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Identity, Power And Fragmentation in Cyberspace: Technology Appropriation by Young People

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Abstract

Why and how do young people adopt and use information and communication technology? Based on social constructivist theory and empirical research we propose a model of 'technology appropriation'. When young people are faced with a new technology we have observed three outcomes: non-appropriation, appropriation and disappropriation. How the technology is affected by, and in turn affects, young peoples' identity, their experience of power and the degree of cohesion in their activities and relations with others appears to be critical in determining the appropriation outcome. The novelty of this work lies in 'opening up' the way that technology is shaped by users after development; in describing the process of appropriation and in examining some of the key influences upon young people's appropriation of technology. This work contributes to a body of work that sees technology as socially constructed.

Keywords

Social constructivist theory; appropriation; technology innovation

INTRODUCTION

The primary focus of information systems research has been the design and use of information technology (IT) in organisational contexts (for example, Keen 1987). The expense of early computers meant that they were used to address organisational goals (Grudin 1994:94). The development of the personal computer and associated applications opened access to IT to individual users who were principally studied within organisations. Technological innovations in the last five years, however, are changing the context of interest. Technologies such as the Internet, email, mobile phones and personal digital assistants are being integrated into everyday lives. Increasingly the Internet is being used for personal and leisure activities—including research, chat, email, games and music—in the individual's personal setting. Greater use of technology for interpersonal communication is reflected in the widespread access to the Internet into private homes and the high uptake of mobile phones in developed countries. This has led to a redefinition of IT to include communication and the introduction of new terminology whereby 'information technology' has been replaced by 'information and communication technologies' (ICTs). Use of ICTs in social interaction and leisure indicates that information systems (IS) researchers need to move beyond the organisation to study the design, adoption, use and impact of technology in the contexts in which people live, socialise and undertake leisure activities (see, for example, Monteiro 1998).

Of particular interest is the role of ICTs in the lives of young people. To date, there has been little analysis of the levels of use or the opportunities for designing innovative technologies that will support young people's lifestyles. The process of adoption and use of ICTs by young people, their attitudes towards ICTs and the effects of ICTs on young people's lives are poorly understood. The motivation for the study reported in this paper is to add to our knowledge of the ways that young people adopt and use ICTs. We are seeking to construct a baseline of current use, attitudes and perceptions of ICTs among young people in urban Australia as the basis for designing future technology. We are investigating how young people aged between 16 and 22 take innovative ICTs and shape them to their needs and wants.

The contributions of this paper include construction of understanding of young people's adoption and use of ICTs within their everyday contexts; the focus on personal and social rather than organisational contexts of technology use is unusual in IS research. Deeper understanding of the adoption and use of technology (specifically ICTs) has led to the development of a model of technology appropriation that will support the design of innovative technological artefacts and it is the presentation of that model that is the primary focus of this paper.

The paper is structured as follows. Firstly, the theoretical foundations and the research approach used to study young people's adoption and use of technology are outlined. A model of technology appropriation induced from

the research is then described. The findings of the research are examined, especially the processes by which young people adopt and adapt technology, and areas for further work are briefly presented.

THEORETICAL FOUNDATIONS

Developing understanding of young people's use of new technologies is challenging partly because the research context is a diffuse space for work, education, social and leisure activities and partly because the vast organisationally-driven IS literature does not seem to capture salient features. These 'multiple contexts' are currently poorly understood: there exists little domain knowledge, even amongst marketers and consultants. Also, there is lack of knowledge of the ways that young people adopt new products. Existing technology adoption theories in information systems focus on organisations and organisational culture. To our knowledge, there has been little IS research into the cultural and social issues surrounding the adoption and use of technology by young people. Therefore, we are undertaking exploratory research of a poorly understood topic (young people's adoption and use of ICTs) in a poorly understood domain (the social, leisure, work and study contexts of the young urban people in a developed country).

The research is informed by social constructivist theory. It focuses on the interaction between technology and the social world; the study examines technology use in young people's personal settings. Social constructivist theory (Bijker and Law 1992a), which proposes that technology is shaped by, and shapes, non-technical or social forces address these two foci. Technology is formed by a range of social influences including political, economic and technical factors, constraints and assumptions (Bijker and Law 1992b:3). During development, a process of negotiation between these influences results in a stabilised technology; in use, users reshape the technology. In turn, the implemented technology shapes future social, economic and technical decisions in the social world. Such a theory suggests that there is no linear, deterministic path between the design of a technology, its adoption, use and impact. For example, a social constructivist view of the utility of the Internet sees that it is created through a process of negotiation and interpretation in specific contexts of use and so the Internet means different things to different people in different cultural contexts (Hine 2000:28); in turn, the Internet is shaping our social, political and economic worlds.

Social constructivist theories have been extended in structurational models of technology (Orlikowski 1992, 2000) and actor network theory (Walsham 1997). These focus on technology in organisational rather than social contexts; in addition, actor network theorists argue that there are no crisp or clear boundaries between the social and the technical (Walsham 1997). In this research, we have used a social constructivist approach because of our interest in social rather than organisational contexts. More importantly, a social constructivist approach was selected as it provides sensitivity to the importance of both technological and social issues and the interaction between the two.

THE RESEARCH APPROACH

In this research, a multi-method research approach was designed (Howard and Vetere 2000) to combine 'focused ethnography' (de Laine 1997:17) with methods used in marketing (focus groups and diaries). An iterative research process whereby data are collected and analysed and the findings expressed in a series of conceptual frameworks (Carroll and Swatman 2000) was used to build knowledge about young people's use of ICTs. Triangulation of different types of data collected from different sources using different methods provided rigour and richness of understanding of the young people's attitudes to, and use of, technology.

Initially four focus groups of young people were held: two each in Melbourne and Sydney. Each focus group was run by an experienced moderator who was a member of the research team. Participants were recruited by professional recruiting companies on the basis of access to a mobile phone and the Internet as well as possession of their own email address. The Melbourne focus groups involved eight young people of mixed gender aged 16 to 18 and ten aged 19 to 22. The Sydney focus groups involved eight males aged 16 to 22 and eight females aged 16 to 22. Issues discussed included participants' understanding of ICTs, their current use of ICTs and their attitudes to, and perceptions of, these technologies. The focus groups provided access to participants' recollections of their use of ICTs and their interpretations of the role of ICTs in their lives. Participants completed a questionnaire covering their personal details, Internet and mobile phone access, payment schemes and use, use of SMS (Short Messaging Service), access to other technologies and a description of their favourite piece of technology.

Following the focus groups, six participants were observed in their everyday activities. Slices of the participants' days at leisure, in social activities and in educational contexts were observed: the time slices covered different times during the week, the weekend and holidays (school and university). The researcher did not passively observe but participated as an outsider in the activities, asking questions to clarify the participants' actions and motives (see Goguen 1994; Holtzblatt and Beyer 1993). In addition, all participants completed an online diary for two days a week for three weeks (selection of days was randomised). The diaries provide a

record of participants' use of ICTs including the time of day, place, ICT used and a description of ICT use. Diaries were used to complement observation as participants' use of ICTs was irregular and often occurred at times where observation was not feasible.

THE TECHNOLOGY APPROPRIATION MODEL

A significant outcome of the research was the observation that the young people used ICTs in their everyday lives in unexpected ways. We have expressed the understanding developed about young people's adoption and use of ICTs in the technology appropriation model shown in Figure 1. The model combines two artefact types (technology-as-designed and technology-in-use) and the process through which the initial technological artefact is adopted and transformed (the process of appropriation). This reflects the three typical components of a change process (Van de Ven 1992:80): a set of starting conditions (the technology as it is envisaged by its designer), an end point or state (the technology as it is currently used by young people) and an emergent process of change. We have called the latter the 'process of appropriation'; this is the way in which technology is explored, evaluated and adopted or rejected by users. As outcomes of the process of appropriation, either the technology is adapted and integrated into the users' everyday lives (appropriation) or users decide not to use it (disappropriation). We argue that understanding the process of appropriation and the consequent technology-in-use provides insights for designers into how and why a technological artefact will be reshaped in use. This forms the foundation for envisioning future users' needs and designing new artefacts, which will then be appropriated by the user group. Therefore, we have augmented the social constructivist view with the process of appropriation, which conceptualises how a socially constructed technology is reshaped in use.

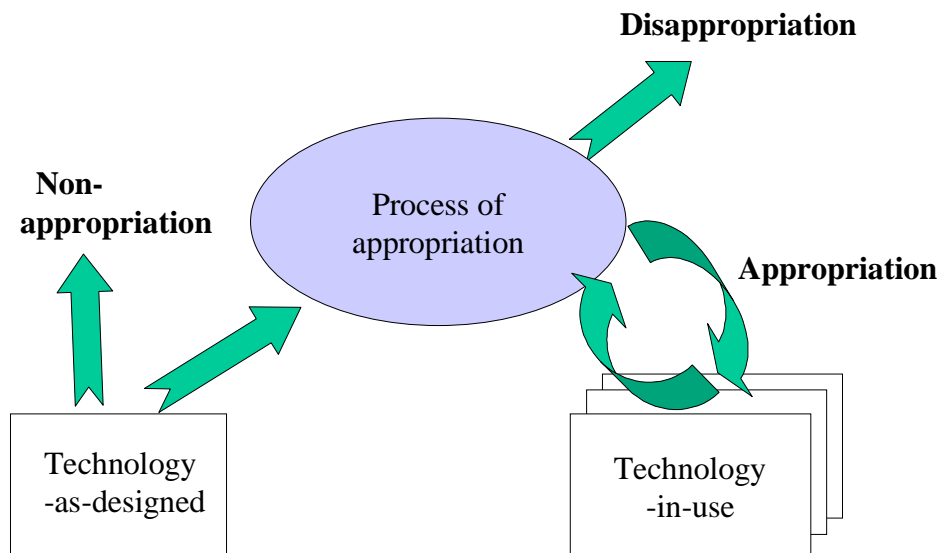


Figure 1: The technology appropriation model

The three components of the model are described.

Technology-as-designed

Technology-as-designed refers to technological artefacts that are designed and then supplied to a target audience. Artefacts contain implicit models of their intended users (Law and Bijker 1992). These models include certain rules about the expected activities to be performed, resources to accomplish those activities, assumptions about user characteristics and knowledge and norms that reflect the processes through which the activities are executed (adapted from Howard and Leung 1991; Orlikowski 1992:410). A range of intermediaries such as suppliers, journalists, consultants and trainers popularise the proposed purposes of the technology and thus influence users' understanding of it (Orlikowski et al. 1995). Often the intermediaries' aim is to influence the adoption decision rather than the way the artefact is used (Galliers and Swan 1999). The designers' implicit models and the intermediaries' propositions may be ignored or rejected during appropriation or use.

The process of appropriation

Diffusion of innovation theory (Rogers 1983) describes the process through which the decision to adopt an innovation occurs. Individuals gain knowledge of the innovation, form an attitude to it, decide whether to adopt

it, implement it and then confirm (or not) that decision so that the innovation is either routinised (Swan and Newell 2000) or abandoned. This theory refers to the adoption of a fixed artefact. In many cases, however, users adapt or modify an innovation (Swan and Clark 1992); this adaptation may continue long after the artefact is produced (see Markus 1983; Robertson, Swan and Newell 1996) with the result that the artefact in use differs from the artefact as designed. This process of adapting or reshaping an innovation is called the process of appropriation.

Appropriation is the ‘unpacking’ of the innovation into its constituent parts or functions and then customising the innovation so that “the user has transformed the shape and uses of the innovation as supplied.” (Swan and Clark 1992:114). Reshaping may occur in varying degrees from minor modifications to major transformation (Clark 1987). Discussions of appropriation in the literature treat it as a black box whose internal workings are not visible. We are trying to ‘open up’ the box and examine the workings of the process of appropriation. This will develop understanding of the way that different groups of users select or modify aspects of a technology, shape it to their needs and thus take possession of it. This enables us to examine the way in which technologies are being “interwoven into the social fabric of life” (Monteiro 1998: 250).

As shown in Figure 1, there are three outcomes possible when users meet technology-as-designed:

- Non-appropriation, where the users are ignorant of or uninterested in the technology or some of its features. In this case the users do not initiate a process of appropriation.
- Appropriation, where the users trial and evaluate the technology, select and adapt some of its attributes and so take possession of its capabilities in order to satisfy their needs.
- Disappropriation, where users choose not to use the technology. This may occur early or late in the process of appropriation. It may also occur as an output of recursion from technology-in-use, where changes in the users’ evaluation of the technology after a period of routine use may lead to disappropriation. Therefore, appropriating an artefact and incorporating it into everyday routines is not a one-off activity. Although integration of the technology results in routinisation, this is always conditional and subject to ongoing reinforcement and refinement. The recursive relationship between the process of appropriation and a technology-in-use may result in a previously routinised technology being disappropriated.

Technology-in-use

Technology-in-use describes the way that particular user groups use a technology. In this research it was observed that different individuals and groups have appropriated ICTs in somewhat different ways, so Figure 1 shows multiple instances of the technology-in-use. Technology-in-use is an outcome of the process of appropriation whereby the technology has been evaluated, adapted and embedded in a young person’s everyday routines. Embedding or incorporating a technology implies some sense of stabilisation of a technology: use of a new technology has become natural or mundane (Monteiro 1998).

However, such stabilisation is conditional. Although some technologies remain relatively stable for long periods, others are subject to ongoing reinforcement. In the absence of reinforcement—or resulting from changes in knowledge, needs, social interaction, time or the technology—the user may re-evaluate the technology and disappropriate it. Therefore, just as technology-as-designed is a product of various social, political, economic and professional factors (Bijker and Law 1992b), so technology-in-use is an outcome of various individual and group perceptions and experiences. Technology is shaped and reshaped over time; at some point, it is suggested that the technology will be routinised although this will be conditional and no ‘final form’ of a technology-in-use can be assumed (see Brown and Perry 2000).

FINDINGS

This paper presents three major issues related to young people’s use of technology. Our research indicates that ICTs enable young people to establish an identity or sense of belonging, to negotiate and exercise power and to achieve a sense of cohesion by dealing with the fragmentation of their lives. These findings are outlined and supported by data collected through the observation, questionnaires and focus groups.

Identity

The research identified the role of ICTs in building a strong sense of belonging and identity. Mobile phones in particular were an important aspect of the young people’s identity. Two of the male participants illustrate this through their comments: “*I feel kind of naked without my phone*” and “*It [the mobile phone] gives you an identity: this is who I am, this is my number*”. Young people in a social group use the same carrier; for example, all members of a social group may use Optus as their carrier in order to call during free time. Frequent calls between friends during free time reinforce their sense of belonging to a group. Though technologically

rudimentary, SMS is a powerful means for young people to establish and reinforce individual and group identity. A common comment observed after participants checked for SMS messages and finding none was *"No one loves me"*. This is supported by a recent European survey that found that more than half of the respondents said that they were disappointed if they didn't receive a text message every day (The Sun of 2/4/2001).

Young people without mobile phones appeared to be struggling to maintain their social links. One young person said, *"it's so annoying [trying to arrange to meet a friend without a mobile]"*; such friends tend to be left out when ad hoc meetings occur. A 17-year-old male was observed contacting friends. He described a mobile phone as a *"pre-requisite for a social life"*. He has two friends without mobile phones and finds it hard to include them in his group's social plans, especially where the plans change.

It was observed that some of the young people selected an ICT for communication according to the strength of the relationship. The most intimate are those contacted frequently using SMS or the mobile phone, especially during non-charge periods of use. In many cases, the SMS message is unsigned *"as you just know who sent it"*. A little more remote are those contacted through email, including intermittent contact with family and friends interstate and overseas or friends in previous social groups where there is infrequent face-to-face contact. More removed are those contacted through chat including friends met through chat sessions ('chat friends') and less intimate acquaintances.

Power

Young people use ICTs to help them navigate the different sources of power in their lives as well as exercise power over them. Mobile phones provide a way of dealing with parental or educational authority. Features such as profiles (personalised ring tones for different callers), caller ID and voice mail are observed being used to filter calls so that young people can choose which phone calls that they will answer (see also Brown and Perry 2000). *"Mum calls when I'm out drinking. Let it go and SMS her."* *"I don't have to speak to the person if I don't want to."* One older female participant had her phone display *"the House from Hell"* whenever a call was received from her parents' phone. A sixteen year old girl uses her phone in her bedroom: *"Your parents think you're doing work but you're not really."* SMS is used in classrooms to communicate without teachers' knowledge: *"If you're bored in class then you SMS across the room: 'I'm really bored.'"* Students at a suburban University campus were observed at the back of a lecture theatre using SMS to contact friends and arrange a meeting for a group assignment; they paid no attention to the lecture. SMS or text messaging is also used to avoid arguments when negotiating social activities with friends; one person can broadcast a message to the rest of the group and the absence of dialogue reduces the chances of disagreement. Finally, a number of the young females had set up their own chat groups so that they could control who was participating in chat sessions. This meant that they could accept or reject participants and could *"block it if you don't feel like talking"*.

Fragmentation

ICTs enable young people to achieve cohesion and deal with the fragmentation of their lives. Fragmentation may arise from geographical distance as well as distinct work, educational, social and personal groups. Many of the participants talked about the different groups of people in their lives. A highly mobile population, blended families and increased numbers of overseas students have resulted in geographically dispersed contacts. Further, young people are juggling the demands of others for their time, including employers, friends, parents, teachers, sports teams and coaches. ICTs such as email, mobile phones and chat help young people to develop and maintain virtual communities of family, friends and other young people with similar interests. Observations of the use of ICTs to overcome fragmentation included a boy who had moved to a new school this year and maintains his relationships with his friends from the old school through his mobile phone. Similarly a female university student studying on a different campus to her friends keeps in daily contact with her (remote) social group through her mobile phone. Many participants described using email and chat to keep in contact with friends and family interstate or overseas. A female in Year 12 said that *"Last year I was on ICQ for quite a while, chatting to people I don't see during the week but it wasted too much time so I can't do that this year [sighs]."*

The transformation of young people's lives

It has been suggested that many ICTs have been designed to increase the level of connection and communication but that more appropriate communication is needed (Brown and Perry 2000). Our research indicates that the increased level of connection has been used by young people to deal with the issues of identity, power and fragmentation in their lives. These issues act as high-order reinforcers of ICT use over time; use of ICTs will continue while they enable young people to establish a sense of identity and belonging, gain power over important figures in their lives and develop cohesion in an increasingly fragmented world.

The young people have appropriated some aspects of ICTs that support their lifestyles; they have shaped the available technology to their needs. At the same time, ICTs have shaped the young people's lives and facilitated

new ways of interacting in the world. It has been suggested that the design of new technology “undermines the stability of the world” (Carroll 2000:48). Examination of the role of ICTs in the lives of young people led to the conclusion that the form and stability of their world is changing. Young people appear to be living in an adhocracy, characterised by an absence of planning. Instead life is an improvised, moment-to-moment experience. Social meetings are arranged ‘on the fly’, moving from meeting place to meeting place as whim or need arises. A sixteen-year-old male noted that *“It’s taken the strict plan out of your social life altogether, once you’ve got a mobile phone.”* One twenty-one year old working male described the effects of mobile phones on his life: *“Before I had a mobile, I used to make strict plans meeting friends and family. Make a plan and make sure that you stick to it: ‘Meet you at 7 o’clock’ and this would be made at 3pm. Now, with mobile phones, everyone’s got one. Within 15 minutes of meeting up it’s ‘I’ll see you at so-and-so.’”* He concluded that *“Life’s become so much quicker and not so planned. Everything’s a lot more rushed because of it.”* A second working male of a similar age commented *“I don’t even remember how we’d ring up and say: ‘I’ll meet you there’ before mobiles were invented. Now it’s mobile phones, two minutes and you’re there. It’s huge. Friends, family, everyone.... It’s made us very lazy, less organised.”*

Criteria for entering the process of appropriation: attractors and repellents

The young people’s appropriation of technologies was driven by the need to deal with higher order issues of identity, power and fragmentation rather than by an imperative to undertake purposeful, work-oriented tasks as is common in more conventional views of IT adoption and use in organisations (Monteiro 1998). Young people make technology-driven rather than task-driven decisions. They experiment with a technology and evaluate it to decide ‘how can I incorporate this technology into my life?’ rather than ‘how can this technology help me to complete this task?’

Findings about the young people’s initial encounters with ICTs provided some insight into the factors that influence the decision to ignore (non-appropriate) or explore and evaluate (by entering the process of appropriation) a new technology. Notably, ICTs provided both facilitators of (attractors) and hurdles to (repellents) appropriation. Here we focus primarily on mobile phones (though data on other types of ICT were collected) and highlight only one or two attractors and repellents in each case. As we enrich our model so we will report on a greater range of appropriation criteria (see Carroll et al. 2002 for more details of these criteria).

The most powerful attractors were convenience, utility and fashion. With respect to convenience, ICTs provide a range of functions for young people. Mobile phones are *“Convenient, easy to use and versatile.”* They satisfy *“...pure laziness. I ring from my bed rather than going to the home phone.”* There was general agreement that the size and weight of a mobile phone are important: *“You don’t want it too heavy in your pocket.”* However, mobile phones can be too small: *“The (Nokia) 82-10 is very small and I lost it. You want to notice that it’s not there.”* There were complaints about the size of the buttons. *“It’s a hassle typing in words”* but there was general agreement that you get used to it. Mobile phones should be robust rather than fragile given their treatment, stored in school bags and pockets of school uniforms or pants.

The utility of an ICT was an important attractor to young people. Participants distinguished between fulfilling a need and frivolous activities. Online chat was generally seen as filling in time rather than serving an essential need, so many (but not all) of the participants had moved beyond it: *“I used to chat but grew out of it.”* A sixteen year old girl observed that *“Chat is such a time waster. You realise that you don’t need to do it... everyone’s over it.”* Chat was described as chatter or gossip rather than something serious. For many of the students finishing school or starting university, chat and surfing the Internet are disruptions to their studies. Several of the younger girls disagreed, one stating *“But I think it’s interesting talking to people who aren’t your friends, making new friends. It’s something to do, something new.”*

Repellents are barriers to the appropriation of technology-as-designed. There were a number of negative perceptions of ICTs to balance the attractors for young people to appropriate new technologies. Cost was an important issue, including an inability to pay mobile phone bills and poorly explained mobile phone plans. Many school-aged participants use pre-paid as *“prepaid is easier to control - you don’t go over your limit then.”* A sixteen year old boy observed that *“You don’t realise how much SMS costs. You think it’s only 20 cents a message but it does cost a lot of money eventually.”* The cost has not caused him to stop using SMS but he is a lot more careful with the amount he uses it. A male in full-time employment noted that *“I use it too much – every day and every night. After a month the cost is scary.”*

Difficulty in learning to use ICTs was also noted. One example was profiles to filter callers. A twenty-one year old male noted *“It’s simple, after you’ve learned how to use it [Lots of laughter from the rest of the group]. It’s easy to learn, once you get the hang of it.”* Another male suggested that it takes about a month to learn and often friends teach them how to use new technologies. Many of the participants have had to teach their parents (and grandparents) how to use ICTs: *“I had to teach my father how to erase text messages. He rang me at work as his memory was full.”*

Health issues, especially the possible relationship between mobile phone use and cancer, were raised frequently by the young people. However, concerns about health were not sufficient to affect phone use. One seventeen year old male commented that it doesn't worry him: "I'm not negative". A female university student said that she thinks about the health implications of mobile phone use every day. Asked whether it affects her use, she replied: "Yeh...It tries, but I can't, I just talk too much. I should get off because I keep thinking that my ear's getting warm, but then, my conversation is too important."

There was extensive discussion about unsolicited email materials. This was particularly interesting given the emphasis young people placed on power as described above; one might theorise whether the arrival of unsolicited mail strikes at the heart of the user's relationship with the ICT as a 'power tool'. Most of the participants had Hotmail accounts. In an all-female focus group, there was a discussion about unsolicited pornography that is sent to their Hotmail accounts: "All this porn comes up, I find it really irritating." One commented that you couldn't reply and ask them not to send it: "It's a bit unfair." Several just delete all mail from an unknown sender: "I'm not wasting my time downloading this stuff." A number of the younger males complained about unsolicited messages "Taking your time to get rid of things that shouldn't be there." Participants suggested that the onus is on users to protect themselves from viruses and unsolicited email rather than seeing these as a failure of the technology or the way it is implemented. It seems certain that the increase in unsolicited advertising to mobile phone numbers is likely to play out against a backdrop of users intent on retaining control of their ICTs, and their lives through their ICTs.

CONCLUSION

This paper has reported on a study investigating young people's adoption and use of ICTs. It has presented the concept of technology appropriation and described some of the influences on ICT appropriation by young people. The concept of appropriation has been used and defined in the IS literature but not examined in detail. The technology appropriation model presented in this paper suggests that, when a user is faced with a new technology, there are three possible outcomes: non-appropriation, appropriation and disappropriation. This paper has identified three issues that reinforce young people's appropriation of technology: identity, power and cohesion. One significant outcome of young people's appropriation of ICTs has been described and labelled adhocacy. Factors that attract young people to a new technology (convenience, utility and fashion) are briefly outlined and their strength in overcoming negative forces (or repellents) has been noted.

The theoretical foundation of the research is social constructivist theory whereby the development of a technological artefact is shaped by social and political interests. We have added to the social constructivist view of technology by 'opening up' the way that technology is shaped by users after development; description of the process of appropriation and examination of some of the key influences upon young people's appropriation of technology has developed understanding of how a produced technology is socially constructed in use.

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