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Title: Understanding Teenager Technological Expertise in Out-of-School Settings

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Abstract

Drawing on Pierre Bourdieu's theory of practice, this study explored the construction of technological expertise of eight teenagers (five boys and three girls) aged 13 – 17. The qualitative study specifically employed observations and interviews and focused on home computer use, which for many of the participants was their primary site of leisure. All of the participants considered themselves to be technological experts, and their peers and/or their family supported this premise.

This paper outlines findings that identify the participants' multiple (and contradictory) understandings of expertise and the ways the participants perceive they have attained expertise and perform as experts in out-of-school settings. Traditional views of expertise are contrasted with what the teenagers think about their development of expertise, predominantly using Bourdieu's framework for analysis. As almost all of the experts in this study gained their expertise through independent means, with minimal input from their schooling, discussion focuses on the trajectories to expertise inherent within these sites of informal learning, and what this might mean for pedagogy and formal learning.

Introduction

Research projects from a range of fields regularly proceed on the basis that teenagers—by virtue of their generational location—almost routinely acquire, possess and display various markers of technological (and computer based) expertise. Although contemporary education literature regularly gestures towards the fact of teenagers' (and children's) ever increasing technological competency, there appears to be little research focused on the ways in which teenagers themselves conceptualise the idea of expert performance and the multiple ways they acquire expert status.

In this paper, discussion focuses on the nexus between *digital insiders* and *digital newcomers* (Goodson, Knobel, Lankshear & Mangan, 2002). Traditional views of schooling and expertise are contrasted with what the teenagers think about their learning and development of expertise. This *gap* between digital insiders and digital newcomers is specifically explained in regard to differences between the concepts and value of learning, expertise, and technology, and how they are recognised and valued differently between the generational gap of digital insiders and digital newcomers.

In 1996, John Perry Barlow wrote about digital natives and digital immigrants in order to distinguish between those who have always been immersed in digital media (specifically personal computers) and those who have been introduced to it at some point of their lives and are newcomers to its use. The phrase 'digital natives' is sometimes regarded as problematic from the standpoint of post-colonial theorists. This relates to the suggestion that 'natives' have some inherent character, a problematic suggestion in literature that has long positioned the 'essential' native in opposition to 'immigrants'. Of course, in this case the 'essence' ascribed to the native is designed to be a positive recognition of particular sets of skills (that is, computer competence) but the historical pattern of ascribing differences between natives and immigrants (or natives and invaders) makes the easy use of these terms unlikely. For this reason, I wish to employ the terms digital insiders and digital newcomers (Goodson *et al.*, 2002), as these terms allow for multiple experiences, rather than just being at one extreme or the other

of a continuum. It is this distinguishable difference of being either a digital insider (always immersed in digital media since birth) or digital newcomer (introduced to digital media) that I am referring to in this paper when I discuss a generational gap.

Digital newcomers tend to talk about computer use by children or digital insiders as something that is optional, that is, it is something they can do without if they were motivated to engage in other activities. However, in the current age, Internet access is fundamentally tied to access of knowledge that it seems somewhat strange to think about engagement with computers as an unwelcome departure from the norm of traditional childhood play and leisure. This raises some questions about whether digital newcomers are able to conceptualise pathways to teenage technological expertise if they see the use of certain technologies as problematic. However, in order to gain expertise in the use of computers, it is arguable that the everyday association and engagement with computers is necessary.

This paper reviews the literature on psychological expertise and argues for a sociocultural view to be employed, then explains the methodology used in the project. Discussion follows which describes the activities in the field and the multiple understandings of expertise, which along with the conclusion highlights some implications for education.

Literature Review

This section on expertise summarizes some of the general findings from the cognitive psychology field of expertise, which has covered diverse practices such as chess, memory performance, typing, and medical analysis. It is important to review the literature on expertise as I am conscious that expertise is taken as an attribute that people do or do not have, an attribute that boys seem to acquire more than girls, or an attribute that girls need if they wish to be successful in a computer mediated world. Whilst the cognitive psychology literature acknowledges or maps or explains different levels of expertise, it rarely problematises the notion of expertise itself. The studies are almost always positivist and quantitative. The texts referred to below describe how expertise is acquired. Some have attempted to design models from which they claim how expertise is performed through linear models, which describe decisions that have been made. This approach is fraught with limitations, as humans are not sequential and undeviating – especially adolescents (Rushkoff, 1997). Presenting the information below explains psychological ideas about the trajectory towards expertise, that is, stages, time commitment, natural ability, intelligence levels, etc., and illustrates the base of literature that addresses how expertise is gained. This will help to inform the critique of this literature and the need to include sociocultural influences when discussing how expertise is obtained.

Ackerman and Beier (2003) discussed Ericsson's model of deliberate practice (c. 1993) which Ericsson developed to explain that skill was obtained by the accumulation of deliberate practice over a period of time, for which one needs not only the time to access these resources, but actually needs the resources. Through the accumulation of training and experience, skills, performance, and the ability to select correct actions comprise expertise. Ericsson claimed that in this model, "The principal challenge for attaining expert performance is that further improvements require continuously increased challenges that raise the performance beyond its current level" (cited in Ackerman & Beier, 2003, p. 116). In support of this model, Ceci, Barnett and Kanaya (2003) stated, "accumulated deliberate practice causes acquired skill and characteristics, which in turn cause performance, and some of these characteristics increase the maximal amounts of possible practice" (p. 83).

Ericsson's model of deliberate practice is similar to Dreyfus and Dreyfus' (1986) model of the five

stages of progress towards expertise described by Bereiter and Scardamalia (1993, p. 17), presented below in Table 1.

Stage	Description
1	Novice - where one rather blindly follows limited rules
2	More flexible and situationally sensitive rule use
3	Competence - one applies goal-directed plans and strategies
4	One has accumulated enough experience that one can often recognize what needs to be done and so have less need of planning and problem solving
5	Expertise - decision making becomes unnecessary and one just naturally does the right thing without having to think about it

Table 1 – Five Stages towards Expertise (Dreyfus & Dreyfus, 1986)

This table highlights how psychologists have focused on the linear progression of humans towards expertise, arguing that it is simply a case of moving from novice towards expert, starting with the application of some rules, then many rules, and finally being able to operate without being conscious of the rules.

In their research on expertise, Bereiter and Scardamalia (1993) found that in comparing novices and experts, experts would “work harder and do a great deal more thinking” (p. x) than novices. This is in contrast to previous studies (e.g. Glaser & Chi, 1988; Johnson, 1988; Posner, 1988), which found that experts (in general) were able to do more with less effort.

Bereiter and Scardamalia (1993) selectively discussed some of the history of research in expertise and presented basic premises about the nature of expertise. These included that many cognitive psychologists believe expertise comprises knowledge, that skill is viewed as a type of knowledge, and that it may take approximately 10,000 hours or ten years for a person to become an expert in a field. They argued for a method of expertise named ‘progressive problem solving’, which they believed constituted a process of expertise, rather than viewing expertise as a product (Gee, 2000). Whilst they acknowledged that some inherent abilities lack in those wishing to become experts (though natural ability or intelligence is not always an indicator of possible expertise), they argued people need to “become expert in becoming experts” (Bereiter & Scardamalia, 1993, p. 2). Bereiter and Scardamalia (1993) explained progressive problem solving to be how a person can become an expert through the process of reinvesting in learning through seeking out more difficult problems and reducing other problems. They argued that through this process, fewer mental resources are needed to accomplish the same results because problems are reduced, so agents can focus on bigger problems. This process of expertise is notable because it represents what is done above and beyond the normal course of learning, that is, what novices do. By reducing problems, more energy and focus is set aside for analysing and focusing on bigger problems.

The literature about expertise does not explain what expertise means to young adults, not has it been examined in settings of youth culture and leisure. The section above shows how expertise has been explained from adult notions of expertise and the field of psychology. Trying to use, design, and apply prescriptive models to how experts make decisions is awkward, as humans are non-linear, and not machine-like. Expertise is a phenomenon that involves complex humans, not cause-and-effect machines. Thus, any explanation of human expertise becomes limited if a quantitative, psychological analysis is employed. These descriptions of expertise do not include sociocultural elements such as the

social constructions of class, gender, age, ethnicity, social stratification, the nexus between technology and power, extension of existing interests, the influence of other people on their expertise, and power relations. A sociological approach – in preference to a psychological approach (be it based in educational psychology or not) – highlights some of the ways in which expertise is developed and performed within the gendered nature of technology and society.

It remains that dominant models of expertise are those from the field of psychology. The aim of this project was to identify sites of expertise that had previously been ignored as sites of learning or neglected in other research projects, and describe the trajectory towards expertise within these sites. It was important to employ a sociological framework such as Pierre Bourdieu's in order to focus on the multiple ways that expertise is developed, instead of employing psychological frameworks that are focused on essentialist notions of expertise acquisition. It is important to introduce Bourdieu's concepts of habitus and field that shaped the design and analysis of the research that informed this paper.

Habitus is a concept used to explain the dispositions that influence individuals to become who they are, and yet also includes the conditions of existence (Bourdieu, 1990) which are displayed everyday in their relations to society in and through individual activities. Habitus explains how the body is present in the social world as well as social world being present in the body (Reay, 2004). While dispositions make up a person's habitus (Bourdieu, 1998), habitus is also formed by an individual's history. As Nash (1999) explained, habitus discloses the traces of its origins in practice (p. 176). Habitus encompasses how people act in a way that is reflective of social structures and their process of socialisation, which is in turn reproduced by their actions. Adkins (2004) stated that habitus generates and shapes perceptions and actions.

Bourdieu (1992) defined a *field* as a "configuration of relations between positions objectively defined, in their existence and in the determinations they impose upon the occupants, agents or institutions" (p. 72 – 73). A field is Bourdieu's metaphor for representing sites of cultural practice (Webb, Schirato & Danaher, 2002). The field that I am focused on is the field of out-of-school leisure of teenage experts.

Habitus and field only function in relation to each other and can be described as a fish (habitus) in water (field) (Grenfell & James, 1998, 2004). To take this point further, Grenfell (1998) has argued that, "Habitus brings with it field and field the notion of habitus" (p. 87). The conventions and organization within a field determine the appropriate discourses and activities that are used, which additionally determines what capital is valued. Within each field (social space), there is that which is excluded, and that which is included. These contexts (fields) shape and produce praxis.

When one speaks about a field, one includes the institutions, rules, rituals, conventions, categories, and structured contexts that make up the hierarchy of accepted processes and practices, where capital is determined (Facer, Furlong, Furlong & Sutherland, 2003). Here, I explain these elements and focus on the structure of the field in terms of the relations between those involved (Grenfell, 2004), and who those actors are, and the out workings of embodied relationships, including cyber-relations.

Methodology

The following research question guided and focused this paper: In the field of out-of-school leisure, how is expertise obtained, constructed and performed by a certain group of New Zealand teenagers?

Participants were selected using snowball sampling (Patton, 2002), a strategy that relies on persons to recommend others who fit certain criteria. This type of sampling was appropriate especially as the

selection of illuminative case studies stemmed from my desire to choose case studies from which the most learning can occur (Patton, 2002).

Semi-structured interviews and observations were employed in order to collect the data. The data were collected over a period of 4 months in 2005. Interviews and observations were conducted mostly in the participants' homes. All of the participants lived in a provincial city in New Zealand of approximately 100,000 people.

The content of the qualitative data collected was analysed according to the key themes raised within Bourdieu's social theory. I employed content analysis to pursue the key themes of habitus, field, and capital in the qualitative data. The textual data that was analysed with Bourdieu's framework included the transcribed verbatim interviews, the observations, and the researcher's research journal. Searches were made for patterns, themes, and categories.

Introducing the participants

There were eight participants in this study – three females and five males. The three females will now be introduced, who at the time of the study were aged between 14 and 16.

Anne, Charli and Lisa

For Years 7 and 8, Anne was in a classroom where each child had their own laptop. Anne did not use the computers at her current school very often and does not attend any computing class. She was adamant that the computer classes for the first two years at her high school were very easy, and were far too simple for her level of expertise. Her strengths at school included mathematics and science. She was considering a career in computers but is not sure as she expects she will find computer programming boring.

Charli was a member of an online community, whose members wrote poetry and prose to share with each other. People viewed different genres of poems in this community and write comments on others' poems. Charli first posted an original poem 2 or 3 years ago and was "quite proud that I'd done something myself and I knew everything about how to do it". Charli had met many people through that site and from there, was recommended another website that allows people to create their own websites, from which she created her own. Many of her associated friends from the poetry site also have their own website with this other community. Charli had spent a lot of time creating her own website. Charli had friends that she has met online which she calls her "friends overseas". "Yeah I love my friends overseas. I love them. Sometimes like I think I'm closer to them than I am like with people here, just because they're that, like I just have that much more space, cause I love, I need my personal space".

Lisa had taught friends and family about how to use the Internet, use sites, make sites, download music, and make (burn) CD's. Lisa had played an important role in others lives through recommending sites and showing people how to use the computer for different purposes. She did not seem to have a role model or someone who has shown or taught her things on the computer. She had her own way of learning new things on the computer: "Um, probably like, go round the very edges of it first and then just see what happens and then just keep moving in further, to what's like in the centre, or something. Yeah [laughs]. Like working round the idea of something". Lisa believed she was learning from herself when she is on the computer. Lisa maintained that her parents do not really take any notice or care about her computer expertise.

A description of each of the five boys is presented below. At the time the interviews were conducted, they each attended the same secondary school. Tom and Tim were good friends, but the other boys did not associate with each other or with Tim and Tom. They were aged between 13 and 17.

Chris, Jake, Joe, Tom, and Tim

Chris spent a lot of time playing video/computer games, but this was usually on his PlayStation 2™ machine. He viewed his computer learning and use as fun. Chris believed he was a computer expert, but that this had been ignored and somewhat discouraged at his school. He listed many software programs that he believed he was skilled at using. He reported that the school he formerly attended played a significant role in the development and encouragement of his expertise.

Jake was the network administrator for his secondary school and was responsible for 140-networked computers. Sometimes he was paid for the out-of-school work he did for his school through the managing of their hall/auditorium, as he was skilled in sound and lighting technologies. Jake did sound and lighting at a church with a modern sound and lighting system, and for his secondary school which was known as a mini-concert venue in the local area. He did video work including the “editing and running” of videos. His technical knowledge gave him a sense of value. Jake spent about six hours a day in front of a computer, two hours a day behind a lighting desk, and about nine hours a week behind a sound desk.

Joe had many interests and he researched them on the Internet. They included space and flight, sports, music, current events, games, and scientific learning sites. He also visited sites of interest surrounding art, art history, weather, climate change, and astronomy (planetarium website and *Cyber Sky*™). He read widely, especially science fiction as he believed sci-fi “extends your imagination”.

Tom spent most of his time online playing the game, *World of Warcraft* (WOW™). WOW™ is a massively multi-player online role-playing game (MMORPG). WOW™ is a continuation of *Warcraft*™ I, II, and III, but they were formerly real time strategy games (RTS). He originally played first person shooter (FPS) games. Tom’s time on the computer was divided into 70% games, 10% homework and 20% web design (“maybe, yeah”). If Tom was at home, he was usually on his computer. Tom had 45 websites (on his record) that he has designed since the age of ten or eleven. He used *Macromedia Dreamweaver*™ to design the pages, though he knew HTML (a computer programming language). He mainly designed websites to promote *Counterstrike*™ gamers (another online game) but had also designed them to develop his portfolio and gain experience.

Tim spent two to three hours per weekday on the computer, and approximately seven hours per weekend day and seven hours per day in the school holidays. Tim had a paper run from which he earned money to pay for things such as his WOW™ subscription. Tim had no idea of what he wanted to do when he left school and did not seem to be involved in many things other than computers. He had not looked at what he could do to make the most of any opportunities that come his way, even in regard to computers: “I don’t really take, like use the skills that I’ve got on the computer anywhere else”.

Attention now turns to exploring the notions of ‘expert’ and ‘expertise’ that the participants assert.

Results

All of the participants said they were an expert, except for Joe who thought he was on his way to becoming an expert. However, each of the participants rated themselves personally as at least a three

on a scale of 1 – 5, that of being between a good expert and a great expert. Table 2 presents the participants’ rating of themselves as an expert on a scale from 1 – 5, one being a ‘great’ expert and five being a ‘good’ expert.

Participant	Rating
Anne	3
Jake	3 for computers, between 1 and 2 for sound, and between 1 and 2 for lighting
Charli	3
Chris	2.5
Joe	2
Lisa	2 or 3
Tom	2.5 or 3
Tim	3

Table 2 – Participants’ Personal Rating of Expertise

As the New Zealand culture can tend to be self-effacing, it may be that the teenagers felt awkward or immodest about admitting a high level of expertise, and may have been uncomfortable with even being labelled an ‘expert’. For example, Joe said, “I can’t say a one [rating], yeah, because there’s still heaps I can potentially learn”. Joe was not comfortable with calling himself an expert, but did state he would like to be. His numerical rating and his verbal rating appear to be discrepant.

Lisa explained her personal rating of expertise: “Cause, um, with like other technology, I can always end up working it out as well. Yeah, it just happens. It’s quite strange [we both laugh]. I always get something working”.

The next sections explain what the participants understood about the terms ‘expert’ and ‘expertise’. It is necessary to explain their understanding of expertise as a reflection of their habitus that constitutes understanding in relation to this field.

When one focuses on whom is involved in this field of out-of-school leisure of teenage experts, one needs to include cyber-relations, that is, those who are not seen, but who the participant communicates with. Some of those with whom the participants interact with also exist in face-to-face friendships, but many other interactions do not take place in person, nor are they personified. These cyber-relations the teenage experts have consist of some or all of the following relations:

- a) With other technological experts;
- b) With other online gamers;
- c) With others online;
- d) With the global village (Levinson, 1999; McLuhan & Powers, 1989);
- e) With their own computer, as a personal extension (Cuthell, 2002) of themselves (an argument of medium theory); and
- f) With others who are economically privileged.

The field is out-of-school leisure, which is the space that these participants have become computer experts. I am focused on the practice of computer use in this field.

Activities in the field

The participants described activities that I did not observe, and they included spending time on the

computer with their friends and family, sharing a task or project, playing a game, or exploring a topic together. The activities I observed both male and female participants engaged in were as follows:

- MSN™ and other forms of instant chat/messaging (e.g., iChat™);
- Surfing (browsing) the web;
- Checking and sending e-mail;
- Homework tasks including research;
- Web site design*;
- Research of popular culture (e.g. television shows, celebrities, products)*;
- Game playing – online and offline;
- Configuring their own preferences for the computer;
- Downloading music for their MP3 players*; and,
- Writing compact discs of music downloaded from the Internet*.

Not all the participants engaged in the activities marked with an asterisk, in that I did not observe these activities with every participant.

While the first four activities were sometimes completed also at school, or at other computers at various locations, all of the activities were conducted at home on the computer that they used. Jake, Tom, Tim, and Charli basically had exclusive use of a home computer. Jake, Tom, and Tim had bought or had been given their computer for their exclusive use. Anne's computer was shared with her younger sister, though her sister had her own additional iBook™ for her school and personal use. Chris had his own laptop at his father's house for his exclusive use, but had to share one desktop computer with his mother and sister at his mother's house. Joe shared the home computer with his sister, but was the main user (his father had another computer for his exclusive use in his bedroom). Lisa shared the home computer with her brother and mother, but also was the main user.

As Joe's various research activities went beyond what many of the other participants did, I now explain his particular activities. He sometimes used *Britannica* software to research information. He copied information, pictures, and diagrams into *Word*, and then printed it. He used *PowerPoint* for school presentations. He used *Excel* to record his cricket scores, which he had been doing for the last three years. When not on the Internet, he would use the computer to play games, listen to music, sort files, or watch DVDs.

In regard to how expertise is performed in this field within the parameters of the activities mentioned above, each participant performed their expertise as an individual, and it was normally a private practice, though sometimes it was shared face-to-face with friends who would sit beside them while they 'played' on the computer together. Arguably, their performance of expertise is more often shared with others, that is, peers, who are online, and most of that practice is synchronous. The only instance of asynchronous practice happened when they sent electronic mail.

Anne, who rated herself a three, believed she had expertise in certain programs, and thought expertise was program-specific. She said she was not an expert of "the whole computer".

Tom seemed to believe that he was "just normal" and that his expertise simply comprised the necessary skills for the field/career he was interested in. The status of expertise with other participants is not as valued as with Tom. Perhaps Tom believed his skill was routine – run of the mill – whereas a generation older than him believes that he and all others of that age are technological experts. This is similar to the belief that it once was routine for all women to be able to sew and mend clothes – an ability that was arguably valued and somewhat necessary up until the 1980's, from when it became

cheaper to purchase clothes already made, and buy new clothes instead of repairing old ones. This notion about the value of expertise will be returned to later in the text.

These previous sections in this section have identified and outlined the feel of the game (describing the field and associated activities) within the field of out-of-school leisure by teenage technological experts. As Bourdieu stated, “the game presents itself to someone caught up in it, absorbed in it, as a transcendent universe, imposing its own ends and norms unconditionally” (Bourdieu, 2000, p. 151).

All of the participants viewed themselves as experts. I did not have to decide whether they were experts, nor determine their level of expertise, as I did not position myself in the role of an external evaluator. Admittedly, they do not sound much different to many children and teenagers. The difference is that they thought of themselves as computer experts, and others thought of them as computer experts. The next sections explain what the participants understood about the terms ‘expert’ and ‘expertise’ and how some participants believed that expertise was age-related. It is necessary to explain their understanding of expertise as a reflection of their habitus that constitutes understanding in relation to this field.

Clear ideas of expertise

Joe used the dictionary to research answers to the interview questions I had sent him. He had copied out the definitions for ‘expert’ and ‘expertise’ out of the dictionary and read them to me when I asked the questions: “A technological expert. I think it's a person who understands a particular field and is skilful at it”. He answered expertise with, “A great skill or knowledge in a particular field”. This could be argued to be a clear idea of expertise (or a clear idea of how to get to know what expertise means), or an unclear idea of expertise, as he did not want to define it in his own words, or an attempt to display the behaviour that he considered would be valued in the field of university research.

Tim described a technological expert as “someone that probably knows more than the average person” and that compared to most people, that is, the average user, he was a computer expert. Tim defined expertise as:

Knowledge, experience, yeah like, oh just, I guess using, if you use something a lot, and you know a lot about it, and then done it for a long time, I guess, that's, you'd probably be an expert at it, yeah,

and he agreed that there were different levels of expertise, exemplified in this sentence:

Yeah like if you own your own business or something, and then you're good at that, whatever it is you want to do, like plumber or whatever, and you have an apprentice or something like that, they'll probably still be an expert, but not as expert as the person that is teaching them, yeah.

Chris agreed that there were levels of expertise:

In any subject, there are many levels of expertise cause I mean, I think I've got expertise, a lot of people above me have more, and more advanced knowledge of how to do things, so they've got better expertise. Even people below me, they've still got a little bit of knowledge, so they've still got expertise in them.

Chris seemed to equate expertise with knowledge, compared to Tim and Tom for example, who associated expertise with skill.

Tom definitely thought there were different levels of expertise and related this to the following:

Like you could be an expert at what you do but you still do things like the old way, or the new way of coming in comes in you like have to learn how to do that and it's faster and stuff like that.

Chris and Jake also thought there were levels of expertise. Lisa agreed by saying there were “heaps of different levels” of expertise. Anne said there were levels of expertise from the “very advanced or basic”.

While some of the participants were clear in their ideas about levels of expertise, some were unsure about the general performance of expertise.

Un-certain ideas of expertise

Some of the participants used the interview questions to verbally explore their own understandings of what a technological expert was.

Charli defined a technological expert as:

Somebody that is confident with knowing their way around and stuff.

I think that it's just someone that's confident, and they feel like they know enough about what they do to like maybe show other people, guide other people. You know like, confident with trying new things on the computer and stuff. Me [giggles].

I used to think that an expert was somebody that knows everything, but it's not really.

I just think it is somebody that's confident.

Chris' definition of an expert was expressed as, “one of those people who can work with computers, and can do a wide range of things with them”. For Chris, knowing how and why things work was very important (“I want to look into things because I really want to learn”), so it is likely that his particular disposition has led to depth of understanding in regard to computers.

Jake initially stated that expertise was, “knowing everything”, but admitted that there was always new stuff to learn especially as new technologies develop. He then changed his description of expertise to, “having a fair idea of most stuff”.

Tom said, “I dunno” when asked what he thought expertise was. He acknowledged that part of being an expert was being part of an ongoing process of learning. Tom thought that a technological expert was someone who was competent in something.

Lisa was not initially sure of what a technological expert was. She said, “Um, an expert in technology? [laughs] Yeah, I don't really know”. However, when she was asked how she would describe her expertise in computers, she replied, “Just like knowing how the computer works really, and knowing what I want to do on the computer, and get it done, yeah”.

Discussion

The preceding two sections show that participants struggled with some aspects of expertise and participants negotiated the meaning of expertise and where they positioned themselves. Many of the comments from the same people were coded as clear and some comments were coded as unsure, that is, some participants had both clear and unsure or uncertain ideas about expertise. There was general agreement amongst the participants that there were different levels of expertise.

These sections demonstrate that the notion of 'expert' is diverse. Taken together, these two sections outlining students definite and indecisive understandings of expertise help to demonstrate that the field of out-of-school leisure for some teenage technological experts is a diverse one. Not only are there multiple ways in which expertise is demonstrated, but there are equally multiple (and contradictory) ways in which expertise is defined by those who seem (to an outsider, or newcomer at the least) to 'have' it. This draws attention to the ways in which fields are experienced differently by those within them, and by those studying them. One needs to recognize what is at stake in the game, and determine whether one allows participants' to define expertise in their own way, or whether traditional, dominant perceptions will prevail.

As a research and observer, I found it interesting that some of the experts tried to distance themselves from the label of expert. Why are some of the participants not comfortable with labelling themselves an expert? Is it because they are not sure that they hold that status? Is it because they don't like the word and its connotations? While most of the participants in this study liked being an expert and enjoyed the social capital (status) that accompanied it, it is arguable that some of them were sheepish about calling themselves an expert. This may be indicative of the egalitarian culture prevalent in New Zealand, in which the individual does not wish to lord herself or himself over others (see James & Saville-Smith, 1989).

As explained in the literature review, expertise and its attainment have been thoroughly explored from the field of psychology, that is, a psychological approach to the attainment of expertise. Various and numerous theories have been put forth to explain the stages from novice to expert, and the differences between novice and expert. Much literature has been published on different types of expertise, namely expertise in chess, memory recall, typewriting, musical prowess and mathematical computation, to name a few. What I have sought to do is show how dominant or traditional definitions of expertise (and the habits/dispositions they assume) might or might not be adequate for making sense of how today's teenagers conceptualise their own computer practices.

Implications for traditional schooling

The children preferred to use home computers for their work, and for their leisure, rather than the computers available at their school (Cuthell, 2002). For these children, the distinction between work and play is difficult to recognize when they use their home computers (as they often engage with leisurely activities while doing their work), which is in stark contrast to how schooling structures differ between work and play (Lynch, 2001, 2002). Engagement with technology demonstrates that the use of one's home computer is both a site for leisure and learning, and for these digital insiders there was sometimes little distinction between the two. Acts of resistance are needed in order to cater to those who are digital insiders, and have learning and praxis preferences pertaining to that of a digital culture.

How could these understandings of technological expertise in non-educational settings influence the delivery of learning and teaching in classrooms? If these participants had access to a computer and an Internet connection for all their schooling hours, not only would a different paradigm be required to include this as a valid site for learning, it would be fascinating to view what they could do, learn, and achieve with or without teacher direction, but in the setting of the school. What the participants are learning at home is not only applicable to one field, that is, out of school leisure.

Almost all the participants viewed schooling as irrelevant to the development of their expertise (except for Chris and Joe), as they became experts without schooling, and they have mostly taught themselves. They have not needed teachers. Schooling has had little influence on the development of their technological expertise. Their schooling is mainly positioned in the print culture of previous

generations, in comparison to the digital world the teenagers are positioned. The scope for e-learning within secondary schooling is something that can be explored, as challenges can be made to those who privilege face-to-face learning, that is, classrooms of children being instructed by one teacher, as this type of practice does not fit with collaborative social learning that focuses on interaction, personal interest, and active engagement all within cyberspace.

Conclusion

Examples such as these demonstrate multiplicity in understanding what it is that constitutes expertise. This multiplicity is vital to recognise in a context where teenagers' particular relationships with the field of technologically mediated leisure is generally regarded as an unproblematic, almost natural one.

The multiple perspectives depict conflict between dominant understandings of expertise from the psychological perspective, and from a sociological perspective of the participants' understanding. It also demonstrates a generational gap between digital insiders and digital newcomers, which has implications for society and education in general (Goodson *et al.*, 2002). The author is currently undertaking a study whereby this whole notion will be explored further, and it is likely that a broader sample of teenage technological experts will be included.

It is important to remember that for these particular teenagers, the act of performing and practising their expertise is vital for them to develop not only their expert skills, but in order to believe in themselves as continuing experts, therefore confirming that expertise is a process for these participants: "Belief is an inherent part of belonging to a field" (Bourdieu, 1990, p. 167). The praxis evident in this field of out-of-school leisure of teenage experts constitutes an embodied way of life for these digital insiders.

Finally, it is evident that the concept of 'expert' is disputable, and that trajectories towards expertise are diverse. This paper has demonstrated that there is no particular 'essence' about the experts in their performance of expertise and that an 'expert' is an unqualified term.

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