Introducing New Technology at the CBC:

How Age, Habits, and Opinions Affect Acceptance

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Abstract

This study examines how age affects technology acceptance in a corporate environment, using the Canadian Broadcasting Corporation as a testing ground. Using survey results from 140 employees, this research examines the relationships between age and the variables affecting technology adoption, based on Davis's Technology Acceptance Model. By comparison, the study introduces the Technology Index to see what kind of affect technology use has on the TAM variables, and a simple self assessment to operate as another comparison group. In short, the self assessment proved to be the most reliable relationship, followed by the Technology Index, and finally age. All comparisons drew favourable results; however, the self assessment scores delivered the most obvious relationships. The study offers insight into how employees in a large company feel about adopting new technology, and which factors need to be taken into account when introducing a new innovation.

Introduction

Understanding new technology has always has often been associated with youth. Home electronics have taught us that parents need their kids to program the VCR, hook up the new cable box, or show them how to work the new digital camera. While parents taught their kids to ride a bike, throw a ball, or bake a cake, children taught their parents how to send email and use the World Wide Web. While for a long time, parents could claim they grew up in a pre-digital era and weren't up to speed with home computers, electronics, or incarnations of the latest gadgetry, for roughly the past 20 years, technology has been an increasingly large part of daily life, and is constantly evolving to the point where the older generation has been forced to adopt it, if not embrace it.

Nowhere is this more obvious than in the workplace. The age range of employees in a particular office can range from 25 to 65. It’s quite possible the ones closer to 65 were doing their jobs in that field long before the 25 year old was born. Of course many of the tools that exist today did not likely exist 25 years ago, and in some cases, even 5 years go. It seems that every few months a new technology product comes out that promises to change the way we do business, do our jobs, or communicate. Not only do the tools change on a regular basis, the cycles for change are getting shorter, and the employees are required to keep up; sometimes willingly, sometimes against their will.

The Canadian Broadcasting Corporation (CBC) is no exception, constantly watching for technology that would improve their shows, broadcasts, websites, and content packages. Technology, of course, is designed to make our lives easier and our products better. With each new technical development, the picture gets sharper, the sound gets clearer, the graphics get more exciting, and the website becomes more useful. The drawback, however, is that buying the technology is often the simplest part. Getting nearly 10,000 employees on board to understand and use it is the challenge.

Almost every Canadian is at least somewhat familiar with the Canadian Broadcasting Corporation. Created as a Crown Corporation in 1936, the CBC began as a series of radio stations, expanded with the introduction of television in the 1940s and 1950s, and again more recently with the rise of online technologies. Since then, they've developed offices in 27 different locations, including every provincial capital, and employ 8,300 people around the world. CBC offers 28 different services ranging from public TV to digital cable channels, from local radio stations to satellite radio, from basic news websites to the million podcasts which are downloaded from CBC.ca every month (CBC, 2008). CBC is an institution in this country. Canadians rely on the nightly broadcast of *The National* with Peter Mansbridge, the weekly broadcasts of *Hockey Night in Canada*, their news and current affairs radio shows on CBC Radio One (and Radio Two), not to mention the content on Canada's most visited website, CBC.ca.

So while content continues to evolve and technology continues to improve, employees of all ages, in all media groups at CBC are forced to keep up. At the same time, recent university graduates are among the first from the so-called "net-generation" (or

Millenials) to enter the workforce. By all accounts, these young folks are *different.* Starting with those born in 1980, these young employees have been surrounded by interactive technology most of their lives, and are empowered by their use of the Internet and other evolving gadgetry (Kupperschmidt, 2001). Many of them have been using computers since they were children, and relying on the Internet as their primary communication and research tool. They're attached to iPods and cell phones, and have gotten used to a live in an on-demand world, where everything is available at the push of a button or the click of a mouse. As a result they've learned to expect customization and constant improvement of existing technologies (Tapscott, 1998).

It seems very obvious from a strictly observational level that a divide is present. Younger employees, who have grown up with computers, seem to have clearly developed better skills as far as computer use is concerned. As a result, they're less apprehensive about learning a new piece of software of exploring the functionality of a program. Older employees sometimes lack the basic computer skills, knowing only the limited functions they require to do their job, but also have a tendency to cling to the system or technology they are familiar with. In a recent nationwide project, users were asked to upgrade to a new piece of computer software, replacing a system that had been used in radio newsrooms for nearly 20 years. While younger employees embraced the change, felt it was necessary, and easily learned the new system, the old guard was very reluctant to change, many times swearing that they would stick with the old system and never learn the new one (even though that wasn't an option). They were forced to upgrade, and after much kicking and screaming finally agreed to let go of the old system.

Currently, almost all users in live TV, Radio, or Online content production use a piece of computer software called Avid iNews. This includes all news, current affairs, music, and live specials on TV or radio, and also much of CBC.ca and CBC Sports production. The software is a collaborative tool that organizes their broadcasts into show rundowns, coordinates show timing and breaks, provides places to write and edit new scripts, receives and filters almost 20 different newswire services by location or keyword, has a graphical interface to create visual elements for on-screen broadcasts, feeds texts into the teleprompter and closed captioning devices, and is the software used to initiate music logging for CRTC reports and SOCAN payments. There are nearly 5,000 users on the English side of this system alone, ranging from the interns to the executives; from St. John's, Newfoundland to Inuvik, in the Northwest Territories.

iNews is a very standard Windows program, using many of the same menus and keystrokes as Microsoft Word, or Internet Explorer. It has File, Edit, View, menus, uses shortcuts like Control-C to copy, and uses collapsing folder directories just like most normal Windows programs. While most young employees find the program very intuitive and similar to most other PC programs, their older counterparts often need extra instruction during training sessions.

Some questions arise from this seemingly obvious divide. First of all, are younger employees any more willing to accept new technology or is that strictly a false assumption? At the same time, are older employees actually more resistant to technology? While the divide appears to be present, it hasn’t been studied to the point where we pinpoint exactly where the split happens to lie. Is it with employees older or

younger than 40? 43, perhaps? Is there anyway to draw this imaginary line? If there is a divide, can we tell if it is based on computer skills, or established habits? Could the difference just be that employees who have been doing their job a certain way for a longer time are more set in their ways?

Another question that surfaces is if the divide is based on age, or other lifestyle habits and choices. While they may seem interchangeable (i.e. young people use Facebook more, so they're on the computer more, and therefore have more technology in their day-to-day lives), they are actually two very different things. If an older employee decided to use Facebook, a GPS navigator, and read articles about the latest iPhone apps, he or she would likely be as tech savvy as a 20-something, no? So is the question age, or is it habits? So while they're not exactly interchangeable, they are related. Young folks will generally use more technology, but that doesn't account for all of them, nor will is account for older people who have immersed themselves in gadgetry and computers. So is there a way to compare age vs. habits?

David Collier, Director of Media Production Support for CBC Technology, runs the departments responsible for training and maintenance on all the technology for News and Current Affairs broadcasting. He's noticed a shift in mentality over the past several years. "I think we're just now reaching a stage where people accept that [learning to accept new technology] is an acceptable part of employment... When we did training ten or twelve years ago, people were far more ignorant [to computers]. It just wasn't part of their craft. Now technology has expanded and infiltrated, largely thanks to the Internet, and it

became something that was useful in life, not just at work. General computer skills became less of an issue." (Collier, 2009).

Learning how employees accept and adopt these innovations is a matter of importance for all professionals. In any office with a computer system, upgrades eventually become necessary. Any piece of equipment will likely break down and need to be replaced by something newer and more effective. The timelines are the things most changing most obviously. The length of time between upgrades is getting shorter and shorter. Learning what makes individuals accept or reject these technologies, and discovering which factors are actually important in their adoption will allow more effective plans to be developed for implementation of new equipment, software, and technological initiatives. Collier commented on that, as well. "Younger people these days are conditioned for a constant evolution of technology, and they're just more willing to accept that a new technology is always going to be available before too long, so they don't fear it. They expect it" (Collier, 2009).

Fred Davis realized the need for a model explaining levels of technology acceptance in the mid-eighties, leading to his 1989 paper, *Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology.* The Technology Acceptance Model (TAM) was an extension of a psychological theory called the Theory of Reasoned Action (Fishbein & Ajzen, 1975), which stated that beliefs and evaluations were a key factor in intentions, and by extension, behaviour. Davis expanded on this idea and theorized that the two most important factors affecting technology acceptance were Perceived

Usefulness (PU) and Perceived Ease of Use (PEOU). Based on one's perceptions and beliefs, he or she would choose to accept or reject a new technology.

While it may seem somewhat obvious, Davis defines Perceived Usefulness as "the degree to which a person believes that using a particular system would enhance his or her job performance." Similarly, Perceived Ease of Use is defined as "the degree to which a person believes that using a particular system would be free of effort." These two factors directly influence the acceptance of new technology, which is what this project is attempting to measure (Davis, 1989).

So with regard to the CBC and the division between young and old, the question then becomes, "Is age the primary factor affecting PU and PEOU, or are other variables more impactful?"

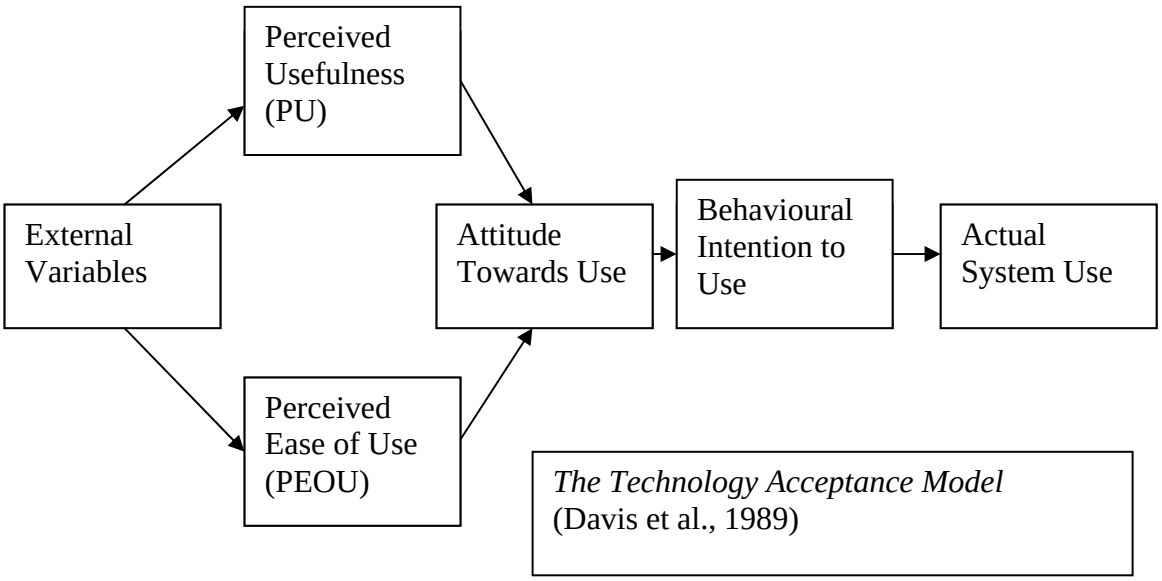
This study will attempt to examine those variables, and how Perceived Usefulness and Perceived Ease of Use are affected by each. The survey takes into account the subject's age, his or her technology use habits, and self-assessment on their proficiency with work and home computers. Comparing these numbers against the opinions on PU and PEOU for iNews will provide an indication as to which variables offer the most predictable results.

Each set of results is broken down into four groups, usually of 35 subjects each. The PU and PEOU numbers fluctuate based on which of the four groups is in question. For example, the group of the 35 oldest subjects has a much different PU/PEOU rating than

the 35 youngest. The series of comparisons will indicate which variable presents the most reliable patterns for predicting PU and PEOU in the future.

Literature Review

The Technology Acceptance Model has been extensively covered in previous research. Originally Davis's doctoral thesis (1986), he turned it into a published paper in 1989. Essentially, argued Davis, the unwillingness of users to accept new technology was costing companies huge gains in performance. After all, even the best computer systems in the world will not help an organization if they aren't used (1989). Based on the "Theory of Reason Action" (TRA) by Azjen and Fishbein (1980), Davis pioneered TAM to make the idea technology specific. Where TRA was designed to explain virtually any behavioural choice by a human, Davis figured there would be a more specific solution to analyze computer-specific choices (Davis et al., 1989). He developed the variables of PU and PEOU to measure the factors involved (Davis, 1989).



The Technology Acceptance Model
(Davis et al., 1989)

The diagram above shows that external variables affect PU and PEOU, which in turn, affect a user's attitude towards using a new technology, and therefore alter his or her behavioural intentions, and thus the actual behaviour (Davis, et. al, 1989). The purpose of this study is to examine if age is the variable that most directly impacts PU and PEOU, or if other factors can be more reliable..

TAM has been used in a huge number of studies since it was introduced in 1986. It has been applied to specific technologies like voicemail (Adams et al. 1992), word processors (Chin and Todd, 1995), spreadsheets (Mathieson, 1991), and more recently e-mail (Gefen and Straub, 1997), the World Wide Web (Lederer et al. 2000), and wireless internet (Kripanont, 2007). Some studies introduce variables such as gender (Gefen & Straub, 1997), social influence and age (Morris & Venkatesh, 2000a, Morris & Venkatesh, 2000b). In their study, Morris and Venkatesh determined that age was in fact a factor affecting technology acceptance, and that each generation, either Baby Boomers, Gen-X, or otherwise each has a unique profile for technology adoption. In a different study, the same duo examined the effects of social influence, stating that outside of Information Systems, there has been quite a bit of research contributing to the viewpoint that social influence plays a critical role in determining behaviour, including the theory on which TAM is based (Azjen & Fishbein, 1980) . Kripanont (2007) found that age was a major factor in the adoption of wireless internet in Thai universities, but it was not the main focus of the study.

Age and technology was previously studied by Czaja and Sharit (1993). They determined that age was associated with slower response times and more user error while testing the

proficiency of users on computer based projects. The fact that this study included subjects as old as 75 in a time when personal computers (1993) were just starting to become mainstream may have influenced the results. Considering 22 per cent of the subjects had no prior computer experience, the test may have had more to do with learning computer basics than accepting a new technology.

Prior to that, a few studies in the mid-1980s proved that older adults could learn computer systems, but generally took longer than younger adults to do so. These studies focused particularly on word processing, which at the time was a common computer function. (Hartley et al., 1984, Elias et. al., 1987). Again, these studies took place in an era when personal computers were still in their infancy, and it is safe to say that user proficiency and technology habits have greatly changed in the last two decades. This study hopes to shed light on today's generations of computer users, as computers and technology have evolved to be much more than word processing tools.

Davis extended TAM in 2000 to include more variables affecting Perceived Usefulness. In the original model, these variables were assumed to be mediated by PU and PEOU, but in the extended version more Image, Subjective Norm, Job Relevance, and Experience are all included as distinct variables. In the end, however, TAM2 is still about how PU and PEOU directly affect behavioural intentions with regards to new technology (Venkatesh & Davis, 2000).

TAM was reviewed in a 2003 paper by Legris, Ingham, and Collerette. They state that TAM has been proven to be a useful theoretical model to describe information system implementation. It has been tested many times and provides reliable results. One criticism

they discussed was the need to collect self-reported data. Most studies didn't track the actual use of the software, but relied on surveys or focus groups. They state that self reported data should only be used as a relative indicator, which is essentially the purpose of the survey in this study (Legris et al., 2003).

Davis's premise was based on the concept of Self-Efficacy Theory, which is defined as "judgments of how well one can execute courses of action required to deal with prospective situations" (Bandura, 1982). According to Bandura, an individual chooses a course of action based on two things: the action required as a result of the decision, and the expected outcome of that decision. Davis spent considerable time extending this model to be technology specific turning those two factors into variables called PU and PEOU, and tested a set of criteria to accurately assess subject's perceptions in relation to those variables. His study included a test of 10 slightly different agree/disagree statements designed to induce an overall measurement of whether the computer software in question (PROFS electronic mail and XEDIT file editor) were in fact perceived as useful and/or easy to use.

Davis's Initial Scale Items for PU included Agree-Disagree statements such as:

- My job would be difficult to perform without electronic mail.
- Using electronic mail gives me greater control over my work.
- Using electronic mail improves my job performance.
- Using electronic mail saves me time.
- Using electronic mail increases my productivity.
- Overall, I find the electronic mail system useful in my job.

His Initial Scale Items for PEOU included Agree-Disagree Statements like:

- I often become confused when I use the electronic mail system.
- I make errors frequently when using electronic mail.
- Interacting with the electronic mail system is often frustrating.
- I find it easy to get the electronic mail system to do what I want it to do.
- It is easy for me to remember how to perform tasks using the electronic mail system.
- Overall, I find the electronic mail system easy to use.

Comparing positive responses to positive terms like “Saves Me Time” and “Accomplish More Work” gave him a measurable number for PU. Comparing positive responses to positive and predictable phrases like “Controllable” vs. negative responses to negative or chaotic things like “Unexpected Behaviour” gave Davis a fairly thorough rating of PEOU.

There is evidence, however, that many studies like that of Davis are wasting their effort using 10-item questions to address a single variable. Zaller and Feldman (1992) wrote that most subjects do not have opinions as specific as the level of scrutiny on many surveys. In fact, seemingly minor changes actually confuse actual attitudes with continued repetition. They propose that fewer, simpler, to-the-point questions provide a truer measure of actual opinions and attitudes. Pointed, practical questions are more effective than repeated items that play on semantics (Zaller and Feldman, 1992). By this logic, using the responses from Davis’s final question (“Overall, I find the electronic mail

system useful.") would likely have offered similar results as the overall tally of his 10-question scale. Using Davis's ideas and Zaller's tactics, this study will use a different kind of survey to examine the nuances of the Technology Acceptance Model. Instead of asking ten slightly different questions about their opinions, this survey asks the subject directly, in plain language, "Did you find it useful?" and "Did you find it easy to use?" This follows Zaller and Feldman's ideas that subjects do not have opinions specific enough to find discrepancies among ten agree/disagree points, and instead uses straight forward language to address Davis's variables.

Another factor influencing the acceptance of technology is the degree to which someone is already technically proficient. Some people, regardless of age, are "computer people" and some people are not. This phenomenon has been broken down into five specific categories explaining that it's not a question of if somebody is going to adopt technology, but how fast. In his 2003 book, Everett M. Rogers called it the Diffusion of Innovation Theory.

What Rogers hypothesized was that some subjects are more inclined embrace innovation than others. While there were innovators making discoveries, inventing better solutions and building new products, not everybody jumps on the bandwagon at the same time. There are people who, by nature, are more likely to experience and take advantage of an innovation sooner than others. Rogers calls them "early adopters." There are others who are always the last to get on board. While IT professionals might call them stubborn, Rogers calls them "laggards." There are also degrees of acceptance between "early adoption" and "laggard." Seventy per cent of the general population falls somewhere in

the middle. Rogers divides them into two halves, calling 34 per cent of the population the "Early Majority" and 34 per cent the "Late Majority."

These categories measure what Rogers calls "Individual Innovativeness," or the degree to which an individual is relatively earlier in adopting an innovation than other members of that individual's social system (Rogers, 2003). Many studies have shown that Individual Innovativeness is tied very closely to PU and PEOU factors. For example, a study of faculty at a large university and found that individual innovativeness had a significant positive effect on both perceived usefulness and ease of use of Internet technologies (Agarwal & Sambamurthy, 2003).

Another model addressing innovation diffusion is Agarwal and Prasad's Personal Innovativeness in the domain on IT (PITT). Where Rogers groups subjects into five distinct groups, the PITT model is more of a continuum, or a sliding Likert scale. PITT can range from low to high and areas in between, depending on what their response was to various statements. Their study examined acceptance of the World Wide Web (1998) and asked them to rate their affinity for new technology on a seven-point Likert scale for four different statements. Where Rogers asked for agree/disagree, Agarwal and Prasad allowed for varying degrees of agreement. The PITT model allowed for more self-reflection during the assessment, the degrees between "agree" and "disagree" needed to be examined (Agarwal and Prasad, 1998).

This study uses a model similar to PITT to gauge how users felt about their own proficiency using computers at work and at home. While proficiency is not the same

thing as acceptance, this variable on the survey will show the connection between the two, and whether any obvious relationship exists.

In a related study, Yi, Fiedler, and Park (2006) looked at online buying habits and the adoption of handheld digital organizers by healthcare professionals, discovering that individual innovativeness had a significant effect on behavioural intention to use the technologies.

What these studies essentially imply is that subjects are aware of whether they are good at using technology, and will adopt a new device at varying paces based on if they're a comfortable "computer person." In other words, how comfortable you feel with current technologies has a strong influence on how you pick up new ones. In this study, we ask subjects to rate their own proficiency with computers both at home and at work, then compare those numbers to PU and PEOU scores. If the Rogers theory stands up, those scoring higher on proficiency scores should show higher scores in PU and PEOU as well.

Aside from the subjects beliefs about whether he or she is a technically inclined individual or not, there are more concrete ways to measure his or her technology habits. In studies where technology use needed to be measured, various survey instruments were created to indicate if a technology was present, and in some cases how often and to what degree they were used. Swamidass (2003) gave a poll to manufacturing plants measuring their use of a certain type of equipment, offering a list of technology and asking them to rate their ability with each on one of three levels. If no level was selected, they were considered a non-user.

This model was based on studies by Richard White and his colleagues (1999) and by Thomas Garsombke (1989). They each offered surveys listing a number of different technologies to see which were in place in certain plants. White listed ten components and asked how long they'd been present in the plant (if they were present). Garsombke listed 30 technologies and the subjects were to check the ones used in their plants. Keeping in mind that access to a technology doesn't necessarily imply use (O'Dwyer et al. 2005), this study adopts a modified version of the survey instrument, taking elements from these studies.

One aspect that will make this study unique is the presence of the "Net-Generation" or "Millenials." There have been many articles written about the particular habits of these multi-tasking, on demand, individuals born after 1980 (Carlson, 2005). Because this generation likely had a computer in their homes and schools from a very early age, their comfort level with technology is at an all-time high for an entire population (Oblinger, 2003). There are no studies thus far specifically about how they adopt new technology. But because they've been growing up with constantly evolving technology their whole lives, some researchers argue that they're better with technology because it's so familiar (Kupperschmidt, 2001). Computers aren't so much a technology for these people, but actually a part of everyday life.

Experts predict that the Net-Generation has the advantage in a variety of categories in today's ever-evolving world. Aside from their basic computer-savvy, they're conditioned to use the full range of technological tools for communicating in what is constantly becoming a more global, network-based workplace. Since they were young, they've

developed relationships via Instant Messaging, Email, and SMS text messages. They're almost oblivious to geographic boundaries, focusing only on the network they're a part of, or the team to which they're responsible (Tyler (HR MAG)).

On the downside, their technology obsession can be counter productive. While research on the Internet can be fast and expansive, many Net-Gen employees lack the foresight (or desire) to confirm sources, vet information, or find non-digital confirmation. Their communication habits can be distracting in real-life situations, as personal phone calls, texts, and instant messages will interrupt the Facebook breaks that interrupt their workday. Although, they're notoriously successful multi-taskers, some of these routines are not accepted in conservative workplaces (Tyler, 2007). Their reliance on networks is a factor compromising their ability to make independent decisions. Any choice has to be run through their friends, their parents, and their online friends through a variety of media and feedback devices before any choice is made. Their obsession with community and networks causes them difficulty in living and operating independently. The same things that hinder independent, however, make them responsible and productive members of groups and communities, especially when objectives, methods, and the rationale behind each are shared and discussed openly.

In terms the scope of this study, it will be noteworthy to see how this unique generation scores in relation to those of different age groups. PE and PEOU are just two factors, but the survey addresses self assessed computer proficiency and overall technology use as well. Their opinions on technology and the pace of adoption should also be examined closely. The following section addresses what this research is likely to prove.

Hypothesis

The results of the survey should make certain things obvious.

H1. There will be a clear distinction that net-gen employees claim higher levels of PEOU and PU for the technology on which they're polled, and would therefore be more willing to accept new technology.

Net-Gen employees have a reputation of being smart but impatient, according to Carlson (2005). Tapscott calls them curious and critical thinkers (1998). Perhaps most importantly, Kupperschmidt tells us that young people are more competent than adults with essential technology (2001). All those descriptions paint a picture of a generation not only willing to adapt and improve, but eager to institute and welcome change. Because they are more competent with computers and also curious and critical thinkers, the idea of learning and applying a new technology will come more naturally to them.

As Dave Collier said, they are conditioned for shorter cycles of technological improvement and more willing to accept change. They do not fear it, they embrace it. So when a new technology is introduced, they're likely to recognize the potential benefits and find learning it to be a more manageable task.

As a result, they will likely score higher on the indicators (measures) pertaining to ease of use and usefulness. Considering most employees of this generation do not have experience with prior systems, and didn't have to "un-learn" anything, their acceptance might also be higher. Even if this wasn't the case, the adaptation to evolving technology

this group has exhibited would still probably lead to less resistance to new information systems.

Employees who worked in the radio department prior to 2003 used a system called Prolog. It was the program that ran the CBC Radio newsrooms for nearly 15 years. At a time when basic computer skills were not necessarily commonplace, many employees learned the bare minimum of what was required to run the software. Because it was based on a command-line prompt system and not standard Microsoft Windows operations, many users didn't learn anything about how to use Windows while the operating system was taking over the industry.

Net-Generation employees, on the other hand, were raised with computers in their house. Many of them watched Windows mature as they grew through adolescence themselves. From 3.1 to 95, 98, 2000, XP etc. there has been a constant evolution of the software just like these students graduated middle school, high school, and university. There has been a consistency in all versions of Windows, however, and most programs that run on Windows follow certain fundamentals. While the younger employees are more comfortable with computers in general, their basic knowledge of how Windows programs work lends them an advantage in learning a new Windows based software.

Because iNews is a fairly simple Windows based program, most new young employees do not require much in the way of training. They experiment, make assumptions (usually correctly), and learn the system based on how they think it would work, provided it's like the rest of the software they know. The employees who only learned to use Prolog for

their specific job functions were intimidated by the new piece of software, even though many of their younger colleagues picked it up with little difficulty.

As a result, younger employees are more likely to find new software immediately useful and easy to learn, rating PU and PEOU higher.

H2. Employees older than the net generation (born before 1980) will claim more resistance to new technology the older they are.

Morris and Venkatesh (2000) had a similar hypothesis for their paper, but their research was psychology based. Casual observation has shown this researcher that younger employees are more receptive to technology training for two reasons. 1) They're more familiar with the technology and 2) They're more willing to do what they're told because they likely haven't been doing their job as long. Older employees resist change because many of them have been doing the same job the same way for many years and are unwilling or a little wary to make an adjustment to something so familiar. Just like the transition from Prolog to iNews, the old familiar system was hard to let go of, even though the new system was (in theory) more useful, more effective, and easier to learn. Collier said this is why many technology projects are hard to institute. It's not that they fear technology necessarily, they just want to avoid change in general (Collier, 2009).

This is where both PU and PEOU become factors. Older employees are more likely to show a lower PU because they know of other ways to do it. They have been accustomed to doing a job a certain way, and often have little desire to change. These attitudes affect how useful a new tool will be. For the same reason, PEOU will likely suffer as well,

because they're learning a different way to do something they've probably already been doing, in some cases for decades.

H3. The primary factor influencing technology acceptance will not be age, but general use of technology. This correlation will be more profound than the correlation with age, as technology users of all ages will agree with this, where non-technical people of all ages will disagree. There will be, however, be a correlation between young employees and uses of technology.

The study will show that there is a stronger relationship between technology use (TI) and technology acceptance (PU/PEOU) than there is between age and technology acceptance. There are users of all ages who will be tech savvy and show high levels of acceptance because they've welcomed technology as part of their lifestyle, however, there are also users of all ages who do not grasp technology as quickly. While there will be a positive relationship between PU/PEOU and age as well due to the documented habits of the Net-Generation, it will not be as obvious as that associated with technology use and PU/PEOU.

At the same time, technology use and age will also show a very obvious relationship, with younger subjects using much more technology. Much of the research done on the Net-Generation refers to the fact that this group uses technology as much for recreation as they do for business purposes. Their day-to-day life is filled with more technology for communication, entertainment, and business purposes. The interactive nature of wired technologies means that social networks are easy to create and maintain, and the wealth of information on the internet makes research and coordination simple. MP3 players and

digital cameras have made personal computers a necessary piece of equipment for arts and leisure. As one researcher put it, “Computers aren’t technology. [Net-Gen] Students have never known life without computers and the Internet... it is an assumed part of life” (Oblinger, 2003). Because of this, PU is way higher among younger employees. Software is easy to learn for Net-Gen kids who spend all day on the computer for personal purposes.

The variable that confuses the issue is that not every young person is a techie. Just like not every older person is a technology-hopeless. There are many older employees who love their computers, Blackberries, and Facebook time as much or more than their younger counterparts. At the same time there are young subjects who do not have a cell phone, who do not go on Facebook, who do not know how to use a computer that well. Because of these anomalies, age is not the most consistent factor on which to base technology acceptance. Technology use habits will be far more telling.

H4. Personal Assessment will be a positively related to PU and PEOU, because those who believe they can handle the technology in their lives, believe they can easy handle or utilize a new one.

As Rogers (2003) said, a person’s individual innovativeness is a trait reflective of their predisposed affinity to innovation. Some people are just naturally more likely to be early adopters and others are just more likely to be laggards. Early adopters would generally not be willing to accept a new technology if a) they weren’t confident they could use it and b) if they were unsure about the technology that already existed in their day-to-day life. Agarwal and Prasad (1998) took a slightly different approach to the same theory,

stating that the categories involved were not entirely distinct, but a continuous scale from innovators down to the last developers. Either way, subjects will have opinions how on they use technology, and whether they are at one end of the scale or the other. Therefore, if individuals state they're proficient with the technology they use daily at home and at work, then it stands to reason that they might be the early adopters of a new technology, seeing PU and PEOU at a higher level than some of their colleagues.

While this is not strictly based on Rogers' model, nor Agarwal and Prasad's, it is consistent with them. Both models said that PEOU and PU were higher in Early Adopters (or in Agarwal's case, higher PITT numbers) than the other groups. We're assuming that having a high self assessment score for technical proficiency leads to at least a tendency to be an Early Adopter. Either way, though, both categories should lead to higher PU and PEOU.

Methodology

The purpose of this research was to determine if age is the primary factor affecting technology acceptance. To collect data, a survey was offered to all users of the Avid iNews system via the built in messaging function (very similar to a basic e-mail, but a specific function within Avid iNews). More than 4,000 users from all CBC bureaus and media groups were invited to take a brief survey. This included CBC Television News and Current Affairs, Radio News and Current Affairs, and CBC.ca groups from each of the 27 locations. Due the nature of how employees use the system, most individuals who work in radio likely didn't read the message because they generally use other systems for sending mail. Only a handful of employees working in radio read iNews mail regularly, although it is used heavily on the television side. This was an understood drawback of iNews mail, but a generic e-mail list would not have worked as a solution either because access to, and regular use of, iNews was critical for answering survey questions. In reality, it was probably actually received and read by around 2,000 employees mainly working in television and online offices across the country.

Great effort was made in the Ethics-Approval process of this research to ensure that all results would remain anonymous and that no pressure would be placed on employees to neither take the survey nor fear any fallback as a result of their participation or lack thereof. All responses were entirely voluntary and employees were offered no compensation. Their only reward was knowing that they were aiding a CBC colleague with his research project. CBC Director of Media Production Support Dave Collier approved the use of company resources to deliver the survey. His contact information

was listed, as was that of the principal researcher in case of questions or comments. No feedback was received by the researcher, excluding informal and conversational references to the survey.

The survey (attached in Appendix A) was posted on the Internet and left active for ten days. It was delivered using a website called SurveyMonkey.com. All employees were made aware of the survey through iNews mail which meant they had access to a computer and Internet. They were informed the survey would only take a few minutes to complete. In reality, it would have required a maximum of ten minutes to complete, but more likely took closer to five. Two follow-up notes were sent during that period reminding employees that the survey was still active and that more responses were required. By the last day, 146 responses were submitted. It is impossible to say exactly what this represents as a precise response rate due to the nature of the iNews mail system. Although the message was sent to about 4,000 employees, less than 2,000 (employees with accounts on the TV server) would be in the habit of reading it, and likely much fewer than that actually did. If an employee didn't log in during that time, the message would be purged after seven days, whether it was read or not. If an employee logs in to perform a certain task (write a script, line up a show, read a newswire), there is no requirement that they read their iNews mail. An informal poll of the iNews system administrators estimated that no more than 1,000 employees would likely have read the message. If that were the case, a response rate of 14.6% would have been registered, however, there is no way to definitively say with any accuracy. As a result, this study should strictly be seen as an exploratory study and its statistics should be interpreted in that light.

Survey questions ranged from general demographic information to subjects' computer and technology habits. Of the demographic information, age was the critical variable collected. Not only is it one of the main concerns in this study, but it was necessary to see which subjects fell into the Net-Generation/Millennial group. Morris & Venkatesh (2000) indicated that each distinct age group exhibited different characteristics in adopting new technology. Charting PU and PEOU against subject ages would prove if the Net-Generation really is as tech savvy as indicated in previous studies, or if other generations are just as likely to adopt a newly introduced innovation (Kupperschmidt, 2001, Tapscott, 1998). There were also questions that asked at what age subjects started using a computer, how they felt about the pace of technological change for CBC software and equipment, although these responses were not used in the finished study.

They were asked to rate their own proficiency with both work and home computers, on a scale similar to Agarwal and Prasad's PITT (1998), to indicate how well they thought they were adjusted to the technology they already used, which by extension would affect how they use new technology. High PITT scores were associated with higher PU and PEOU scores (Agarwal and Prasad, 1998), so conceivably high numbers on this self-assessment would also associate with high PU/PEOU numbers.

In one section, ten different kinds of modern technology were listed to gauge how often subjects used them. Similar to Swamidass (2003), White et al. (1999) and Garsombke & Garsombke (1989), a list of technology was provided in the survey. Intending to include a mix of "commonplace" tools like DVD players or the World Wide Web, and some more "cutting edge" technology (GPS Navigation, Smartphones), the list offered technologies

most employees would have access to in their home or work environment. Because access does not equate directly to use (O'Dwyer et al. 2005), participants were to answer how many days a week they would actually utilize a particular technology. These numbers when added would become a rating of their tech-habits that we're going to call the Technology Index (TI). The highest possible TI is 70, which would require using all ten technology items every day of the week. There were also questions pertaining to their attitude about using their personal computer. The items listed were intended to be fairly modern technology, but mainstream enough that the subjects would be familiar with them and likely make use of at least a few of them. The items listed were:

- Facebook/Social Media
- GPS Navigation
- DVD Player
- Digital Camera
- Cellular Phone
- Smartphone/Blackberry/Organizer
- iPod/Music Player
- World Wide Web
- Video Game Console

The final section had to do with the iNews software and the its perceived usefulness and ease of use. The two factors Davis (1989) created to measure technology acceptance are the keys to deciphering which variable most directly relates to the adoption of the software. Because it is a fairly simple tool that is used in every CBC newsroom, every

user is now familiar with it. Also, because it's a rather specific software for this particular niche market, most users wouldn't have used it before working at CBC, which allowed us to ask questions about their perceptions of their first exposure to it, and their eventual acceptance of it. Depending on the employee and where he or she is located, there may have been formal training involved, or it may have been a situation where they learn by observing someone doing a similar job, and experimenting. Because their experiences involve a variety of learning methods for an unfamiliar piece of technology, this is the section where the TAM elements were queried. Questions about PU and PEOU in relation to iNews are going to the primary indicators measuring technology acceptance. This section was directed at collecting Davis's Technology Acceptance Model (1989), using an approach modeled after Zaller and Feldman (1992).

Comparing the age of the subject, the Technology Index, and the TAM responses will allow us to make some inferences as to which factor is more relevant. At the same time, this study also examines the personal assessment of proficiency, and how that compares to PU and PEOU, in accordance with Rogers' model for Innovation Diffusion. While the nature of the work at CBC would lead to greater technical literacy in general (many journalists, producers, writers, etc. spend their entire days at a computer), that fact should help minimize confounding variables by providing a subjects that are somewhat more homogenous.

Findings

Of the 147 surveys completed, only 140 (95.2%) of them filled in all the questions required for analysis comparing age, TI, and the variables important to Technology Acceptance Model. The rest had questions left unanswered or entire sections that were skipped. For the sake of averages and consistency, the empty responses were discarded. A variety of interesting trends were noticeable, some of which confirm the hypotheses, and others that present anomalies that could require attention in future research projects. Age, TI, , and SA (the proficiency rating based on their self-assessment) were the three factors compared to the TAM variables PU and PEOU. Drawing comparisons between those sets of data reveals which variables result in predictable patterns, and which are more influential on technology acceptance.

Age

The 140 complete surveys represented subjects with a wide variety of ages. Three subjects registered in the 18-21 age group, and two were in the 61-64 group. This was not surprising considering the bulk of the workforce is old enough to be out of university, which explains the lack of responses under the age of 22. On the other end, due to recent financial strains, many CBC employees nearing retirement age were offered incentives for retiring early, which could explain the lack of responses for subjects over the age of 60. The vast majority of subjects reported they were somewhere between 22 and 60, with the average age group being in the 38-41 year old range. The most well represented age groups were 30-33 (23 responses), 26-29 (18), and 49-52 (18). Overall, the whole range

was covered and the survey results benefited from the variety represented.

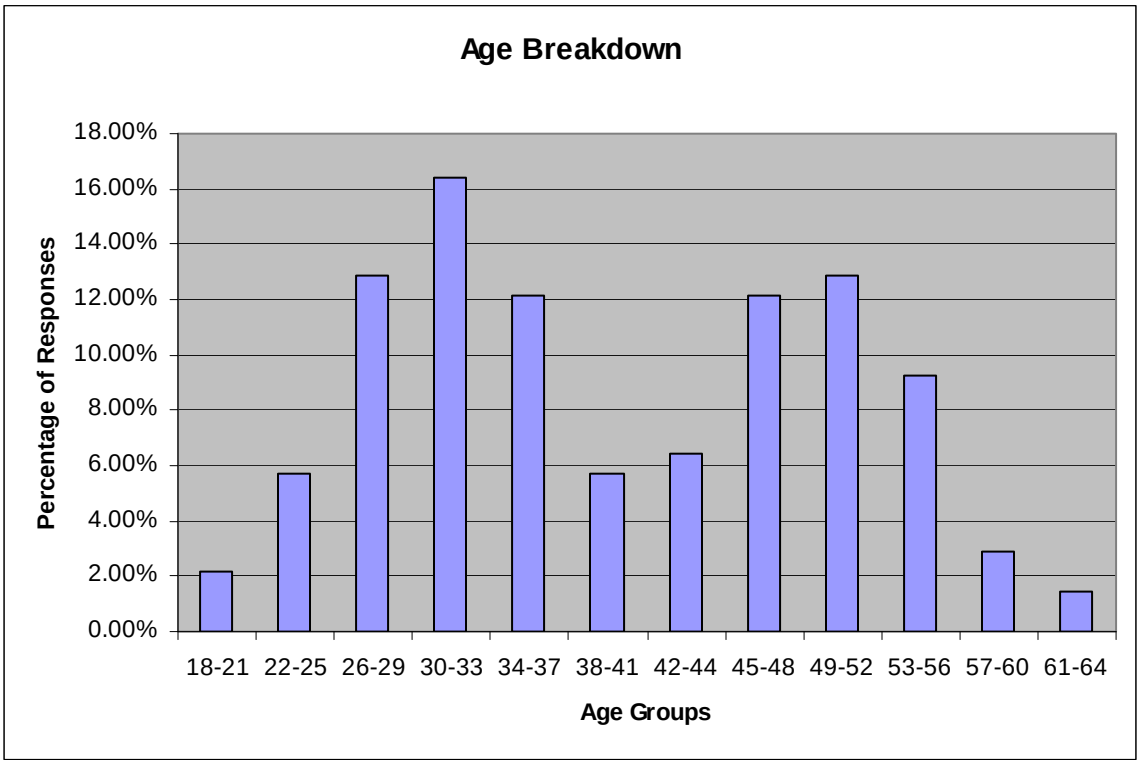


Figure 1. Age range breakdown for survey responses.

Technology Index

The Technology Index (TI) was calculated from the total number of days of use (UD) indicated for each of the listed technologies. The technologies surveyed were Facebook/Social Media, GPS Navigation, DVD Player, PVR - Digital Video Recorder, Digital Camera, Cellular Phone, Smartphone/Blackberry, iPod/Mp3 Player, the World Wide Web, and Video Game Consoles. The highest possible score would be 70, which would occur if a subject claimed to use each of the ten technologies every day. The lowest TI score would be 10, because the lowest possible usage (0-1 day) still counted as 1 usage day (UD) for each of the ten technology items listed.

As expected, the final TI numbers ranged from very high to very low. Only one user claimed the absolute minimum of 10, but everybody else was somewhere between 12 and 62. The average TI over the 140 surveys was 31.44. The World Wide Web was the most popular technology which averaged 6.52 UD/week per user. Video game consoles were the least popular technology, averaging 1.4 UD/week per user. GPS Navigation was a close second for least popular, with 1.46 UD/week. The findings would indicate that, on average, a CBC employee utilizes these particular technologies about 31 times a week, which is between 4 and 5 times a day. That would indicate a fairly high comfort level with at least one of the technologies listed, or at least moderate use of several of them. In short, the average subject is not a stranger to technology.

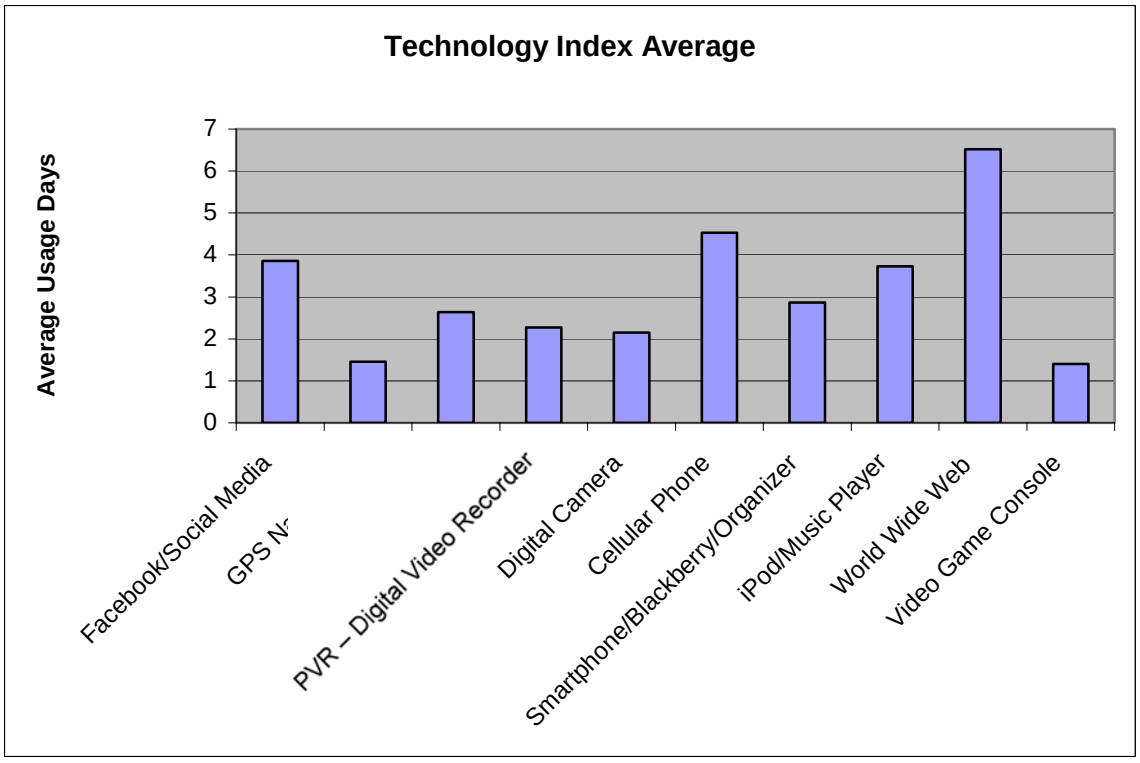


Figure 2. Average ratings for each technology factored in the Technology Index (TI). Average total TI was 31.44.

TAM Variables

The variables in the Technology Acceptance Model are Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). In relation to the Avid iNews software, the survey asked users about their perceptions when first introduced to the program and their opinions today (assuming that many of them have now been using the software regularly for months/years). The four questions that were used to measure PU and PEOU were (5 point scale, Strongly Disagree vs. Strongly Agree- in relation to the iNews software):

1. At first, I found it easy to use.
2. Initially, I thought it would be useful.
3. Today, I find it easy to use.
4. Today, I find it useful.

On the survey results, 1 represented "Strongly Disagree" and 5 represented "Strongly Agree". All results averaged to the Agree/Strongly Agree side, with the "Today" results (Questions 3 & 4) considerably higher than the "At first/Initially" results (1 & 2). Technology Acceptance, however, relies more heavily on initial impressions than the opinions developed after the fact, so the first two questions are more critical to the core nature of the study. Averages for the first two questions were 3.59 and 4.09 respectively, indicating that users generally agreed more than they disagreed. These questions relied on users to recall their thoughts about this program from their first exposure to it, which in

many cases could have been months or years ago. These memories have been skewed over time, but for this study, it is the best available gauge.

For employees who work in radio, their training would have taken place since 2004 when iNews replaced Prolog. For television users, however, it could have been as long as ten or more years ago. Their memories and perceptions are the only indicator of PU and PEOU in the past. In future studies, it may be worth targeting only new users of a particular system to collect results at the time of training, instead of after the fact.

For the next two questions, once users became more familiar with the software, opinions were even more favourable registering a 4.16 average and a 4.24, respectively for questions 3 and 4. This indicates that most employees surveyed leaned heavily to the Agree/Strongly Agree side, which is to be expected as comfort levels increase over time. This number is also more reliable because it is based on current opinions and not thoughts or memories from the past. Unfortunately the study was geared at examining subjects and their opinions on accepting a new piece of technology, not their opinions on that technology that they're now quite familiar with.

Self Assessment

The last variable that this study will examine initially is the technology proficiency rating of the subject according to his or her self-assessment on two survey questions. Subjects were asked to rate their proficiency on a scale of 1-9 (1- Awful, 5-Average, 9-100% Proficient), once for the technology they use at work, and once for the technology they use at home. Those two scores were averaged to create a general Self Assessment (SA)

score. The results ranged from 3 to 9, with 9 being the highest possible score. The lowest could have been as low as 1. The average SA score was 7.26, indicating that most users believe their ability is almost exactly between Average and 100% Proficient.

Independently, self assessment for the proficiency in the "Work" category rated slightly higher proficiency than the "Home" category, at 7.37 vs. 7.16 respectively. Surprisingly, 27 users (19.3%) claimed they were 100% proficient both at home and at work. While this number is not directly based on Rogers Innovation Diffusion scale, it should be noted that, on average, only 16 per cent of all subjects fall into the Innovator or Early Adopter categories. This raises the issue of whether proficiency on current technology alone is enough to inspire the adoption of a newer technology.

Technology Index vs. Age

The variable of Technology Index (TI) revealed some interesting results and relationships with other numbers, and may also likely require further refinement. Initial analysis of the Technology Index compared to the specific age groups in the study did not produce a perfect positive relationship, where TI increases as age decreases. There were several other things, however, that could be drawn from comparing these two variables.

First of all, it should be noted that the highest TI scores were from individuals over the age of 30. Loosely stated, the oldest "Net-Generation/Millenials" would be 29 (those born in 1980). Oddly enough, however, none of the 29 Net-Generation subjects were among the highest nine individual scores for technology use. Of the 140 subjects, no Net-

Generation subjects appeared in the highest nine TI scores. Two Net-Generation subjects tied for the 10th spot, nearly 20 Usage Days behind the highest score, and several UDs behind some users in the late 40s and mid 50s. Right away it became clear that age is not a clear indication of ones technology use habits. Instead, the results indicated that the highest 6 per cent of individual scores belonged to subjects outside of the Millennial group.

Subject's Age Group	**Individual TI Score**
30-33	62
38-41	52
45-48	51
41-44	50
41-44	50
30-33	49
34-37	49
30-33	47
49-52	46
53-56	45
45-48	44

Figure 3. The ten highest TI scores came from subjects aged 30 and higher.

As far as the age groups surveyed go, the highest average TI belonged to the 30-33 year-old group with 36.52. Obviously, this means that none of the groups within the age groups considered part Net-Generation were exceptionally techie. The few 18-21 year-olds had the second highest average at 35.67. 42-44 was the third highest age group, with a TI of 35.33, only slightly lower than the 19-21 year olds. The lowest average TI was registered by the 53-56 year-old group, at 22.69. 57-60 year-old finished slightly higher with 23.75.

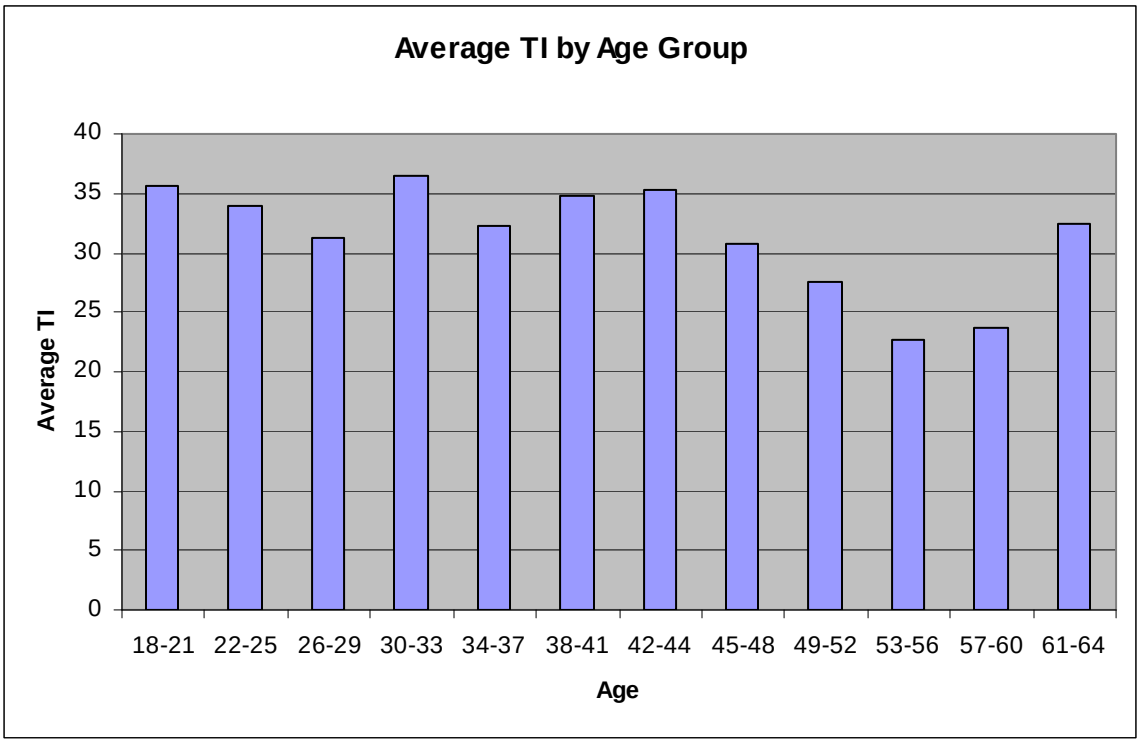


Figure 4. The highest TI scores were not found in the Net-Generation age groups. Average TI ranged considerably and unpredictably.

It is obvious from these numbers that the TI scores to not necessarily correlate in any sort of pattern to the specific age groups. Literature suggesting that the Net-Generation begin with 1980 birthdays, would include everybody from 18-29 in that window. To see if their numbers were special or unique compared to other age groups (all roughly a decade long), the results were split into four groups: 18-29, 30-41, 42-52, and 53-64.

The 18-29 group, which should consist of solely Net-Generation employees, averaged a TI 32.48, roughly one UD higher than the total average, an increase of only 3.33 per cent. While it indicates this population statistically uses more technology, the difference is not substantial, at least when measured in these terms. The other thing worth noting is that

the average for employees aged 30-41 was 34.71, which is 10.41 per cent higher than average. Users in their 30s, therefore, reported more technology use than the tech savvy whiz kids of the Net-Generation.

The most predictable part of this portion of the study was that the average TI scores for the older employees were lower as age increased. The third group (age 42-52) had a TI of 30.41, 3.27 per cent below average. The last group (53-64) was substantially lower, with a TI of 23.95. This is 23.82 per cent less than average.

Age	Avg. TI
18-29	32.48
30-41	34.71
42-52	30.41
53-64	23.95
Total	31.44

Figure 5. Average TI for each Age Group

So, while the Net-Generation turned in higher numbers than those over 42, it appears that affinity for technology use is more prevalent in those born as many as 10-12 years before the oldest Millenials. While there appears to be a noticeable divide in the day-to-day use of technology, it doesn't appear that the Net-Generation was the group who led the change. Their older brothers, sisters, and in some cases, parents may have helped shape their technology habits.

Age vs. PU/PEOU

Comparing Age to the variables affecting Technology Acceptance (PU/PEOU) delivered results fairly consistent with the previous section. While the PU and PEOU answers from all age groups ranged all the way from 1 to 5 (Strongly Disagree to Strongly Agree), the averages tell which age groups would be most likely to adopt a new technology easily based on the Technology Acceptance Model proposed by Davis.

To keep this section consistent with the others, the age groups were broken down into four, each roughly 10-11 years in length (18-29, 30-41, 42-52, 53-64). In theory, higher degrees of agreement on "At first, I thought it would be easy to use" and "Initially, I thought this would be useful" would indicate better chances of technology acceptance. As stated above, the whole sample (140 responses) averages for these two questions were 3.59 and 4.09 respectively.

For the first question, regarding PEOU, age did seem to be a fairly influential factor. The youngest group, 18-29, posted the highest number at 3.72, followed closely by the 30-42 group at 3.71. The .01 difference really is meaningless considering it represents a .25 of a per cent change. The trend is more noticeable as the 42-52 group measured a 3.52 and the oldest group (53-64) measured 3.26. Just like in the previous comparison, the two younger groups were higher than average, and the two older groups were lower than average.

For the second question, a similar trend developed. However, the second age group (30-42) ranked slightly higher than the first (18-29), although the numbers were very close

again. The youngest group's PU was 4.17 and the second group was 1.44 per cent higher at 4.23. Again, both of these numbers were above the average of 4.09, but both were close enough that neither age group could claim any sort of advantage.

Age	PEOU (Q1)	PU (Q2)
18-29	3.72	4.17
30-41	3.71	4.23
42-52	3.52	4.02
53-64	3.26	3.74

Figure 4. Age Groups' average responses on TAM Variable Questions

The two older groups, however, again measured below the average. The 42-52 group's PEOU was 4.02, and the 53-64 group was 3.74. There seems to be a pretty strict division based on age, however the two younger groups seem to post similar numbers. The Net-Generation didn't test any higher than the 30-something crowd again, which would indicate that some of the literature claiming their superiority in technology matters may be exaggerated. It is clear however, that the average user over the age of 42 will adopt new technology slower, based on Davis's model.

The "Today" versions of the questions yielded some similar trends and some anomalies, although numbers in each case were higher and less consistent. For "Today, I find it useful" the two younger groups averaged the exact same number at 4.31, while the older two were considerably lower at 3.93 (42-52) and 4.05 (52-64). For the last question "Today, I find it easy to use," numbers were sporadic where the youngest group and the

oldest group were similar (4.24 and 4.26), but close to the average (4.24), while the 30-42 group measured a 4.4 and the 42-52 group, a 4.04.

While the first "Today" question roughly fits the mould created by the "At First/Initially" set, the last question offers a set of seemingly random results that do not fit any particular pattern. While certain patterns are obvious in the Age vs. PU/PEOU comparisons, they are not reliable and are not likely the best way to predict any reliable results. And again, technology acceptance is based on what the user felt at the time, not months or years after the fact, so the “Today” numbers might not indicate what Davis intended to be the important numbers.

Technology Index vs. PU/PEOU

For this section of comparisons, we again divided the 140 responses into four groups of 35, ranked in order of their TI scores. Age, in this case, was removed and TI was compared in relation to PU and PEOU. The four groups were numbered from lowest to highest, in relation to their TI average. The 35 subjects Group 1 had a TI average of 19.8. Group 2 had a TI Average of 28.51. Group 3 was 34.60 and Group 4, the best 35 TI results, registered an average of 42.82.

Group 1, the lowest TI scores, also ranked lowest on the PEOU and PU tests. For question 1 ("At first, I thought it would be easy to use"), they averaged a 3.40. For question 2 ("Initially, I found it easy to use"), they scored 3.91. Both scores were well below the total sample averages of 3.59 and 4.09.

Groups 2 and 3 posted similar numbers for PEOU and PU. The first question brought the exact same average of 3.60 from both groups. Question 2 results were also similar, however, Group 2's average was slightly higher than Group 3 (4.11 vs. 4.06). Again, both were very close to the average scores, which is to be expected, considering they possess the 70 scores in what would be the heart of the bell-curve.

Group 4, not surprisingly, posted the highest scores for each question. The group with the highest TI also rated the highest average for PEOU (Question 1 - 3.77) and PU (Question 2 - 4.36). As expected, these scores were well above average.

TI Rank Group	Average TI	PEOU (Q1)	PU (Q2)
1-35	19.80	3.40	3.91
36-70	28.51	3.60	4.11
71-105	34.60	3.60	4.06
106-140	42.83	3.77	4.26

Figure 5. Technology Index's bearing on TAM Variables

Like the age comparison, questions 3 and 4 were less predictable. Groups 1-3 all scored very similarly, and finished in unpredictable orders for each of the questions. All three groups were below the average, meaning the highest 35 scores (Group 4) had an average high enough to compensate for the lowest 105 scores. Group 4's average for question 3 was 4.40, and 4.46 for Question 4.

These results indicate that a high TI score leads to high PU/PEOU scores, but the results may be less predictable as TI scores decrease. Group 4's results were way above the average and higher than any group examined thus far.

Self Assessment vs. PU/PEOU

The last variable examined was the Self-Assessment score (SA) for proficiency with computers at work and home. Numbers in this case ranged from 3 to 9, with the average being 7.26. Like with the TI scores, the results were arranged in order then divided into four groups.

Group 1 had an average SA of 5.43. Group 2's SA was 6.97, while Group 3's was 7.84. Group 4 was 8.81. Comparing to the same PU/PEOU questions, similar patterns emerge, although in some cases the lows were lower and the highs were higher. For question 1 (PEOU), Group 4 measured a number higher than any other group tested. Group 4, the subjects with the highest self-assessment, reported a 3.86 on the PEOU question. Each of the other groups rated progressively lower. Group 3 measured 3.74, while Groups 2 and 1 posted a 3.69 and 3.31 respectively.

Question 2, again, showed similar results albeit with higher numbers. Group 4 was the highest again at 4.31, followed by Groups 3, 2, and 1, in that order (3.83, 4.14, and 4.17). As with the previous question, Group 4's score was the highest of any of the variable groups tested.

SA Score	PEOU (Q1)	PU (Q2)
5.43	3.31	3.83
6.97	3.69	4.14
7.84	3.74	4.17
8.81	3.86	4.31

Figure 6. Self Assessment (SA) scores vs. TAM Variable Questions

Questions 3 and 4 provided similar results, with a minor anomaly. Group 4 was the highest score for question 3, with a 4.45. Group 3, however, scored the highest on Question 4, barely surpassing Group 4 with a 4.40 (compared to 4.37 for Group 4). In each case, the responses were the highest measured compared to any other group.

Other Numbers

There were a variety of other statistics collected on the survey. This particular study ignored certain demographic information like gender and job type. It also did not take into account several of the other questions asked on the survey. Whether or not someone was trained on the software, whether they enjoy using computers, whether they had to "un-learn" a previous system, etc. would all factor into their adoption of the iNews system. Future studies could include these other variables.

Discussion

Results

The results of this survey answered some questions, but also raised new ones. Many of the numbers added up as expected, but in almost every comparison, there was some sort of inconsistency, or a result that seemed out of place. In some cases, it may have been the result of a poorly designed survey question, and in others it was likely just incorrect assumptions. Discussing the findings might help address some of those anomalies.

The Age category was diverse and well populated. Initially, there was concern about if there would be a suitable sample size, and if so, would the ages be varied enough to represent a broad sample for comparison. Considering there were subjects in 12 different age groups and five (possibly six) decades were represented, the results were able to offer a fair assessment of average opinions based on that variable.

The Technology Index (TI) was an interesting first attempt at quantifying technology use. The technologies chosen on the survey were meant to consist of modern devices, yet not so cutting edge that they'd alienate average subjects. It was supposed to be a variety of things that employees might use on a day-to-day basis, and for the most part, it seemed to work. In retrospect, the number may be flawed due to some of the technology chosen, and in later sections, some changes will be proposed to make the number more reliable. For example, some technology was an “all or nothing” answer. Most employees with a GPS unit in their car would mark down that it’s used 7 days a week, because it’s on while

they drive. Subjects without one, or who do not drive, are likely to mark a 0-1. Those with a Digital Video Recorder (PVR, TiVo, etc.) could argue the same way because it's programmed to record shows every day, even though they may get watched in bunches on one day.

When Davis (1989) tested TAM, he had his subjects respond to certain statements that reflected Ease of Use and Usefulness. Essentially, by asking them to agree, or disagree with each of six statements, he developed a rating for PU and PEOU. In this study, it was one question straight to the point. Based on the concept that subjects do not usually have opinions at the specificity required for a detailed multiple point question (Zaller & Feldman, 1992), and the fact that the questions were simple and easily understood, this modification was an attempt to keep the survey to a reasonable length so that it could be completely quickly and easily. While it may be difficult to say if this affected the results in comparison to a strict TAM model, the results are consistent within this study, which allows comparisons to age and TI to be valid. As stated in the previous section, the four questions were divided into two parts: initial impressions (Question 1 and 2) and current impressions (Questions 3 and 4). Because initial impressions required subject to remember how they felt about the program months or years in the past, their results are based entirely on memory and may have altered over time. Oddly enough, those initial impressions seemed to be more consistent than the current impressions.

Self Assessment (SA) was examined just to see if users were aware of their prowess, or lack thereof. It was not initially intended to correlate to Rogers Innovation Diffusion Theory, but many of the same ideas applied to both. While all the questions were

answered through ones own personal bias, it is not a stretch to think that somebody who rated their computer proficiency very low might have also indicated that they didn't find the software particularly easy to use. Conversely, it makes sense that a user who rates his or her proficiency as 100% (as many users did), they're probably more likely to claim that iNews was simple for them to use. The other question raised by this statistic is that the average SA score was 7.26 out of 9. The average score was 45.2 percent higher than the choice marked "Average," which makes one wonder what makes these subjects believe they are all better than average, or to whom they are comparing themselves. It is certainly a stretch to think that there are just as many employees somewhere else in the company who would mark the survey halfway between 0 and 5 to balance it out. The survey didn't specify, however, to whom each user was to compare him/herself. Because these employees sit at a computer all day, it's likely that they compared their computer skills to the general public, many of whom do not spend their time at a PC.

As stated above, an interesting finding in the Age vs. Technology Index comparison was that none of the highest TI scores were found within the "Net-Generation" demographic. The highest Net-Generation subject was tied for 10th highest, which goes against the (perhaps anecdotal) evidence that they're super technical and attached to their gadgets. The 30-42 age group was the overwhelming winner in that category, begging the question of why that might be, considering there are a number of articles stressing that the Net-Gen subjects are constantly plugged in. The answer may live in the make-up of the TI score. A few of the technologies listed could fall outside the normal habits of a 18-29 year old. While Facebook, the World Wide Web, and the cellular phone/Blackberry may be almost guaranteed 7s out of 7 for most of them, many Net Gen subjects might rarely

use a DVD player, preferring instead to download or stream movies and television shows. Many employees in this demographic may not own a vehicle either, let alone one that has a GPS system. Again though, an older employee had GPS in his or her car, that might register as a 7 out of 7 too, boosting that score. They may be less likely to download a TV show, though, which is a technology unaccounted for in this study. The measurement system for technology use should be refined.

Again, it was the 30-42 year age group that threw the Age vs. PU/PEOU numbers out of order. While the Net Generation posted numbers higher than average, the thirtysomethings were almost identical for PEOU but higher for PU. The important thing to note, however, is that there was a noticeable trend in the numbers. The two younger age groups were well above average, and the two older age groups were below average. The statistics confirm that, but do not necessarily support the technological dominance of the Net Generation.

Although, it is clear that TI is a number that could use a little reworking, it was the critical factor in this test. The fact is subjects with higher TI scores ranked higher on the PU/PEOU questions as well. There is an obvious correlation, especially considering the group with the highest 35 TI scores ranked higher on both of the main questions than any particular age group. By extension, it would be logical to assume that subjects who use a lot of technology would be most likely to embrace a new technology, regardless how age.

Self Assessment (SA), however, seemed to be the most reliable number for predicting PU/PEOU. Users who believed they were very proficient with their home and work computers also believed that iNews was going to be useful and easy to use when they

first were exposed to it. These numbers should be taken with some hesitation, though, because they're somewhat self-fulfilling. If somebody says they're a perfect computer user, they're not likely to say they found a particular software difficult to learn, or that they do not find it useful, though they likely rely on it to do their job. Overall, users in the highest SA group posted the highest numbers for PU/PEOU of any group tested, which raises the question of if the easiest way to find out if somebody is going to grasp a new technology is simply to ask them.

To expand on this study, it would be interesting to investigate the relationship posed by some of the other questions on the survey, or to use a different formula for calculating the Technology Index, perhaps incorporating some of the other survey items. There are, no doubt, countless other comparisons to make, and a variety other conclusions at which to arrive.

Hypotheses

The research confirmed some assumptions, but also raised some more questions. Examining the expected findings in the form of the hypotheses will allow some opportunity for analysis.

H1. There will be a clear distinction that Net-Gen employees claim higher levels of PEOU and PU for the technology on which they're polled, and would therefore be more willing to accept new technology.

This statement is somewhat true, yet not bulletproof. In the Age vs. PU/PEOU questions, the Net-Gen age group (18-29) did, in fact, post numbers well above average. They did

have the highest PEOU score, and were very nearly the highest in the PU section. The most notable fact, though, was that in many cases the next age group (30-42) scored as well or better than the Net-Generation. They used more technology, on average, and posted almost identical numbers for the TAM variables, which indicates that they are as technology-friendly as the Net-Generation, if not more so. There was a clear indication, however, that employees in older age groups did post notably lower levels of PEOU and PU.

The research indicates that the 30-42 generation is just as wired for technology as the younger decade, which would be a shift in popular thinking. One factor worth considering is that those in their thirties knew life before the technology boom, and remember life without constant connectivity, and therefore treat the technology differently. They knew how to live without it, and had to learn and adapt to live with it. The Net-Generation, however, has never known life without it, so it is an assumed part of life. While the volume of use seems to be fairly even, the attitudes surround that use are extremely different.

H2. Employees older than the Net Generation (born before 1980) will claim more resistance to new technology the older they are.

Again, this statement is not entirely true. Just like in Hypothesis 1, the cut off does not seem to be 1980, but perhaps closer to 1970. H2 certainly doesn't apply to the 30-42 group whose scores were comparable if not better than the Net Generation's. Beyond 42, however, average TAM scores dropped drastically, and were lowest among the oldest

employees. There are exceptions, as well, considering high PEOU and PU scores were found in every age group.

The danger of this kind of research is often that the aim is to generalize subjects to that broad, sweeping, statements can be made. Of course, trying to make an accurate statement about the habits of 140 unique individuals can often prove troublesome. There are always going to be exceptions and anomalies, and in this section of the study, it was no exception.

H3. The primary factor influencing technology acceptance will not be age, but general use of technology. This correlation will be more profound than the correlation with age, as technology users of all ages will agree with this, where non-technical people of all ages will disagree. There will be, however, be a correlation between young subjects and uses of technology.

Once again, this statement is mostly true. The younger half of employees posted a Technology Index, a number designed to quantify how much technology a subject uses, that was well above average. The older employees, on average, posted lower TI scores. Age aside, however, TI scores were very effective in predicting higher PU/PEOU scores. Age results were lower and less consistent, while TI scores were highest and generally followed a predictable pattern. Also worth noting is that the highest TI scores came from some of the older employees, which indicates than many of our older subjects also ranked very highly in the questions regarding TAM variables. TI, therefore, IS more reliable than age.

H4. Self Assessment will be a positively related to PU and PEOU, because those who believe they can handle the technology in their lives, believe they can easy handle or utilize a new one.

This hypothesis was confirmed. In each of the four groups, as the Self Assessment average increased, so did the PU and PEOU scores, without exception. The highest Self Assessment scores also posed the highest PU and PEOU scores of any group tested (Age, TI, etc.) and the lowest SA scores corresponded with the lowest PU and PEOU of any group.

As previously stated, this line of questioning is treading a fine line between fact and self-fulfilling. If people think they are good with computers, they seem to think they're more willing to accept a new technology. While that seems like it makes sense, it can also be seen as a convenient opportunity to stroke one's own tech-ego. If a user claims to be highly proficient, they'd certainly be less willing to admit that they found a piece of software difficult to learn.

The other side of this, however, is that the entire project is based on survey data, which is all subject to the opinions, biases, character flaws, and logic of those taking the survey. We are to assume that everyone answered honestly and therefore, the best we can do is assume that they are, in fact, proficient, and that they would be more likely to accept a new technology based on TAM variables.

A more rigourous test would involve observation and empirical testing of the introduction of a new technology, compared to previous assessments of the technical ability of the

subjects involved. Something like the tests that Czaja and Sharit (1993), Hartley et al. (1984), or Elias et al. (1987) would be required. Introduce a new technology, observe closely, and devise an empirical measurement of usability, or a scale on which to base the level of acceptance. Instead relying on the subjectivity of those being tested, the results of the test would provide objective, measurable, data. This sort of information could be useful when compared to subjective survey results, considering TAM is still based on a subject's perceptions.

Research Design

Much of the discussion thus far has been in regards to the variable of Technology Index. Although, the numbers actually did support the hypothesis in this case, a better TI formula should be developed. How many days a week subjects use a specific technology is a start to measuring technology habits, but quite limiting. If somebody uses the World Wide Web to check email everyday, and somebody else uses it to research and write server-side code for web development everyday, should those two functions measure the same on the TI scale? The way it was designed for this survey, they do. In the future, however, they should not. The fact that somebody uses a technology should not be the only variable. It should include how well they use the technology and for what functions. Swamidass (2003) addressed this with their scale, which included three options for skill level. That scale on its own, however, would not have accounted for frequency, which was something this study attempted to capture. A future effort might try to combine frequency and skill level, to paint a more accurate picture of how a user actually uses a technology. White et al. (1999) and Garsombke and Garsombke (1989) both limited their

surveys to whether something was used or not, without accounting for frequency or function. While their model may have worked in the manufacturing setting, much of the technology in question could be used a variety of different ways.

Similarly, some technology on the list has a bias built in. DVD Players may actually be somewhat obsolete to those who are truly tech savvy. Most networks offer their TV shows on demand for online streaming these days, and cable companies offer On Demand programming for about the price of a movie rental, lessening the need for a DVD player. Many techies have abandoned even the latest Digital Video Recorder (TiVO, PVR, etc.) in favour of downloading content from the Internet, sometimes illegally. Even many average Internet users have embraced this level of new-age piracy. Based on this model, there would be no additional points for using a cutting edge technology that isn't on the list. For example, subjects who may have designed and installed media servers hooked into 50-inch HDTVs with 5.1 Dolby Surround Sound wouldn't get any extra TI points, despite their obvious tech-habits.

Other technology listed isn't necessarily the kind of thing employees use more than once or twice a week. Most participants have a digital camera, yet how many individuals use it more than once a week? Most people might use it less than that. Having that on the list didn't really help develop any knowledge on the user’s technology habits. Conversely, there are some technologies on the list that are likely to always generate high scores. Subjects with a GPS system in the car will likely claim they use it every day because it is always on. Similarly, a PVR/TiVo is always on and always recording shows, so that number may be skewed as well.

At the same time, those who hack and modify existing devices are considered by this scale to have the same TI as someone who happens to have that device and use it regularly. These hackers are likely the most tech savvy users in the world, and likely deserve the highest TI, but their skill-set, passion, and affinity for gadgetry is difficult to quantify. Average users are often not aware that these hacks are possible, let alone available to regular people, so the folks to develop them and use them regularly deserve some sort of extra TI points. And to confuse things further, it opens the window into a confounding realm where users are not aware of how much they do not know, and will likely think that they are far more skilled with a technology than they might actually be.

How then, would we improve this scale? Clearly, it would have to be more than a checklist of ten technologies. Without following a subject around to objectively assess his/her habits and level of proficiency performing various functions, a survey based self-assessment will always lead to certain subjectivity in the answers provided by the subjects. Limiting opportunity for that subjectivity should be the primary aim. It would almost be necessary to create a whole separate survey section with a large number of questions on not only the technology used, and the frequency of use, but also the functions performed and the skill/knowledge required for each.

Another issue with the survey is the age ranges are awkward. Due to the use of three-year divisions, it was impossible to break the subjects down into clean age ranges later on. Five year or ten year age groups would have been simpler to deal with and may have offered slightly different results, or insight into various patterns. Instead age groups were

generally 12 years long, which leads to a lot of variety within the group, but also cumbersome explanations and descriptions throughout the research.

Finally, the Self Assessment should also be reworked. While rating oneself out of 9 is an indication of his or her own opinion, we have no way to determine its accuracy. Ideally, everybody would rate on the same scale, keeping in mind all the variables, different hardware, software, and computer functions, comparing themselves to the same group of people, this is certainly not the case. A further study would have to limit the opportunity to be overtly subjective. In this case, personal bias and experiences could have tainted the results excessively, although there is no way to tell because of the limitations of the survey.

Implications to Business

What affect does research this have on the CBC? What lessons can be drawn from these findings to make the workplace more efficient for users, and easier on technical staff including trainers and support specialists?

First of all, making assumptions based on age is dangerous. While the averages for technology acceptance numbers in younger employees are generally higher, and older subjects tested generally lower, there were anomalies across the board and therefore, age shouldn't be used as the sole basis for any sort of assumption.

Two more reliable factors exist, and one is simple to access. Even though TI needs some attention as a number, it was still fairly effective in predicting PU/PEOU. No matter how old a subject is, the amount of technology they use affects how they adopt a new

technology. Collecting this information before a training session or a class, however, may prove difficult. This is where the Self Assessment may be more effective. Simply asking a subject if they're proficient or not, or to give themselves a ranking out of 10, would give a trainer a decent indication of what kind of student he or she is dealing with. This process already happens sometimes informally. Users who do not feel confident with their computer skills often state that they might need extra attention, or that the instruction should move slowly, and with that in mind. Asking them to rate their skills as a standard part of the instruction would be helpful to the instructor. Of course, this relies again on self-reporting which can be misleading, even with the best intentions of those involved.

CBC should also take some relief in that all average PU/PEOU numbers were on the positive side of the scale. Even in the lowest groups, all numbers were higher than 3.00 (which would indicate neither agreeing nor disagreeing). Because all the groups' average numbers were 3.26 or higher, users of all ages, technology habits, etc. agreed (at least somewhat) that the Avid iNews system was going to be useful, and easy to use. Considering the overall averages were all 3.59 or higher, it is safe to say that most users would have been likely to accept the technology without too much fuss.

While the numbers suggest one thing, there is certainly enough anecdotal evidence against that claim. Dave Collier has seen all kinds of what he calls "creative disobedience" in his CBC career training, supporting, and now managing technology initiatives. Many other trainers have been told by users that they just weren't going to use a particular piece of software because it's different than what they're used to. Could it be

possible that CBCers are more likely to lie on a survey than they might to a trainer's face? That would be an interesting phenomenon, although there seems to be some evidence to support it, strictly anecdotal, of course.

Perhaps the greatest lesson CBC could take from this study is that technology training, hypothetically, should get easier. As the older employees start to retire and are replaced with younger ones, the overall technical ability, proficiency, and affinity will continue to increase. Based on this research, that cutoff line is somewhere near the age of 42, at the moment. Subjects younger than that use more technology, claim less resistance to technology, and show more inclination to accept a new system.

Conclusion

In conclusion, age is a factor that affects technology acceptance, as much as it is a factor that affects technology use. Younger people use more technology, but that is not a statement without exception. Older people generally use less technology, but there are those who do not fit that stereotype either.

That the strongest finding emerging from the data is that those subjects who use a lot of technology claim to be more receptive to a newer one. Those individuals with the high TI scores also had pretty high TAM variable scores.

Finally, however, the one thing that became perfectly clear was that those who think they can (or cannot) use a computer well are most likely (or least likely) to adopt a new technology. If a subject thinks he's good with computers, he's going to claim high acceptance. If a subject thinks he's a poor computer user, then he'll reflect that in his technology acceptance scores as well. While this seems obvious, the simplest way to figure out if somebody will respond well to a new technology may simply be to ask.

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Appendix A: Copy of Research Survey