Ultrabooks™ and Windows 8: A *touchy* UX Story

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Abstract. This paper demonstrates how a multi-region ethnographically informed study has influenced Intel's Ultrabook™ strategy. In 2011 Intel Corporation launched a $300M fund focused on the next generation of notebooks, called Ultrabook™ (Merritt, 2011a) and at Computex the same year announced the Ultrabook™ concept: a thin (less than 0.8 inches thick) notebook that utilizes Intel processors and can incorporate tablet features such as a touch screen and long battery life (Burt, 2011) that would be priced below $1000. A few months later four Taiwan ODMs (Original Design Manufacturers) showcased prototype Ultrabook™ devices with Intel's 3rd Generation Core™ Processors at Intel Developers Forum (Merritt, 2011b). Within this context, the imminent arrival of Windows 8, Microsoft's Operating System centered around a "touch first" philosophy, opens up a range of questions on whether touchscreens should or should not be part of the clamshell Ultrabook™ experience. In mid-2011 the conventional wisdom in the industry was that touch on vertical screens is a mistake. This existing belief had been strengthened in 2010 when the late Steve Jobs explained during a keynote that "touch surfaces don't want to be vertical. It gives great demo, but after a short period of time you start to fatigue, and after an extended period of time, your arm wants to fall off" (Carmody, 2010). The industry even coined a specific term to describe this issue: *Gorilla Arm*.During that time, I decided to explore this territory further as I didn't fully buy into the conventional wisdom or negative statements by industry representatives about this usage. In particular, I decided that the best approach to learn about this heated topic was to learn through direct observation of what everyday users really like, think and ultimately do. The qualitative case study at the center of this paper was consequently initiated, ultimately documenting and demonstrating user behavior that is drastically different from what was expected based on industry wisdom. Indeed, not only did people reach for the screen a lot during the study – they loved doing so. The study, a qualitative user experience investigation focused on the use of touch in clamshell devices, was conducted in 2011 in the US, Italy, PRC and Brazil. The research's key insights, recommendations, strategic impact and influence are discussed in this paper through a number of examples, narrated through users' voices. This paper is divided into five sections. The first section offers a background on Ultrabooks™ and the rationale for the case study. The second section overviews the UX approach and philosophy which underpins the case study. The third section focuses on the actual case study: timelines, aims, methodology, insights and key recommendations. A number of specific user examples are used to illustrate key learning. The fourth part of this paper is dedicated to the impact that this research has generated, with specific emphasis on best known methods for

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influencing product development and marketing strategy through user experience research and design. The final section offers a number of conclusive remarks and recommendations, with focus on ethno-design methods that assist product development.

Keywords: Anthropology and ethnography in DUXU, Design philosophy of HCI and UX, Design/evaluation for cross-cultural users, Future trends in DUXU, Mobile products and services.

1 Background and Rationale

In 2011 Intel Corporation launched a $300M fund focused on the next generation of notebooks, called Ultrabook™ (Merritt, 2011a) and at Computex the same year announced the Ultrabook™ concept: a thin (less than 0.8 inches thick) notebook that utilizes Intel processors and can incorporate tablet features such as a touch screen and long battery life (Burt, 2011) that would be priced below $1000. A few months later four Taiwan ODMs (Original Design Manufacturers) showcased prototype Ultrabook™ devices with Intel's 3rd Generation Core™ Processors at Intel Developers Forum (Merritt, 2011b).

For manufacturers to market a laptop as an Ultrabook™, Intel set a number of specifications which need to be met – requirements change with each release of Intel's mobile platform. Required specifications focus on: Thin Design; Responsiveness; Extended Battery Life; Security Enabled; Fast I/O; Processor. Since the launch of this new category, a number of manufacturers (including Acer*, Asus*, Dell*, HP*, Lenovo*, LG*, Toshiba*, Fujitsu*, Sony* and Samsung*) have released or announced a wide range of Ultrabook™ devices.

During this time, my team was heavily involved in the development of a number of Ultrabook™ devices, with a particular focus on a program codenamed "Cove Point": a touch-enabled and Windows* 8 targeted convertible Ultrabook™ design aimed at providing an easy and elegant one-step conversion experience. Being a convertible, the device had a touch screen. However, the imminent arrival of Windows* 8, Microsoft's Operating System centered around a "touch first" philosophy, which opened up a range of questions on whether touchscreens should or should not be part of the clamshell Ultrabook™ experience.

At that point in time the conventional wisdom in the industry was that touch on vertical screens is a mistake. This belief had been strengthened in 2010 when the late Steve Jobs explained during a keynote that "touch surfaces don't want to be vertical. It gives great demo, but after a short period of time you start to fatigue, and after an extended period of time, your arm wants to fall off" (Carmody, 2010). The industry even coined a specific term to describe this issue: "Gorilla Arm." Without wanting to be particularly controversial, I decided to explore this territory further as I and my team did not fully buy into the conventional wisdom or negative statements by industry representatives about this usage. In particular, I decided that the best approach to learn about this heated topic was to learn through direct observation of what everyday users really like, think and ultimately do.

2 UX Philosophy

Before describing the case study at the center of this paper, I will offer a background on the User Experience philosophy that underpins it. There are many schools of thought when it comes to user research, from the ethnographic-observational to the interventionist, going through the participatory design path, the quantitative/survey evaluation or the usability-centered approach. In the case of the study here discussed I adopted an ethnographically-informed approach mixed with design tools and quantitative analysis metrics.

We created, adopting a traditional design approach, a simulated Windows* 8 environment which enabled participants to directly experience a number of key scenarios (it should be noted that when the study started there was no Consumer Preview of Windows* 8 available, hence the need to create a simulation from scratch, using available information at that time). The simulation was built to enable tracking of every navigation step and related behavior for each participant and the creation of a quantitative illustration of behaviors. An ethnographic philosophy was the guiding principle throughout each session, where the focus was on closely observing every participant, in action, and on asking a wide range of related questions to uncover motivators and persistent behaviors.

This mixed approach is the modus operandi that I tend to adopt in all my user experience work. In past studies the design side played a more substantial role since there was a need to model a range of ad hoc video animations, mockups, prototypes and appearance models – to be in a suitable position to test in action a range of new usage propositions. Although it is true that story boards and verbal descriptions of a new product or service can be used as good tools to elicit participants' responses, I am a firm believer that working or semi-working devices and physical objects enables researchers to elicit deeper data that is embedded in action as opposed to speculation. For instance, asking questions about one's perspectives on a specific new product is less powerful than observing actual behavior with that product (or simulation of) – this is because there is often a gap between what one says (or even believes) and what one actually does in practice, due to the vast range of subconscious habits and behaviors that populate people's everyday lives.

3 Case Study: Touch on Clamshell Devices

In mid-2011 the "Touch on Clamshell" qualitative study was funded to be conducted with participants in the US, Italy, China and Brazil. Twenty participants per country were recruited according to a number of criteria, including: age, income, household composition, device ownership. In parallel, we developed an Adobe* Air simulation of Windows* 8 and loaded it onto a touch-enabled notebook PC. The simulation included a range of scenarios, from Windows* 8 to Desktop environment since I wanted to observe users' behavior in touch-optimized as well as traditional/legacy user interface environments. All interviews were conducted in a facility to ensure that the experience would not be impacted by different contextual characteristics, and the

room was initially set up with the notebook on a desk and with a mouse next to it. At the start of each interview, after establishing the participant's baseline with regard to his or her technological attitude and ownership, I would ask participants what their most common posture when using a laptop is. If participants expressed they typically use their laptop on a desk, they were asked to make themselves comfortable. When participants expressed that they use their device on a couch or in bed, the room setting was modified to mimic their everyday posture as much as possible.

Once settled into a comfortable position, I would brief participants, providing basic information on Windows* 8 and explaining that they were about to directly experience a number of scenarios and that at any time they were free to use any of the provided input means, among Mouse, Touchpad, Touch, Hard or Soft keyboard. Participants were heavily encouraged to use the input method they felt most comfortable with and informed that I was just interested in observing what they did and then ask questions. It was made very clear that there was no expectation on what was best and that the only expectation was for them to use the input mode they felt appropriate and natural. After this brief introduction, I would ask users to engage with each scenario – while this was occurring, I would observe each navigation step and track them according to the selected input modality. Additionally, I would ask them a number of follow up questions around posture, input preferences, motivations, likelihood to purchase, overall impression, and so forth.

During data analysis it became very evident that the behavior that participants exhibited was drastically different from what was expected based on industry wisdom. Not only did people reach for the screen a lot – they loved doing so, as Marcus (49, USA) well expressed during his interview: *I just LOVE the interaction without having all these peripherals (mouse, touchpad)... You gotta make me take this home with me!*

For some participants, touch represented a more intuitive and less overwhelming way to interact with PCs, as in the below example of Sam (56, USA), who approached technology late in his life and had great difficulties in learning how to use a touchpad and mouse: I think it's great, I am a fan already. Big fan. I am just surprised how easy it was to learn. For others, touch felt like the obvious next step, as Susan (33, USA) told me while pointing at the touchscreen: I like touch so much that I find every once in a while I forget I can't do that on my computer. For others again, touch implies sensorial pleasure or immediate results: There is something about the interaction of actually touching the screen and pressing a button that feels more engaging (Sonia 26, USA). Some participants were skeptical at the start but once they had the chance to try the device, immediately made connections and change their perspective: I was a bit hesitant on the cropping as I do a lot of cropping (he's an architect), but as soon as I saw the cropping box, I picked one corner and I brought it down and… then I felt pretty confident in using the whole thing with touch (Brett 41, USA).

During the session over 50 actions per user were tracked, which resulted in over 4000 actions tracked throughout the study. Surprisingly, 77% of those 4000+ actions had been accomplished by touching the screen, instead of the touchpad or mouse. These results would be less surprising if the scenarios participants had to go through were all touch-optimized, but the reality is that the majority of scenarios were legacy applications, not optimized for touch interaction. Consequently, results are not only

astonishing – they drastically challenge common industry wisdom around the role of vertical screens in PC interactivity. Alongside percentages, the motivations behind users' behavior represent however the phenomenal story we need to pay attention to. The four key lessons learned through this study are offered below.

Firstly, users described touch on clamshell devices as something that transforms the notebook from a work to a play device. In participants' mind, touch enables them to feel immersed, transforming laptops into something which is fun to own and delightful to use. Terms used to describe this sentiment included: fun, amiable, freedom, interactive, and connected. Below, participants' quotes which illustrate this point: It's more fun, it's a new thing… (Veronica 27, Italy); More immediate, faster… more amiable… (Alessandra 44, Italy); Having a laptop with touch is having a laptop with an extra gear (Pino 35, Italy); I like it actually… it's freeing (Kyle 30, USA); It seems more… connected (Jacob, 39, USA); It makes the experience more interactive… (Marcus 49, USA).

Fig. 1. Example of postures. Top: Filomena, 34 (Italy); Jacob, 39 (USA); Bottom: Wang, 26 (China); Betty, 22 (USA).

Secondly, and differently from the belief that touch on a vertical screen is ergonomically inappropriate, users expressed that in their perspective touch on laptops enables a better and richer ergonomic landscape. Throughout the study a wide variety of postures, switching of hands and natural interaction and behaviors were observed (see Fig. 2). Here are what users had to say from a posture, versatility and ergonomic perspective: It'd be nice to kind of have a little variety… switch around… more than being stuck in one spot (as he points at the mouse) the whole time (Mark 37, USA); It's actually better as I can put my elbows on the table (Pino 35, Italy); I actually prefer it (screen) being propped up… as opposed to being flat (as a tablet)… it just creates for a more ergonomic landscape (Meredith 32, USA); Absolutely not an issue... also, I can use both hands (Filomena 30, Italy).

Thirdly, conventional wisdom was that implementing touch on a clamshell would not work because users would poke at the screen very hard, causing challenges for

hinges or causing it to tip. In no case did this occur – not even once during the 80 interviews. On the contrary, users (including touch novices) touched very gently.

Fourthly, users strongly indicated that they are not prepared to give up hard keyboard functionality. While they see the touchpad as inefficient and frustrating and the mouse as something they must use but that limits portability, the keyboard is something they do not want to see taken away from them. Here is how participants described their perspectives on mouse, touchpad and hard keyboard: *Taking the whole mouse experience out… and use touch (…) who needs a mouse? You have your whole experience here, on your computer* (Marcus 49, USA); *I like touch but for typing I prefer the feel of the keyboard* (Marcus 49, USA); *I've been using THAT (touchpad) and it's very tedious* (Pamela 49, USA).

4 Impact and Best Known Methods

As soon as this research entered a socialization process within the company and external partners, it became increasingly clear this work had the potential to dramatically change the industry. During each presentation, and particularly so while showcasing a video collage with users' direct feedback, even the most skeptical audience clearly experienced a revelation – a clear ah-ha moment that enabled them to shift their thinking and choose a different course of action, to enable and increase touch adoption in laptops and notebooks.

One of the biggest and most profound consequences of this study is that Intel Corporation decided to engage in a campaign to substantially promote the capability in Ultrabook™ devices and signed agreements with touchscreen manufacturers such as Cando*, HannsTouch*, TPK*, and Wintek* to guarantee the supply of touch displays and to increase of 3 to 5 times the capacity that is available today in the 13" and greater display size (Crothers, 2012). When the study was presented to ODMs, OEMs and retailers, similarly decisive actions followed, with the design and development of a number of touch-enabled Ultrabooks™. Such an impact does not represent the norm in user experience work: I have done this type of work for over a decade and this is the first time something of this magnitude has occurred. Surely, there is a "being in the right time and place" factor that contributed to this success – however, it is also true that throughout this study a number of fundamental strategies were consistently utilized and leveraged: strategies that I consider fundamental when conducting UX work, especially in industry settings. Far from being rules to be blindly followed, I offer the following strategies to inspire reflections on a number of key issues and hopefully enable the reader to create his/her own modus operandi.

One: push upfront the users' perspectives and direct views. When working in the industry in particular, there is a tendency of relegating users' quotes and images at the periphery of a report and over-focusing on bullet points and high level recommendations. With this study I deliberately avoided that trap and instead I actively used images, quotes and memorable stories to illustrate the key points based on the data analysis. This technique made each point stronger as it provided undisputable, visual and intimate evidence – it showed the reality of real people and removed all

abstractions that could have weakened the final message. All audiences – regardless of hierarchy or culture – can easily relate to such evidence as it is about real life and real people – not an abstraction.

Two: visualize the data as much as possible and ensure visualizations are accessible, memorable and unique. It is worth investing extra time developing appealing ways to visualize quantifiable data instead of relying on pre-set templates for charts and tables. Being able to visualize data in a clear, easy to digest and visually pleasant manner is an important asset – it enables one to powerfully tell the story one needs to communicate and people will more likely remember the points one made because of how they were represented. For this study I deliberately developed a simple but unique visual language to visually describe data and the time used for that undertaking paid off a number of times since, as the report became memorable, easy to describe and something which stood out among the multitude of template-clone reports that clogs industry employees' emails and calendars every week.

Three: create succinct yet powerful video summaries of your research. This of course assumes that one video-records all interviews, has good audio-visual material to draw from, and engages in basic video-editing. It is incredible how much impact a 3-5min video can have at the end of a presentation. By highlighting all the presentation's key points though participants' voices, one can more likely convince his/her audience, even the most skeptical. The video says that the research is true: it is not an abstraction – it is REAL.

Four: socialize, socialize, socialize – but do so directly in all key occasions. When creating a report many tend to present a couple of times and then forward the PDF around, with the idea that people can use it as a reference and forward it to new audiences that might have an interest. This is usually done so one can move to the next project and works well in some circumstances – but in others it does not. For instance, the context is often a fundamental aspect of UX research and its richness can be rarely included in a PDF. Additionally, many times short examples and memorable commentaries are what make the difference, transforming a UX report into a unique UX report – those cannot be equally communicated with a written report or slideshow: they need a person. Also, relying on others (e.g. marketing representatives) to present your material to executives or customers is often a big mistake – those people, no matter how skilled and experienced they are, did not conduct the study, are not UX professionals, do not have important and contextual nitty gritty details at hand and will never have the same passion in communicating results: and passion is often what makes the difference when trying to convince an audience to take important decisions. My rule of thumb is to socialize directly with all the key stakeholders and customers and then create a recorded audio or video session of the presentation for all other secondary audiences one cannot reach directly – that way if someone asks for the material to be presented the to them, the link is available so they can be exposed to the presentation indirectly. After some shelf life it is then ok to simply forward the report and offer clarifications if needed, since at that stage the wanted impact has been hopefully already achieved.

Five: ensure your manager is prepared to facilitate you and equip her/him with your strategy. One's manager can open doors, set up executive meetings, facilitate

customer interactions, defend one's approach and protect the research when needed. A suggestion is to create, as soon as possible, a strategy describing the type of aspired impact and what actions are needed for that to happen. What meetings must occur? Who are the key stakeholders? Who are the advocates? What possible hiccups can be anticipated and what are best way to address them? Should the research be shared only internally, under Non-Disclosure Agreements with key customers, or also externally? What about press and social media? Evidently, some material might not be immediately shareable outside the company due to confidentiality requirements – but maybe some high level points can be discussed externally. Having work published externally is an important aspect from a portfolio perspective and additionally provides the opportunity to connect with other researchers, inspire them and even initiate new opportunities and collaborations. The bottom line here is that a manager can play a key role, in backing up the work, approach, and strategy – this of course requires one to take on the responsibility of going to the manager with clear ideas on what is needed, how and why.

Six: protect your participants at all costs. Having a report with images of participants can sometimes be a two-edged sword, as those that will receive it might not be fully clear that participants' privacy and identity must be respected. Those individuals might take the liberty of cutting and pasting images in contexts which are not authorized under the Consent Form participants signed when you interviewed them – this is a serious issue ad must be avoided at all costs. The researcher is responsible for protecting participants' identity and privacy. Over time I learned that it is better to pixelate participants' faces even when using images inside the company and that it is best to iterate with all audiences the legal agreement with participants – both during presentations and via email, when forwarding the report. Since pixelating participants faces in video is a harder task, a good approach is to give a copy of the video only to some trusted stakeholders, not to all that ask for it.

Seven: create multiple versions of the report and be ready for all types of requests. At a minimum it is suggested to create the following: Full report for internal use only (Read Only version); Summary of report for internal use only (Read Only version); Full report for external NDA (Non-Disclosure Agreement) use (Read Only version); Summary of report for external NDA use (Read Only version); and (if applicable) Summary of report for external non-NDA situations (Read Only version). With customers I recommend this technique: if asked, provide the summary of the report for external NDA use (Read Only version) and offer to present the full report if there is an interest. The high level summary contains enough information for the customer to understand if there is any serious interest in the data and if there is, the summary acts as a teaser for getting the full download. This way you provide something when asked but also create clear expectations around the full report and related presentation (as discussed in point four). The same approach should be used with others inside the company, when not fully clear on their motivation and possible usage of the data.

Eight: ask for help and engage those that have knowledge on areas that are closely intertwined with your study. Getting feedback from peers that have knowledge on the areas that surround the matter one is investigating is crucial – it helps to ensure that all the right questions are asked during the study, that all the key patterns are

considered when analyzing data, and that a report that can talk to, be understood by, and be of value to a wide range of key audiences is created.

Nine: provide data once you are done with analysis, not prematurely. When conducting studies in the accelerated industry world, there is a trend to ask for "preliminary insights" as the research is still occurring. I advise to strongly oppose such requests as providing premature data can lead to disaster as many will be tempted to move ahead with decisions that are not yet grounded in real and final data. If requests come from senior leaders and one is placed in a position where something must be provided, I recommend offering 3-4 extremely high level points alongside a long list of disclaimers to make it clear that no actions should be taken based on such points.

Ten: consistently use a few powerful and memorable user stories. For each point you want to make, ensure that you have one very specific user story to tell and, depending on the context and audience, use it over and over again. In the case study described in this paper for instance, each time I make the observation that users find touch fun and that people often make decisions based on emotions, not mathematical equations, I talk about Alessandra, 44 years old from Italy, who described touch on the laptop as "simpatico" – because I am Italian, I can clearly explain what an unusual term it is to use for an inanimate object, since "simpatico" is typically used for a person or for objects and situations that have a special place in one's heart – they have been humanized. This example is real, credible, grounded in cultural traditions, it resonates with any human being you might encounter, it is slightly witty and it is memorable. With no exceptions, this technique proved bullet-proof – as a matter of fact, many peers and even executives used during their keynotes this specific example when talking about this study. Hand-picking a few powerful stories will make the study memorable and enjoyable.

5 Conclusive Remark and Recommendations

In this paper I discussed a case study to provide a number of recommendations and to illustrate best known methods to conduct user experience studies within an industry setting. In particular, I offered ten strategies to consider when undertaking user experience work.

I suggested the importance of pushing upfront users' perspectives and direct views inside all reports. Next, I discussed the role of visualizing data and ensuring visualizations are accessible, memorable and unique. I overviewed the need to create video summaries of research, and then offered the perspective that directly socializing research has its long-term benefits. Following, I suggested that one's manager can play a key role in scaffolding the success of one's work, that participants should be protected throughout one's UX process, that it is important to have multiple versions of one's report ready, that engaging peers to enrich and benefit one's study is key and to consistently use a few powerful and memorable user stories.

Above and related to the above recommendations, there is one final key point: the described case study was successful because it was shaped, executed and shared using a balanced mix of ethnographic and design practice – it is only thanks to this mix that

user insights could be translated into actionable recommendations and related product definition. Ethnographic practice provides the observational and contextual inquiry capability which is essential to engaging participants, seeing what they do and highlighting key patterns. On the other hand, design practice is fundamental to clearly visualize patterns and translate what was observed, into actionable and practical recommendations and propositions. This disciplinary duality is, in my opinion, key to the success of user experience work in industry settings. Additionally, because this is a duality that is often acquired through experience instead of learned academically, I suggest that academic courses focused on user experience should all offer such a duality throughout their duration, to properly prepare the next generation of UX practitioners so they can play lead roles within large organizations.

* Other names and brands may be claimed as the property of others.

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