

# ***Online Usability Testing with Different Generations: Digital Natives and Digital Immigrants in the online usability space***

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## **Abstract**

In this paper I will present a case study of eight generational web usability tests. The tests are focused around three web usability standards which are defined by leaders of the online usability world. The results are then compared to two different generations in regards to their experience with information and communication technology (ICT). The two generations are based on definitions outlined by Marc Prensky's and Gordon Hotchkiss' digital natives and digital immigrants.

The hypothesis is that through generational web usability testing, results will indicate that current web usability standards follow the usability needs of a generation who has not grown up with ICT.

### **Keywords**

e-commerce, usability, Jakob Nielsen, Marc Prensky, Gord Hotchkiss, Donald Norman, digital natives, digital immigrants, buyershere project

## **Introduction**

The debate over a new generation of learners is becoming a hot topic among educational commentators. Mark Prensky defines the generations as digital immigrants and digital natives—those who have grown up with information and communication technology as an everyday part of their lives and those who have not. Supporters of the digital divide theories believe that “education itself must fundamentally change to accommodate the skills and interests of these 'digital natives'” [1].

So far the the attention and debate of the digital divide theory has remained in the educational research community—mostly focused on students in schools and universities. In this case study the characteristics will be applied to web usability in an effort to help understand how the digital native generation will mesh with current usability concepts and what future usability standards might look-like.

## **Background**

Online graphical user interface usability emerged during the

dotcom explosion in mid-1994. The demand extended from the widespread adoption of personal computing—at work and at home—which popularized computing among people with no formal training; therefore easy-to-use computer interfaces became an immediate element for success. Luckily, many advancements in computer hardware at this time aided in making easier user interfaces a reasonable task. For example faster CPU's allowed for increased complex user interface interactions; accelerated graphics cards allowed for more developed and detailed visual aids; cheaper RAM increased storage; and increased bandwidth aided in user-interface development by giving users the computing power needed to produce UI's with remediation detailed enough to assimilate millions of new users online. [2]

However, these advancements could not prevent the dotcom bubble crash on March 11<sup>th</sup>, 2000 [3]. The crash changed the online space forever. The reasons for the crash given by analysts are somewhat numerous and varied. Commonly accepted beliefs focus on the surge of excitement over a new international, untapped market. In 1995 an estimated 15 million users were online [3]; as businesses and investors scrambled to get a piece of the action a common theme of too-much-too-fast became apparent.

Jackob Nielsen, online usability guru, believes one of the reasons behind the crash was the lack of good online usability [4]. Nielsen believes that the lack of decent usability effectively hindered revenue generation, especially in relation to expenditures acquired by the exponential growth described above.

After the dotcom crash, questions around how to make the web profitable gave the web usability ample attention. Evidence of this can be seen with the emergence of usability experts like Dr. Jakob Nielsen, Dr. Donald Norman and Steve Krug during this time. These pioneering web usability professionals sought to define standards around the web to aid in its unification in the name of usability.

Ten years later Norman and Nielsen still lead the way in web usability. Jakob Nielsen is often criticized for having an unhealthy monopoly on usability consciousness online and it is argued that the stagnation of the usability elite could potentially hinder the generation of new ideas and develop-

ments.

## The Digital Divide

A new generation of online users are emerging—a generation that no longer sees the Internet merely as a way to increase productivity [5], but rather as a focal point in their lives and a vehicle to do new and different things. “The difference (in the generations is) not so apparent in how (they) use technology, but rather how (they) feel about technology ... the new generation doesn't call it technology. It's simply the 'stuff' they use everyday” [5].

There is no mistaking the presence of a new digitally immersed generation. They have been defined as the MySpace Generation [6], the New Media Generation [7], the Net Generation [8] and finally Digital Natives [9]. Prensky's definition of digital natives is the most in depth and recognized look at analyzing this generation. Hotchkiss states that digital natives' brains are literally wired differently then their counterparts, digital immigrants. Digital natives have been continually exposed to interactive technology or information and communication technology (ICT) [1] during the “super-plasticity” years of their lives—the teenage years [5].

The digital universe was conceived of, pioneered, and created by the immigrant; but what will happen when digital natives take over the world's information and virtual marketplace? With human computer interaction (HCI) entering an age filled with new challenges and solutions can traditional concepts hold up to these significant sociological changes? How can designers anticipate the needs of this new generation and the generations to come? If e-commerce usability is not inline with this new generation could this cause the next bubble burst?

One thing is for certain, contributing to advancements in web usability concepts is important because as the dotcom bubble taught us, the economy has more then just a vested interest in the online space, it has a direct and real dependency.

## The Three Web Usability Standards

The three usability concepts chosen were done so because they focus around concepts which have competing characteristics for digital immigrants and digital natives.

Two of the three web usability concepts that will be tested are derived from Dr. Jakob Nielsen's research and findings. Often dubbed as the "guru of web usability", Nielsen's research primarily focused on intranets. He has done numerous eye tracking studies, has written over twelve books, and holds 79 United States patents—mostly focused on ways to make the internet easier to use [10]. Another notable contribution derived from Nielsen is

Nielsen's Law. Nielsen's Law states: Network connection speeds for high-end home users would increase 50% per year, or double every 21 months. As a corollary, he noted that as this growth rate is slower than the Moore's Law growth in a processor power, user experience would remain bandwidth bound.

Nielsen is famous—or infamous depending on the crowd—for his bold predictions on the future of business, though respectfully admits when he is wrong. Some of his more famous claims include: "Flash is 99% bad" [1]; polished graphic design has little impact on usability [12] [13]; 90% of his usability guidelines will likely be achieved by 2017 [13]; blue is—and forever will be the only appropriate colour for links [13]; and PDF's are unfit for human consumption [15].

Common critiques, which often stem from his bold emphatic statements, state that he is too vague in his predictions. Critics also complain that he fails to balance the importance of other user experience considerations such as esthetics; and as mentioned earlier, he is believed to have an unhealthy monopoly on usability consciousness online [13].

The first usability standard of Nielsen's we will look at is his interests around the information architecture of a website and noise—or for lack of a better word 'clutteredness'. In particular Nielsen does not recommend pages with too many links and features. In his alerbox titled, *Amazon: No Longer the Role Model for E-Commerce Design*, He tells us:

“Amazon's product pages are littered with extraneous features, ranging from a "Gold Box" over a "wish list spree" to promotions for reading glasses and other irrelevant products. A single book page I analyzed contained 259 links and buttons. It was so cluttered that key product information — like publication date, page count, and average review rating — was three screen-fulls below the fold (on a standard 1024 x 768 screen).” [15]

On this very same topic, Hotchkiss tells us that while digital immigrants generally fit Nielsen's standard of simplicity in navigation and page layout, digital natives can handle much more interaction and stimulation. Digital natives "brains are shaped in a more frenetic environment, so they adapt to it" [5]. He also tells us digital natives characteristics include "parallel process(ing) and multitask(ing)" and that they "can multitask easily" [5] – characteristics which are very useful for processing cluttered websites with over 200 links and a plethora of advanced features.

To test Nielsen and Hotchkiss' statements just mentioned above, the web usability tests will include examples of cluttered and busy websites, to which the users opinions will be observed and recorded.

For the second usability concept of Nielsen's we will look at the users willingness to explore unfamiliar territory online. Nielsen tells us that users "face plenty of complicated problems in their own work and they don't want to devote brain cells to your website or its design" and that they "want to get in, get out, and move on with their own tasks" [16]. In fact, he tells us that uptake speed for new browsers in 2006 was at about 2% a month where as in 1998 it was at about 4% a month. Nielsen tells us that web users are now twice as conservative as they used to be when it comes to embracing new technology[17].

On the same topic Hotchkiss tells us digital natives "will pursue, newer, faster cooler" and they will "move quickly towards new technology" expecting advanced functionality and the ability to "do" something, while digital immigrants do not.

The final concept is more of a general usability guideline, rather than web focused. This guideline is given to us by Dr. Donald Norman:

Dr. Norman, founder of The Cognitive Science Society, is considered an expert of cognitive science and is widely considered to be the first to apply advanced human factors to design via cognitive design (wiki). He currently co-directs the dual-degree MBA Engineering program at Northwestern University.

Norman has been identified as one of the top influential designers [5], been awarded the Benjamin Franklin Medal in 2006 [5], and has received the "Lifetime Achievement Award" from the professional organization for Computer-Human Interaction [2].

While Norman often states he is not an expert in web usability [15], his repertoire has simply out-shined this modest persona. To underestimate Norman's impact on current web usability standards would be a mistake, even if his eclectic counterpart, Dr. Jakob Nielsen, often overshadows him in this area.

The usability guideline we will be including in the usability test is Norman's concept of that when the user is confronted with usability issues they blame themselves [12].

However Hotchkiss tells us that while digital immigrants blame themselves when they have usability issues, digital natives blame the technology. Hotchkiss explains that digital natives set the bar higher, try advanced functionality online and if the functionality doesn't perform as expected they have little patience and "sites and applications are just supposed to work" [8].

While the tests will look for any trends that appear to be generational, these three usability concepts will be the focus: Cluttered Website Architecture, Confidence to Ex-

plore the Unknown and Poor Usability Blame.

## Testing Overview

Eight users were tested and categorized as four digital immigrants and four digital natives. Digital natives were defined as users born in 1980 or earlier and Digital immigrants were defined as users born after 1980. All participants had no prior knowledge of what the test would entail or any existing knowledge of the case study topic.

All study participants were shown four websites while their voice and screen were recorded using the software Camtasia. The following was the testing script that was used:

### A. Read Introduction:

*Hello, my name is \_\_\_\_\_, and I'll be working with you in today's session. I would like to give you a brief idea of what you should expect and what we are trying to accomplish.*

*Today we are testing your online experience of a couple websites and determining how you feel about them.*

*Your experience here today will help us evaluate different website structures. Remember, you are not being evaluated in anyway – we are simply trying to see how users navigate through the site. Do your best, but don't be concerned with the results. While you are working, I'll be taking notes.*

*Please talk out loud as you go through the site and tell us what you are thinking. You may ask questions, but I probably won't answer them, because it is important for you to go through the site as if I was not present.*

*Afterwards we will have some time to talk about the site and your experience. I will also ask you a few short questions at the end before we conclude.*

*Do you have any questions?*

### B. Testing

The participants were asked to visit the four sites, all of which are considered to be quite cluttered. How will they react to the clutter? Two of the four sites are also quite feature intensive. Will they notice this and be intrigued? Or just ignore the complex features? When usability problems occur do they blame themselves?

1. *Locate the site: <http://www.amazon.com> by typing the address into the web browser.*
2. *Take in the site by looking around the page. Voice your initial opinions of what strikes you first.*
3. *a) What would you want to click on first  
b) Don't click on the link, why do you want to click on it?*
4. *Move around the site and click on anything that in-*

trigues you.

5. Repeat steps 1-4 with the website: <http://www.getdefensive.com>
6. Repeat steps 1-4 with the website: <http://www.zappos.com/>
7. Repeat steps 1-4 with the website: <http://www.gnc.com>

### C. Post-Test Questions

1. What is your profession?
2. How many hours do you spend online per week?
3. How many of those hours are on social networking sites?
4. What is your favourite Web Site?
5. How old are you?
6. How many people are in your household and how many computers do you own?
7. (Digital natives only): between the age of 11-14 how many hours did you spend online per week?
8. How many email accounts do you have? How many are work and how many are personal?

### D. Wrap up

Lastly, the participants were thanked for partaking in the usability test and asked if there is anything else they thought was pertinent to share about the sites.

## Results and Findings

### A. Cluttered Websites Architecture

The cluttered website testing seemed to have the most conclusive results of the three concepts. All four digital immigrants tested identified that one of the two sites chosen to represent over-stimulation was too cluttered or too busy.

Digital Immigrant #1 (DI #1) and DI #2 called <http://amazon.com> busy. DI #4 called <http://getdefensive.com> too cluttered and flashy, while DI #3 mentioned it was too busy.

In contrast only two digital native's mentioned that any of the sites were "cluttered". This may not seem like a huge difference except when you look at the ages of the two digital native's. Both digital natives who also mentioned "busyness" or "clutter" were born in 1981 and 1982, while the two who made no mention of clutter were born in 1990 and 1985.

User	age	clutter
DN 1	20	no
DN 2	29	yes
DN 3	27	yes
DN 4	25	no
DI 1	32	yes
DI 2	44	yes
DI 3	35	yes
DI 4	36	yes

### B. Confidence to Explore the Unknown

Based on the results of how users interacted with advanced features when browsing for items I would definitely say that there is a clash of concepts between Nielsen and Hotchkiss.

While the polarity of these two beliefs might not be as black-and-white as the first, one could even argue that Nielsen might only be referring to a simplistic goal within a website and therefore his user is just not looking to be sidetracked or learn anything new. However I would argue that this is the main difference between the digital native and the digital immigrant; the digital immigrant isn't looking to be sidetracked while the digital native is—they want to see their options and explore. For example, what else could they buy, or what else can they do, what else are they missing—they want more.

Fortunately, in this case, one of the sites <http://zappos.com> has an advanced feature at the top of the page taking up the majority of the top fold. The feature is quite a robust filter found on all sub-category pages. Since all users ended up at a subcategory page at one time or another all were faced to engage with an advanced feature. The divide in the two groups was painstakingly apparent in their body language and vocal confidence expressed when using it.

DN #1, our youngest user at 20 years of age, took one glance at the tool and quickly beamed with confidence about how it worked and how it could be manipulated. Yet if we looked at any of the digital immigrants they fumbled, squinted, and tried to avoid it all together.

### C. Poor Usability Blame

Unfortunately only a few users identified and then vocalized blame regarding an usability issue. In hind-site, it seems in order to test this concept more thoroughly a specific goal should be incorporated into the directions; for example: 'please purchase a product you find of interest'. Giving the user a specific direction may have given more conclusive results. This being said, of the eight participants three ran into usability flaws and vocally expressed blame: DN #3, DN #4 and DI #1.

For example when digital native number 3 was reviewing the site <http://zappos.com> they expressed they wanted to look for watches since the main feature on the home page had a watch on it. However while reviewing the drop-down they saw no option for watches. At this point the subject blames them self for not being able to find it.

## Future Research

Understanding web usability for all users is an infinite task. With ever-developing technology and sociological and cultural differences throughout the world, standards and blanket statements can not always be true. However if a di-

gital divide exists as some researchers believe, so to must this impact the online usability world.

Testing these generations is a good start in finding trends and tracking behaviours so online usability can adapt as quickly as they do. While eight user tests barely scratches the surface of the testing needed, closer to one-hundred participants seems more of a grounded number.

In order to come to a conclusion, I look forward to continuing this case study and developing my hypothesis base around exploring generational differences in web usability and how they are changing here and now.

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