Development of New Methodologies for User-testing of Technology Products

Isil Onol, 2009 Fellow
Dates of Fellowship: 8 August to 24 September 2010
Countries Visited: USA and Canada
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Itinerary

Boston (A): 8 August – 12 August  
New York (B/G): 12 August – 18 August  
Toronto (C): 18 August – 26 August  
Detroit (D): 26 August – 28 August  
San Francisco (E): 28 August – 2 September  
Los Angeles (F): 2 September – 17 September  
New York (G): 17 September – 24 September

Key places visited
- Massachusetts Institute of Technology, Cambridge  
- Boston Public Library, Boston  
- Harvard University, Boston  
- University of New York  
- Samsung (New Jersey)  
- New York Public Library  
- Guggenheim Museum, New York  
- Bell Laboratories, Toronto  
- University of Southern California & Syntouch, Los Angeles  
- UC Berkeley

Also visited on some destinations:
- Hotel / Business Centre Lobbies (to compare web/usability testing)  
- Usability Professionals Association Office  
- Small museums and galleries (to observe visitor’s interaction)  
- Buildings open to tourists (to see their use of technology for visitors)
Acknowledgments

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Caglar Kimyoncu | Filmpro, London, UK
Dave Miller | University of New York, New York, USA
David Roche | Presenter/Speaker, San Francisco, USA
Diane McKerlie | Bell UX Group, Toronto, Canada
Gerald Loeb | University of Southern California, Los Angeles, USA
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Jem Turk | Samsung, New Jersey, USA
Julia Weston | Winston Churchill Memorial Trust, London, UK
Matt Borzage | Syntouch LLC, Los Angeles, USA
Murat Dagli | UC Berkeley, Berkeley, USA
Nicholas Wettels | University of Southern California, Los Angeles, USA
1. Introduction

I was awarded a Winston Churchill Memorial Trust Fellowship in 2009 with the prospect of supporting a long term potential project. This project aims to help develop a new method or set of methods to enhance usability and accessibility of products that are being developed in the research labs; and its objective would be to contribute to the theory and practice of Usability and User Experience (UX) Design within the UK design industries. The main aims of applying for this fellowship were to undertake a background research to this project and self-development.

This research involved interviewing (mostly in informal style) some of the key people, visiting their labs or studios, brainstorming with them, and in some cases shadowing their work without obstruction. Other activities involved visiting libraries, museums and exhibitions, attending free lectures and seminars, as well as comparing usability notes within projects.

My award was given under the category of Business, Industry & Commerce and the fellowship not only enabled me to visit two key countries that brought up the pioneers of my industry, but also improved my career by adding new experiences and creating networking opportunities. The purpose of this report is to provide its readers with an overview of my fellowship.

1.1. What is User Experience (UX) and Usability

Usability is the state of quality attached to a human-made object in terms of its ease of use. The term can also refer to enhancing the ease of use of a product while it is being developed. Jacob Nielsen and many scholars of his era measures usability with five quality-defining elements: Learnability, Efficiency, Memorability, Error levels and Satisfaction. All approaches for measuring usability are considered ‘user-centred’.

Taking its origins from fields such as Ergonomics and Human Factors, User Experience can be described as the design field that is deeply concerned with the end-user’s needs and way of interaction with products. UX designers not only can carry out the tasks of graphic designer and information architects combined but in addition to this they carry out user-testing and field studies to create a two-way interaction between the design of the product and usability of the product.

There has been ongoing arguments amongst industry professionals whether or not experience can be designed. For the sake of clarity and consistency in this report, I will stay away from such philosophical arguments but instead refer to User Experience Design in its most conventional and generic terms.

Currently UX and usability studies are applied mainly to creation of large websites, information kiosks/portals, handheld devices, computer interface controllers and game consoles.
1.2. Brief description of my path & the idea behind this project

Originally coming from Information Design background, which is very much in tune with usability concepts and UX Design in principal, I have been working in the Arts and Multimedia industries for over twelve years. I went back to academia seven years ago after receiving a scholarship to do a masters course combining smart materials with emerging technologies in order to enhance usability in audience interactions. This led me to develop an innovative practice–led PhD project in a similar area, and I researched and studied emerging technologies and visitor interactions in museum and gallery environments, with full funding from HEFCE.

Before going back to academic life I worked as an Interactive Designer for the BBC which enabled me to apply my gained knowledge into practice especially when producing user–centered content for their audience. After completing the research side of my PhD, I went back to design industry and managed my own company which gave me the chance to combine all of the knowledge and skills gained both from academia and the industry. While on this path, however, I have noticed the big gap in practising or communicating usability and UX principals into technology based research projects, with special focus on tactile and multisensory applications.

I also noticed how the old systems were still constantly being applied to usability studies despite the change in users’ needs and behaviour in today’s times. Therefore I wanted to study the emerging techniques in the USA and Canada as well as finding out the opinions / ideas of experts and professionals working in this industry; and sought ways of introducing usability/UX methods which are currently applied mainly to web projects and handheld devices into research labs of tactile or multisensory projects. My hypothesis is that the years–worth of knowledge and experience that is currently being used in the UX design and testing can be applied to other areas; in this case haptic/tactile projects that are taking shape in research centres and waiting for businesses to notice or fund them. In order to undertake a background research to kick–start a project that aims to develop a new method (or set of methods) to enhance the accuracy of user–testing, I submitted an application for a WCMT fellowship and I was lucky enough to be given the chance to realise this seven–week research, visiting the key people and organisations that shaped my industry.

2. Main highlights of my visit

With this section I will try to illustrate the main events and major visits that shaped my fellowship. It would be impossible to list every occasion that took place within the seven–week , as every single one of them turned out to be a valuable addition to my overall experience; however with this section I will try to provide the relevant information by highlighting some of the planned and scheduled activities I was involved with during this trip.
2.1. Boston and the MIT

Boston was the first city that I landed to for this fellowship. It has become a personal favourite not only for providing everything you would expect from a capital city of a state, but also by becoming the location of my first ever visit to USA. Because of this reason, I was extra excited and my eyes did not stop looking around for once.

After sight-seeing and getting accustomed to American lifestyle a little, I went straight to Boston Public library to start my research. In the library there were some papers I've been wanting to read and the building itself has been a curiosity to me since I saw its photographs many years ago. I joined the library as a member and spent 2 full days there reading and planning, while being amazed by the fact that I was there.

Since around 1997, the early days of studying for my first degree at the University of Westminster, I have been admiring the work and ideas produced at the Massachusetts Institute of Technology (MIT) from a distant. Even though I had met some of the pioneers at international conferences and discussed their work with them, I had never had the chance to see the institution before my WCMT fellowship. Therefore, being able to finally arrange a visit in real life was such an exciting experience for me.

Lindsey Hoshaw, the Communications Director of the Senseable City Lab kindly greeted me at my arrival to MIT, and after a brief introduction to their different projects currently taking place at the centre, she introduced me to my main contacts at the lab. I joined them for lunch where I was able to listen to their day-to-day discussions about the department and watch the presentations of projects through their lunch-time lectures.

During my first visit to MIT, I was also given the chance to do a presentation to the academic staff and researchers at the department of Senseable City Lab, and to some researchers from other countries that were present in the room, in order to introduce myself and my fellowship with WCMT. I also took this opportunity to talk about my work and past PhD research. This talk is now listed on my résumé.

One of the main reasons of visiting MIT was to have a first-hand experience of talking to other researchers and see their prototypes. One of the largest projects that was taking place at the time at the institute was the Seaswarm, an ocean-skimming
and oil removal system developed and funded by Senseable Labs of MIT. Seaswarm is proposed to work as a fleet of vehicles, which communicate their location through GPS and WiFi in order to create an organized system for collection that can work without relying on any human support contentiously. During my visit, I was able to witness the reaction of other members of the department to this project at the presentation of the prototype and research developments.

The associate director of the Seaswarm, Assaf Biderman, presented their current prototype. While introducing the groundbreaking elements of its design, he also explained some of the faults they were facing at the time and wanted the audience to throw suggestions for a brainstorming session.

Assaf Biderman is presenting the prototype of Seaswarm

Presentation at MIT
Adam Pruder who made the 3D graphics for the project also attended the presentation and answered questions related to how the work would be presented at the next Venice Biennale (2011). An introduction video of Seaswarm can be viewed on this link:
http://www.youtube.com/watch?v=KLHapZoIXqg&feature=player_embedded

During my time at the MIT, I also saw the working prototype of the Copenhagen Wheel Project that took place at Senseable Labs. The Copenhagen Wheel allows its user to capture the energy dissipated while cycling and braking and save it for when a bit of a boost is needed. It also maps pollution levels, traffic congestion, and road conditions in real-time. A teaser clip of the bicycle can be viewed on this link:
http://www.youtube.com/watch?v=S7y3qIQu3Gc&feature=player_embedded

2.2. New York and Technology

When I visit a country for personal travel, I usually tend to avoid visiting touristy attractions and experiences that I consider to be cliché. However on this occasion, since the reason of my visit was gathering as much information as possible on human’s interaction with their environments and the technology products that are provided for them, I visited some famous buildings and attractions in each of my destinations, as long as they offered an innovative display or interaction system. One example to this in New York was the intelligent LED light installation that was placed top of the observation deck of Rockefeller Centre. Created by Electroland, a creative team that creates interactive light projects and public art, this installation aims to engage visitors as they pass through by tracing their movement with intelligently controlled light. It is always important to have a first-person experience with an art installation; and seeing this work in person was quite important for the project rather than reading about it. I will be contacting Electroland for finding more about the project and learn about their user-scenarios or approaches later on in the year.
Another example to seeing a work that I previously read about was Daniel Rozin’s 2007 interactive art installation called Peg Mirror. I had talked about this object even on my PhD thesis however never had the chance to see the work in real life. My trip to University of New York was definitely worthwhile as this work was displayed on the sixth floor of the Tisch School of the Arts.

Peg Mirror is formed of 650 round wooden pieces that are cut on a sharp angle. It casts shadows by twisting and rotating the wooden pegs, these then form concentric circles surround a small central camera. The mirrored image produced in this work is activated by software that is written by Rozin processes these video signals and breaks up imagery geometrically, seemingly pixel by pixel. The rotating wood components in this piece flicker like tinsel in the spotlight, and creates an illusion of what he calls a digital object. A clip on this link shows the Peg Mirror in action: http://www.youtube.com/watch?v=dghosi6k

David Miller, a bright graduate student with groundbreaking work, agreed to meet me at the Tisch School of the Arts. He showed me the labs, and explained me their processes of research and prototype building. After our discussion he also wishes to stay in the loop of communications with regards to the later stages of this project.

One unexpected highlight of my trip to New York was visiting Samsung offices in New Jersey. This has certainly changed my opinion on corporate presentation of visitor areas. When this opportunity to visit Samsung first presented itself I had decided against including such places in my research as they sounded irrelevant, however I now consider such places as products of technology as they offer the initial tactile interaction with visitors indirectly. This visit gave me the idea to study other business offices, business centres, hotel lobbies and shopping malls in order to compare the usability reports of some websites with their real-life equivalents.
2.3. The Bell UX Labs / Toronto

After New York, I flew to Toronto; for the first time in my life. Apart from the excitement of setting foot on Canadian soil, the great weather gave me extra strength to start work straight away.

Because of the convenient location of my hotel, I was able to walk to everywhere that was covered by the central map. This way, I was able to discover little art centres and gatherings that were not always covered by the guide books. Still, I did not avoid any of the famous places and to my surprise I really enjoyed some of the information kiosks and visitor interaction booths that I came across during my walks.

After attending numerous exhibitions and museum talks, the day of my main meeting with the Bell UX Labs arrived. I consider this a major meeting as I was aware of how important they were in the industry and knew about their work. Brett Maraldo, a senior UX consultant who’s been in the industry for over 15 years agreed to show me their work and resources. I was very impressed by the high standards they were following in application of user-centered design principles in order to provide well-proven accessibility and usability through great information architecture and up-to-date methods. In theory, their resources were not unique or any different than those in the UK, however to see all elements together in one lab like this along with creative experts (rather than scholars following old usability principles as religion) gave me an eye opener for sure.

As well as admiring the lab, and attitude in general, I also found myself respecting this experienced consultant straight-away as he genuinely seemed to enjoy his work; and from his notes and draft works I worked out that he introduces new methods and ideas into his working style regularly. I straight away mentioned my plans for this project to Mr Maraldo and his feedback and enthusiasm was very encouraging.

I look forward to contacting Mr Maraldo and his team for future collaborations. I believe his approach would be very valuable to the researchers and industry workers in the UK also therefore I will definitely be inviting him to present his work if this research develops further enough to organise seminars.

A section of the Bell UX labs and Brett Maraldo
2.4. Streets of Detroit

One of the most interesting destinations of this fellowship for me was Detroit. I travelled there by bus from Toronto. Even though it was not part of my initial itinerary, I added this onto my schedule after realising that a stop-over this way would make my journey from Toronto to San Francisco more economical and certainly a lot more useful one as it would give me a chance to find out more about some of the projects I had heard about, such as the EyesOn Design project which had a show in Detroit prior to my arrival. This project was suggested to me by Aaron Stachewicz, the Operations Program Manager at Roush Industries in Detroit. The show of EyesOn Design did not coincide with my visit to America, however Mr Stachewicz’s suggestion certainly made me aware of the Detroit Institute of Ophthalmology mainly because of the proximity of their work to my research area of Haptics for visually impaired visitors (which is also very relevant to the heart of this fellowship).

Through my research activities, I have had the experience of applying Haptics to museum practice by combining technology with traditional artworks, and re-interpreting museum objects through this method for blind people (theory + practice). The show in Detroit similarly allowed visually impaired visitors to wear white gloves and touch the cars to see them. They provided guides that also gave descriptive information. The results of this project will be very useful to my research.

![Image of Detroit Institute of Ophthalmology](image1)

During my time in Detroit, not only I was able to visit the institution but also got a closer look at the people’s lifestyles, art & culture events and the architecture of this mysterious city. Unfortunately some of the places I wanted to visit were either closed...
down due to recession, or were under repairs without any warning. For example, after a long walk to the Museum of Contemporary Art, I found out that they were closed for construction works until mid autumn, however the Tourist Information centre was not even aware of this. Still, the walk to that part of the town and seeing the building from outside itself were great experiences indeed. Following this with short visits to University of Detroit (School of Architecture) and Detroit Public library, I can say that visiting this city most certainly added valuable data to my work.

2.5. San Francisco Bay Area & Los Angeles

I've never thought I would say this for a city other than London, but San Francisco became my favourite city in the world not only for its famous streets and beautiful climate but also because of its people's free views and peaceful attitude towards life. I truly wished I allocated more time to San Francisco rather than the one week I spent there. However I was lucky enough to meet brilliant scholars and artists both in San Francisco and Berkeley.

The highlight of my visit to San Francisco Bay area was visiting Ms Jane Berliss–Vincent, Usability/Accessibility Manager at the Center for Accessible Technology, which was located off campus at Berkeley at the time. Ms Vincent who is an expert consultant in the field of assistive technology, kindly gave me a tour of their organisation and explained to me the work they do. She has definitely made my visit to Berkeley a worthwhile and an exciting one.

Center for Accessible Technology, in its broad sense, provides access to computers for people with disabilities. In detail on the other hand, the centre supports people with disabilities with a lot more than that. For example they help disabled children to have access to technology at schools and provide consulting services to businesses, libraries and government bodies. As a not–for–profit organisation, they provide hands–on assistance on creating accessible websites and profile user–testing to products with a focus group of people with disabilities. Center for Accessible Technology is very relevant to the nature of this fellowship therefore her contribution would be very much enjoyed at future events organised as a result of this journey to America.
My next destination was Los Angeles where I spent the largest part of my fellowship. Because there were endless events and happenings taking place in Los Angeles, I decided to divide my activities into three different groups for a systematical use of time. First, I aimed to see places associated with the artists that work in interdisciplinary areas with end-users; then I wanted to attend free public lectures to view scholars and get to know the institutions and as a third category I visited my contacts for pre-arranged appointments. Due to an unforeseen illness, I had to cancel some of my meetings as I was only able to travel certain distance and spend only a few hours each day on my research between 9th and 16th of September. During this time, as well as spending majority of my time at the public library, I attended some (what I thought would be) lighter events and exhibitions in order to stay connected with my research. Some of those were:

- Yousuf Karsh: Regarding Heroes exhibition: University Park Campus, USC Fisher Museum of Art
- Multimedia and You: Engaging Teaching and Learning in the Classroom, Center for Excellence in Teaching (CET)
- Sound Art Lecture: Arthur Jarvinen, USC Roski School of Fine Art
- After-events of Digital Media Pipeline Event in Los Angeles

Despite spending numerous interesting days at the campuses of University of Southern California and attending exciting events and witnessing discussions on groundbreaking projects, I consider the main event of my time in Los Angeles to be meeting Professor Gerald E. Loeb and his extraordinary team of researchers and
colleagues at the Neuroscience faculty. I am very grateful for his time and patient in explaining me some of the work they do despite being so busy with meetings and other academic commitments.

Since the neuroscience terminology is hard to grasp for me, I refer to Professor Loeb’s own description of his research topic and his team’s research projects, as it appears on his University research page:

*We are interested generally in using electrophysiological interfaces between the nervous system and electronic equipment in order to understand natural functions (e.g. hearing, vision and movement) and to repair their disorders (e.g. deafness, blindness and paralysis). Previously, I have worked on cochlear implants (now commercially successful) and a cortical visual prosthesis (now being pursued by other research groups). Our current research is focused on reanimating or replacing paralyzed muscles and amputated limbs. This involves development of interface technologies (sensors, stimulators, etc.) and biomimetic control systems based on physiologically realistic mathematical models of muscles, proprioceptors and spinal cord circuitry. Such modeling builds on our many years of experimental research studying those structures in animals. We are also enhancing the haptic capabilities of mechatronic prosthetic limbs and industrial robots by incorporating biomimetic tactile sensors that we have developed and commercialized.*

As it can be seen from the description above, this type of research has to focus on users’ needs and it is very vital to carry out constant user-testing during the process. Because the user-testing of such products are in nature different than web usability and UX design principals, a dialogue between both fields is possible. Therefore Professor Loeb’s background and projects would provide the perfect case studies, if this project develops to the next stage. I am very pleased that he kindly accepted to attend and present his work at future seminars if his workload permits.

At this stage I must mention that I am also very grateful to Nicholas Wettels, a research assistant working on medical devices, for showing me the labs and explaining me some his work. He is very much open-minded to introducing and using knowledge from other disciplines as his background is in military.
finalising his PhD in Biomedical Engineering, and was previously awarded Nasa Fellowship in order work on a robotics project. He too has shown interest to potential work this research might create and would consider to contribute to it if the project takes more shape in a near future.

3. Conclusions

This fellowship has definitely been a big step towards developing my career further by giving me the opportunity to experience what could almost be described as a sabbatical research, which is a rare opportunity in reality. As a milestone, I believe the results of this fellowship will help me achieve my objectives in contributing to my industry within the UK, which provided me with all the possibilities to study my subject to its best in the first place.

Some of the results I have achieved started to make themselves apparent as early as the first half of my visit. One of these was that, in order to achieve a full case study, longer periods of shadowing would be necessary. A usability study or experts’ unique approach to user-testing must be observed from the beginning to the end. Therefore I decided to use my time more efficiently within my given fellowship, and left the shadowing activities to a later stage when the project takes a better shape. Instead I focused on what the individuals showed me in terms of their company resources and needs; and as well as directing specific questions about the work styles their organisation adapts, I also tried to find their individual opinion behind the scenes. As a result I was positively surprised to find out that despite working
towards guidelines and carrying years of work habits, most of these experts were all individually open to new potential developments and techniques.

My data gatherings from experts made it clear that more networking and intellectual discussions with the key people will be necessary before starting to design any methodologies or identifying new methods. For this reason I asked most of the people I met during this fellowship, whether or not they would be interested in taking part in the later stages if this project becomes alive; and also asked if they would be willing to travel to UK to write a paper or do a seminar presentation if I could get more funding to organise an event on this subject. All of them approached this positively, therefore I see this as another good result of the fellowship as it opened doors to a potential platform of dialogue between academic departments and businesses in the UK, USA and Canada.