. So long as the need for authentic human interactivity advances, so long as the vision to invent invigorates us, design will live on.

6. REFERENCES AND CITATIONS

(1) Kelsall A. *The Impact of New Digital Technology on the Nature of Graphic Design: The Digital Designer* [Internet]. 2001 Oct [cited 2013 January 29]. Available from: http://www.andrewkelsall.com/the-impact-of-new-digital-technology-on-the-nature-of-graphic-design-the-digital-designer.

(2) Lister M, Dovey J, Giddings S, Grant I, Kelly, K. *New Media: A Critical Introduction*. 2nd ed. Oxon/New York: Routledge Publishing; 2009.

(3) Manovich L. *Introduction: New Media from Borges to HTML.* N. Wardrip-Fruin and N. Montfort (eds.) Cambridge, MA: MIT Press; 2005.

(4) Kelsall A. *The Impact of New Digital Technology on the Nature of Graphic Design: The Digital Designer* [Internet]. 2001 Oct [cited 2012 December 23]. Available from: http://www.andrewkelsall.com/the-impact-of-new-digital-technology-on-the-nature-of-graphic-design-the-digital-designer.

(5) Helfand J. *What is Graphic Design?* [Internet] 2013 [cited 2012 November 17] American Institute of Graphic Arts (AIGA) Available from: http://www.aiga.org/what-is-design/.

(6) Bernes-Lee T, Fischetti M. Weaving the Web: The Original Design and Ultimate Destiny of the World Wide Web. San Francisco: HarperCollins Publishers; 2000.

(7) Lister M, Dovey J, Giddings S, Grant I, Kelly, K. New Media: A Critical Introduction. 2nd ed. Oxon/New York: Routledge Publishing; 2009.

(8 - 9) Lee PD. *Will the i-Pad change the way you design? Design Blender* [Internet] 2010 Jan 28 [cited 2012 October 11] Available from: http://www.graphicdesignblender.com/will-the-apple-ipad-change-how-you-design.

(10) Obscura Digital. *Obscura* [Internet] 2013 [cited 2013 February 04] Available from: http://obscuradigital.com/.

(11) YouTube. *An Obscura Digital Surround Projection System at Carnegie Hall with Michael Tilson Thomas and the YouTube Symphony Orchestra*. 2009 April 16 [cited 2013 Feb 25] Available from: http://www.youtube.com/watch?v=ngkESyNMSY4.

(12) Science of the Movies. *Discovery Communications* [Internet] 2013 [cited 2013 February 25]. Available from: http://science.discovery.com/video-topics/sci-fi-supernatural/science-movies.htm.

(13) Kipper G, Rampolla J. *Augmented Reality: An Emerging Technologies Guide to AR.* 1st ed. Missouri: Syngress Publishing; 2012.

(14) PC Mag. Griffith E. *Augmented Reality: The "New" Virtual Reality.* [Internet] 2012 Feb 25 [cited 2012 September 5] Available from: http://www.pcmag.com/article2/0,2817,2400655,00.asp.

(15) Esquire. *Welcome to the Esquire Augmented Reality Issue*. [Internet] 2013 [cited 2012 August 30] Available from: http://www.esquire.com/the-side/augmented-reality.

(16 - 18) Prensky M. Digital Natives, *Digital Immigrants*. [Internet] On the Horizon 2001; 9(5) Oct: 1 [cited 2012 July 22] W. Yorkshire, UK: MCB University Press. Available from: http://www.marcprensky.com/writing/prensky%20-20digital%20natives,%20digital%20immigrants%20-%20part1.pdf.

(19) YouTube. *Alice for the iPad*. 2010 April 12 [cited 2013 Feb 27] Available from: http://www.youtube.com/watch?v=gew68Qj5kxw.

(20) YouTube. *The Fantastic Flying Books of Mr Morris Lessmore i-Pad App*. 2011 Oct 11 [cited 2013 Feb 27] Available from: http://www.youtube.com/watch?v=nmxuhGF1yj8.

(21 - 23) Mauro CL. *Why Angry Birds is so successful and popular: A cognitive teardown of the user experience.* [Internet] 2011; Feb 6 [cited 2012 May 06] Available from: http://www.mauronewmedia.com/blog/why-angry-birds-is-so-successful-a-cognitive-teardown-of-the-user-experience/.