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The Teenage Expertise Network: The online availability of expertise

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Abstract: Young people of the 21st century are, like no other generation before, immersed in a technologically rich environment. It is not surprising then that these young people have developed a wealth of expertise in the use of digital technologies. Whilst this is the case, understandings of how these young people have gained this expertise in these contemporary techno-cultural contexts is limited. The design of the Teenage Expertise Network (TEN) follows principles of ethnographic research adapted to an online environment. The small sample of teenaged technological experts in this study claimed that technological 'expert-like' practices have been shaped and brought about via informal (and some formal) modes of education. Expertise is assumed to be gained by countless hours spent accruing knowledge of the field, and while it is, it remains something not only gained by professionals who have degrees. In the technological field, those who are experts are those tuned in to the fluidity of knowledge. This study suggests that when one looks to become a technological expert, one needs to not only employ particular dispositions in one's practice, but utilise various strategies and tactics when going about learning new knowledge.

Keywords: Teenagers, Expertise, Technology, Sociology, Certeau, Strategies, Tactics

Introduction

THE FINDINGS OF a recent, small-scale, qualitative research study (Johnson, 2007a) found that there were five key dispositions in the obtainment of technological expertise. These were experimentation, time, motivation, 'flow', and fun (Johnson, 2007a, 2007b). In this innovative and new research project that utilised online methods borrowed from ethnography, the teenagers who were technological experts also displayed similar dispositions. These dispositions have proved to be essential in the ways young people go about learning fluid knowledge[1].

The purpose of this article is to offer some ways about thinking about expertise that have not yet been highlighted in previous literature. Drawing on a sociological lens, the project sought to explain the process of how young people have gone about obtaining technological expertise, exploring this phenomenon in an online environment.

The research project contributes to knowledge on teenage technological expertise that is of potential significance to formal education (schools, curriculum, pedagogy). It contributes a timely and original perspective on teenage technological expertise, one that is vital to the pedagogical practices that need to respond to and work with the techno-cultural contexts of students in the 21st Century. In this emergent area of learning, TEN is an innovative means to conceptualise technological expertise, one that has taken this new techno-cultural context

[1] This article does not try to justify this type of fluid knowledge alongside previous publications that focus on the nature and differences between fluid and crystallized intelligence (Cattell, 1987).

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into consideration. Linked to this, the research project is of significance in its utilisation of a sociological lens to understand how expertise is developed.

Literature Review

In previous articles (Johnson, 2009a, 2009b), I have highlighted the need for sociological views of expertise to be researched and constructed. In the technological field, those who are experts are those who are committed to the acquisition of new knowledge - not that which has already been already found out, published and is 'common knowledge'.

Findings from the cognitive psychology field pertaining to expertise have covered diverse practices such as chess, memory performance, typing, and medical analysis (e.g. Chi, Glaser & Farr, 1988; Ericsson & Smith, 1991; Sternberg & Grigorenko, 2003). Many such studies are positivist and quantitative (e.g. Ackerman & Beier, 2003; Ceci, Barnett & Kanaya, 2003; E. Johnson, 1988), with some designing models from which they claim how expertise is performed through linear means (e.g. Chi, et al., 1988; Dreyfus & Dreyfus, 1986; Ericsson & Smith, 1991). This notion of linear progression towards expertise assumes that becoming an expert involves 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 (Dreyfus & Dreyfus, 1986).

Critics of this view argue that such perspectives are fraught with limitations, as humans (especially young people) are not sequential and undeviating (Rushkoff, 1997). Similarly, it is contended that discourses of developmentalism in young people imply a "linear progression from the simple to the complex and from the irrational to the rational" (Kenway & Bullen, 2001, p. 3), and do not give attention to the "multiple and complex ways that adolescent and adult discourses interanimate each other" (Alvermann, 2002, p. viii). In contemporary techno-cultural contexts, understanding expertise must take account of perspectives such as Rushkoff's (1997), that see youth as self-determining and comfortable with non-linear, complex experiences (an exemplar of which is what they experience 'in front of a screen').

An objectivist position of knowledge invokes that knowledge is 'fixed' while a constructivist notion of knowledge suggests that knowledge is 'constructed' by the learner. While there is not the space to acknowledge and review the philosophical assumptions that underpin the nature of knowledge, I wish to suggest that as knowledge and technology are steadily increasing and developing, that there remains a need for learners to possess a disposition that appreciates the continuous development and fluidity of knowledge, that there is little that is settled or stable, and that knowledge is likely or able to change.

Theoretical Framework

I used Michel de Certeau's sociological theories (1984) to gain an understanding of the practice of everyday life for these teenage technological experts. Certeau's key concepts of *strategies* and *tactics*, alongside *production* and *consumption* are employed in the data analysis and interpretation in order to explain these everyday *ways of making* and *ways of operating* that are evident in the lives of these young people.

Everyday practice is constituted by the ways of operating or ways of being within society. The speaking, reading, writing, thinking and action of the everyday is what comprises

practice. Certeau makes clear that this is subconscious to a certain extent, but reflects the inherent structures of beliefs and strategies imposed by society and imposed on society.

Certeau's key concepts of strategies and tactics provide a useful framework to examine the everyday practice of these technological experts as they go about obtaining, maintaining and developing their technological expertise in fields that are constantly merging and developing, alongside knowledge that is also constantly developing.

Mills (2008) claimed there to be a distinction between those who are producers and dominate spaces and those who are consumers who simply occupy spaces. Booth (2008) highlighted the need to re-read Certeau's dichotomous positioning of production and consumption, arguing that in digital texts, users are both producing and consuming meaning, knowledge, and "new avenues of identity-making" (p. 520). In using Certeau's theories to analyse the data collected, I used the phrase *strategic production* to refer to the writing and production on which meaning is imposed by the actions of the agent, and *tactical consumption* to refer to those practices of reading, using, and manipulating texts and spaces.

Methodology

The aims of this research project were:

1. To design, develop and test an interactive, online, discussion environment that would appeal to and engage teenage technological experts;
2. To test the method of conducting online ethnographic research;
3. To use sociological perspectives to investigate how technological expertise is obtained, constructed, performed and understood by teenage technological experts.

The participants were aged from 13 – 18, and were sampled through a snowballing method whereby the chief investigators asked people they knew (within and outside of their Faculty) if they could suggest names of teenaged technological experts who may be interested in being involved in the research. The potential participants who were approached were young people who were experts in their use of digital technology, namely computers. Young people were initially approached via the researcher contacting adult members of the university community. The snowballing technique was utilised within the project as new participants recommended others to join.

The online environment that is TEN comprised survey questions, an instant chat (messaging) facility and a discussion forum. The ten survey questions that all participants were required to answer were:

1. What do you think makes someone a technological expert?
2. If someone aged 13 wanted to be a technological expert, what would you suggest they do?
3. How did you become a technological expert?
4. In what areas are you an expert?
5. In what areas are you developing expertise?
6. What is expertise?
7. If someone aged 33 wanted to be a technological expert, what would you suggest they do?

8. Some people say expertise can only be gained by adults - what do you think?
9. Who and what have been key influences in you becoming an expert?
10. What have you done that proves you are a technological expert?

These questions were designed in light of the previous study I also conducted on teenage technological experts (Johnson, 2007a). The discussion forum was used as a way to probe answers given in the survey questions. The instant chat facility was designed to be used to connect with participants who were online and provide a social aspect to the study. However, as detailed elsewhere (Johnson, 2009d), the function was limited as no one could see who else was online, despite the advertisement of when the lead researcher would be online. It remained an under-utilised facility of the project, and remains a feature that is to be enhanced and re-used in future iterations of the project, alongside other features (Johnson, 2009d). The limitations and benefits of this methodology remain the focus of a separate article and what I wish to focus on in this article are the findings of the research questions, illustrating Certeau's theory of strategies and tactics.

All of the six participants (Ben, John, Simon, Matthew, Paul, and James were their given pseudonyms) were located in the state of New South Wales, Australia. They each considered themselves to be technological experts and gave informed consent (alongside parental consent) before participating in the online data collection. The data was collected over the period of July 2008 – January 2009. It was not an aim of the research to produce generalisable statements, but rather to utilise an innovative methodology to obtain some understanding about the process of obtaining technological expertise for a small group of young experts.

While in my earlier study I explored notions of gendered stereotypes surrounding experts (Johnson, 2007a), it remains a further area for exploration in subsequent phases of this project (TEN). Future iterations can explore the interesting fact about why only male participants identified as technological experts, and agreed to participate in the research. While one female did sign up to TEN (expressed interest), she did not give informed consent, nor did she answer the questions in TEN. No further correspondence occurred.

Research Questions

Three research questions of this project have framed the data analysis presented in this article:

1. What strategies and tactics have been employed in the development of teenage technological expertise?
2. What distinctions between types of knowledge and levels of expertise are made?
3. How does the everyday practice of these teenage technological experts contribute to our understanding of fluid knowledge?

Based on the answers to the survey questions and the postings within the discussion forum, I analysed the data according to various themes that emerged including *strategies* and *tactics*.

Strategies and Tactics

This analysis has been conducted in light of Booth's (2008) argument that strategies and tactics overlap within digital worlds. Some of the technological experts went about learning

through patterns of consumption. They read and they spoke with people and they navigated multiple texts. Others focused on patterns of production whereby they deployed strategies of action, in that they created, tested, and experimented with various facets of technology to serve a range of purposes.

However, I was able to ascribe a higher level of agency to those participants who deployed strategic production more often than those who mostly employed tactical consumption. It was evident that for each of the technological experts that they needed to exhibit a notable amount of strategic production in order to obtain their expertise. Ben seemed to possess more agency than the other participants because of the active strategies he utilised in going about obtaining his knowledge. Indeed, it may be that he had a higher level of expertise than the other participants. He was one of the eldest in the group (c. 18 years).

What follows now are multiple examples of tactical consumption which help to produce strategies. These examples demonstrate the close nexus between strategies and tactics in a digital world.

The Tactic of Asking Questions

5 of the 6 participants (all except James) referred to the need to ask questions (both online and offline) in order to obtain technological expertise. Asking questions on a forum would seem to be a practice of acting on a space and encoding meaning through a strategy, however perhaps it is more appropriate to say that asking a forum question actually decodes meaning through movements that change space organisation, therefore it is more aptly categorised as a tactic. Saint-Charles and Mongeau (2008) highlighted how "advice networks are called upon in situations of information uncertainty and friendship networks in situations of ambiguity" (p. 38).

The Tactic of Maintenance

The tactics Matthew used to help maintain his expertise involved keeping up to date with technology trends and advances, including reading online (forums, websites, tutorials) and offline (books and PC magazines) and downloading new programs. He also stated that, 'through helping people out and being challenged, I learn alot.'

Paul's tactics were similar but he included 'blogs' as a resource. He also referred to teaching himself his 'I.T. work'.

John had been 'developing expertise in networking and server admin after my Mum has been showing me stuff from her school'. He also pointed out that when he was having a 'rough time socially at school', he 'sat and played with computers'.

The tactics Ben deployed included 'reading and messing with things', 'googling as much as I can', 'playing' and doing what was best for his learning style. He advised, 'stick to learning how you learn best, if you learn best by reading, read as much as you can, if you learn by doing, create test environments to test things in!'

James advocated many tactics that he had successfully used in obtaining his technological expertise. He focused on the relevance of RSS feeds which he claimed could provide breadth as well as depth of information about technological topics. Reading (on the Internet and in the library) and learning from others were also important, especially with the constant and continuing advances in technology; it was important to 'keep up'.

The Tactic of Googling

An example of a tactic was the use of Internet search engines. Simon was a strong advocate of using Google to help develop one's technological expertise, referring three times to its use and assistance stating it was 'your best friend online, Google'. He also referred to the benefits of utilising online forums. James also highlighted how 'seeing cool technology in movies often makes me want to see just how real that tech is, thus I make an appointment with my friend Google'. Matthew discussed 'google searching' as an important part of becoming a technological expert. In reference to getting help, John said 'nothing beats wikis, forums and Google on the Internet'. Ben referred to searching as one of his strategies to obtain expertise: 'I know what I know by googling as much as I can'. Only Simon referred to a search engine (Yahoo) other than Google.

The Tactic of Research

Researching information was an important tactic of the participants. Paul advised young users seeking technological expertise (e.g. age 13) to 'Avoid wikipedia, for the very simple reason anyone can edit it, therefore you don't know if it is legitimate or not.' However, when the same question was asked pertaining to people aged 33, he stated, 'the same as if they were 13, age doesn't matter but access to resources might be a bonus if you're older. Get a lot of background info about what they want to specialise in, if its more broad then look up everything. Ask question on most available sources, i.e. forums, blogs'. Paul seemed to suggest that though forums and blogs are user-generated that they were more reliable than Wikipedia in his opinion, perhaps because one could ascertain the direct source of the postings.

Matthew advocated numerous forms of research advising, 'Browse on the internet for what you want to learn. Find a few helpful sites with tutorials. Find a forum or online community where you can ask questions'. Ben suggested that in order to develop knowledge, one should 'play and read things to gather as much information as possible'.

Strategic Production

There were various strategies used to produce knowledge. Matthew's strategies that highlighted patterns of production included the following (when answering 'What have you done that proves you are a technological expert?'). Designing, developing, and maintaining my Church's website, as well as other various websites. Developing print designs in Photoshop for various purposes. Creating Drupal themes and modules Creating VisualBasic.Net programs - such as an education one for a Primary class at school to use. Teach elderly people about using computers'. In terms of advising how people should become experts, he stated, 'But I think the best advice is: to do something! Don't be scared. If you want to learn photo editing, download GIMP or something, and try it out! If you want to make dynamic websites, get a CMS and start!'

Simon's examples of strategies that proved he was a technological expert comprised, 'I have hacked Safe Eyes (The Australian Government that blocks every site including YouTube for the reason of "enjoyment"), Bypassed the school block to get onto any site, Hacked

games (Combat Arms is most recent), it isn't much but I set up an ftp client between my phone and computer but I still feel proud and my Dad coming to me to fix his computer'.

John's strategies of production focused on fixing, building and restoring computers. James had also 'built and rebuilt old PCs, encountered problems, found solutions'.

In contrast, Ben had more many actions that were coded as strategic production. They included, using and experimenting with test environments, helping to manage his school's network of 300 computers, and his recent experience with both small-scale and large-scale network deployment, involving servers at home and in small businesses. Ben said he was an expert in the following areas: 'Upgrading and building computers; Troubleshooting computer issues on both phone and onsite; Data centre planning and deployment; Small experience in PHP coded websites with MySQL backing. I mainly look after servers on different sites varying from 1 to 30 servers, and 1 to 4000 clients'.

Consuming and Producing

As indicated earlier, there has been a distinction made between consumption and production, or tactics and strategies, whereby consumers who occupy a space are different to those who dominate a space (Mills, 2008). The spaces in question here are those search engines, online forums, wikis, blogs, and websites that each of these participants used. In one sense they are all consuming what has been placed within cyberspace by others. However, the actions that these participants make on these spaces becomes a production of knowledge as they impose and encode meaning. As they contribute to cyberspace, they are strategically contributing to the fluidity of knowledge. In digital texts, consumption and production can become blurred (Booth, 2008), especially in light of the enabling features provided and executed by wikis and discussion forums. So while the practices that I have coded as strategic production have focused on 'doing', that is, producing, it must be acknowledged that the participants are concurrently consuming while they are producing. Their strategies and tactics are closely combined. An example of this is James' statement that 'practical experience has no parallel -- the more experience you get, the more problems you encounter, the more problems you overcome and the more in-depth your understanding of your focus'.

Different types of Knowledge and Levels of Expertise

All of the participants referred to the different types of knowledge required to become an expert. James referred to 'just head knowledge', comparing it with 'in-depth knowledge' that he defined as 'knowledge partly born of experience and readily applicable to a situation that needs it.' John demarcated between the 'explicit and comprehensive knowledge' that makes someone a technological expert: 'When they know it through and through and can experiment with the technology without breaking it. They must also be confident in the knowledge they know to be an expert.' Matthew spoke about 'extremely in-depth knowledge' making the distinction between that and 'overall general knowledge'. In reference to the type of knowledge an expert must have, Paul stated they should have 'comprehensive' knowledge or an 'overwhelming and valid knowledge in a selected field'. Simon was less convinced about the importance of the type of knowledge stating that one who has a 'fairly good knowledge' comprised an expert.

Simon seemed to be disparaging of the level of knowledge that his teachers displayed as when he replied to the question, 'If someone aged 13 wanted to be a technological expert, what would you suggest they do?' he stated, 'Google it would be the number one thing to do, the way I find out stuff like this is googling and asking on forums (eg QJ.net), asking on YAHOO answers or see their Computer Studies teacher as a last resort.' This is in contrast to James who was more reasonable in his assessment stating, 'since adults have been around longer than us, they've seen more and are *likely* to have greater wisdom than us, and thus can often make better use of any expertise. I frequently find that (and Matthew will agree), at my school, many teachers have limited computer knowledge and often require the assistance of students. However, there are still teachers at my school that are significantly more knowledgeable concerning technology than Matthew or I.'

Only Matthew and James referred to different levels of expertise. Matthew referred to a general level of expertise, though he maintained it could have a wide or narrow focus. James mentioned the difference between a 'super-expert' and an 'apprentice expert' and others who had 'greater expertise' than he, from whom he was able to learn.

Fluidity of Knowledge

As knowledge is ever-increasing, and is no longer fixed or stable as some thought it was, we can refer to it as being fluid. The fluidity of knowledge is reflected in the fluidity of the technological field as new fields develop, transpire, and change. Therefore, those who are technological experts are constantly negotiating changed, changing and developing fields, therefore demonstrating an acceptance of the fluidity of knowledge.

This is illustrated in Matthew's focus on the accessibility of knowledge via the Internet. There are 'no restrictions to who can learn' (Matthew) because 'Expertise, or knowledge, can be gained by anyone. Historically, in many areas, only adults could be experts, as they were the only ones with access to in-depth training and information. However, it is a much different story today, and with computers. The internet allows people of any age access [to] great amounts of information' (Matthew).

Paul highlighted the nature of fluid knowledge by stating, 'I was able to adapt to the changing technological requirements around me, I was also required to use the knowledge that I already possessed'. Ben emphasised how the areas in which he was an expert were 'large areas that keep expanding'. He stated how a field 'is always changing, new things are added, setups are done differently and setups will never be the same, so you can't know everything about it'. The following quotation from Ben suggests a high level of confidence in his current knowledge and his adaptability to the contexts of the problem: 'It doesn't matter what age you are. On a daily basis I outsmart someone with university degrees who just can't think the same way I do. He [sic] may say: replace it, its totally busted, in 5 min[utes] I have it working because I'm willing to spend time trying to find what's wrong with it. Just because someone hasn't had as much time to learn it doesn't mean they aren't able to learn quickly and soak every scrap of knowledge they can up like a sponge' (Ben). Simon suggested fluidity of knowledge is defined by those who can 'pick up easily new things in their subject of expertise'. James claimed that this knowledge was 'partly born of experience and readily applicable to a situation that needs it'.

Technological expertise is not only gained by those who spend 10,000 hours in a specific field. For these young experts, it is acquired by those who are committed to the development

of fluid knowledge of a field which is continually developing. Technological expertise is characterised by dispositions that utilise time, and draw on motivation and fun, and are not contained by the conventions that surround achieving a piece of paper, be it in the form of a certificate or a title.

Conclusion

A range of strategies and tactics were utilised in the development of teenage technological expertise for this small group of participants. Many of them by their nature blurred the dichotomous position of production and consumption.

The field of technology is ever-changing and along with the expansive amount of subfields within the field, these teenage technological experts are constantly negotiating new knowledge and applying their current knowledge to continually developing contexts. This fluidity of knowledge is consumed and produced through the everyday practice of these young people.

From the findings of this project, it suggests the need for wide-scale research that models the innovative way that young people go about learning their technological expertise. It remains an aim of future iterations for TEN to attract many numbers of participants in order to add to what has been intimated from the current findings. That said, there also remains the need to explore realms of expertise that concern areas like memory, chess, sport, dance, etc., to consolidate how sociological views of expertise can enhance our views of expertise attainment. Further research could also focus on finding out what changes need to be made to traditional schooling environments from the viewpoints of the teenaged technological experts.

As I have previously detailed (Johnson, 2009a, 2009b), findings from this field of informal learning have implications for formal education (schools, curriculum, and pedagogy) in relation to what counts as meaningful learning (especially if it is self-directed), and what is suggested to be important in the lives of young people. This research has highlighted that the technocultural context that we find ourselves placed within has significant effects on the learning and the agency of young people who have access to personal computers and the Internet. The positive practice evident in the lives of these young people demonstrates the validity of their leisure and their learning (Johnson, 2009c).

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Dr. Nicola Johnson is currently a lecturer in curriculum and teacher education in the Faculty of Education at the University of Wollongong. As a schoolteacher in New Zealand, Nicola was interested in how computers could be utilised within classrooms. Now her focuses are more on the effect of new learning spaces on the traditional delivery of learning and teaching in classrooms, the nexus between informal learning and formal learning, and sociocultural perspectives of technological expertise. This forms the basis of the construction of the Teenage Expertise Network (TEN).