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A case study of Information and Communication Technology Adoption in Indigenous Households in a rural context: a grounded theory perspective

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ABSTRACT

The integration of Information Communications Technologies (ICTs) in Australian society is almost taken for granted. The link between habitus and household use of ICT is poorly understood, and many further theoretical developments need to occur before advances in our knowledge transpire. This paper takes a case study approach using grounded theory techniques and develops a conceptual model by drawing on habitus theory as way of explaining the low uptake of ICTs (home internet and computers) in Indigenous households in Australia. The paper illustrates the value of habitus as an ontology to understand ICT adoption from an Australian Indigenous perspective.

KEYWORDS

Indigenous, Development, Diffusion, Households

INTRODUCTION

It is recognised that the Indigenous (Aboriginal and Torres Strait Islander) community is the most disadvantaged in Australia. While the disadvantage increases with geographic remoteness, Indigenous people in urban areas also suffer disadvantage compared to the non-Indigenous community in their area (Productivity Commission, 2011). It is important to note that Indigenous people are looking towards research and its designs with the hope that it will contribute to their self-determination and liberation as a way to address their continued struggle for social and economic equality (Rigney, 1999). ICTs have the potential to overcome some of the disadvantage Indigenous Australian's face. ICTs in the Australian society are a critical communications channel linking Australian households with the government, educational institutions and commercial companies. Yet, Indigenous households are consistently more than 60% less likely to have the internet connected in the household than other Australians (Australian Bureau of Statistics, 2001, 2006b, 2012).

ICTs have positive impacts on addressing disadvantage in many areas of an individual's life, including increase in income (Green, Felstead, Gallie, & Zhou, 2007; Pietro, 2007), access to both educational and government services and better civic engagement (Allyn & Yun, 2005). There is a growing body of evidence on the importance of ICTs in Indigenous communities (Dyson, 2003; Gibson, 2009; Hinkson, 1999; Kral, 2011; Olutimayin, 2002; Sutcliffe & Richardson, 2004; Tafler, 2000). Lloyd (2000, 2004) and Daly (2005, 2006) show that both education and income affect Indigenous use of ICTs; however, other research demonstrates education and income by themselves do not fully explain the gap in household adoption of ICTs between the Indigenous and other Australian households (Daly, 2005; Daly & Lloyd, 2006; Lloyd & Bill, 2004; Lloyd & Hellwig, 2000; Radoll, 2006).

To better understand the gap, this paper is a study of the factors that lead to and prevent ICT adoption in Indigenous households in a rural context in Australia using grounded theory techniques. Drawing on the theory of habitus, it identifies adoption factors as they relate to the Indigenous normative social structures.

BACKGROUND

Technology uptake is routed in adoption theory. There are a number of key adoption models such as Diffusion of Innovations Theory (DOI) (Rogers, 1995), the Theory of Planned Behaviour (TPB) (Ajzen, 1991), and the Technology Acceptance Model (TAM) (Davis, 1989). These have produced significant and insightful contributions to diffusion of ICTs. Such theories as DOI and TAM postulate that perceived ease of use and usefulness are key to adoption, while other theories such as TPB rely upon behaviour and belief which are independent of the perceived outcome of use of the technology to explain adoption (Compeau & Higgins, 1999; Compeau, Higgins, & Huff, 1999). DOI has been used as a theoretical lens in similar case studies, yet the limitation of this approach has been well documented. The biggest weakness of using DOI is that it focuses on an individual's belief about the adopted technology and the outcome of using the technology, rather than the adoption of networked technologies such as ICTs (Benbasat & Barki, 2007; Compeau, et al., 1999; Straub Jr. & Burton–Jones, 2007). While TAM is well cited in information systems literature, the 'heavy reliance' on it has limited the results from studies because it takes a very narrow view of the user's interactions with a given system (Benbasat and Barki 2007). Many attempts to address the limitations of TAM have been made by the addition of various components; however, it still produces 'dysfunctional outcomes' (Benbasat and Barki 2007). TPB also has limitations because it does not deal with the causal effects of the adoption of household ICTs very well. Additionally, as Compeau et al. (1999) argue, the causal effect aspect of TPB is unidirectional. The Model of Adoption for The Household (MATH), developed by Venkatesh and Brown (2001), used TPB as the theoretical lens and found that TPB predicted only 43% of intended adopters. They argued that any further research in the area of household ICT adoption should examine 'unconscious factors' because TPB was a very poor predictor of household ICT adoption. Therefore, an alternative approach was considered the best method of examining Indigenous household ICT adoption.

Increasingly Pierre Bourdieu's habitus theory is informing information systems research and draws on the theory of practice as a predictor of human behaviour across social groups or fields where norms within a particular field determine a particular practice in a particular situation (Levina, 2005; Levina & Vaast, 2005; Schultze, 2000; Schultze & Leidner, 2002; Schultze & Orlikowski, 2004). In his book, *Outline of a Theory of Practice* Bourdieu demonstrates the strong relationship between structures, habitus and practice (Bourdieu, 2007, pp. 72-95). He defines habitus as 'the product of the work of inculcation and appropriation necessary in order for those products of collective history, the objective structures (e.g. of language, economy, etc.) to succeed in reproducing themselves more or less completely, in the form of durable dispositions, in the organisms (which one can, if one wishes, call individuals) lastingly subjected to the same conditionings, and hence placed in the same material conditions of existence' (Bourdieu, 2007, p.85). Habitus refers to ways of doing and being, which subjects of a society or agents acquire their socialisation. Habitus is shaped by the social structures and regulates practical activities. Habitus argues that any practice involves varying degrees of both embodiment and objectification (Levina & Vaast, 2006). These concepts are used by Bourdieu to refer to habitus which regulates modes of practice and the subsequent production of practice (Bourdieu, 2007, pp. 78-95). The production of practices with respect to embodiment relies quite heavily on a number of elements including community norms, community ties as well as reciprocity (Levina & Vaast, 2006). Each agent or individual draws on 'memories of their interpersonal interactions and mimics acceptable behaviours, appearances and manners to reproduce existing relations'…'without overt explication among agents; often agents simply play along' (Levina & Vaast, 2006, p.16).

At the same time 'objectification', or the naming of objects, is crucial to practice production. It is the naming of objects which Levina and Vaast (2006) argue that is important for interpersonal relationships to exist beyond a given interaction. These objects can be both tangible and intangible and are representations of relations through practice. Objects can take many forms including, markets, institutions, procedures, roles, terms, codes and so on (Levina & Vaast, 2006). All objects are created in a particular field. Moreover, these objects can, in fact, become a commodity within a field providing both a method or way of gauging membership of a field (Bourdieu, 2007; Levina & Vaast, 2006)

Indigenous Australians can be identified as living within a 'field'; that is, at least partly separate from the field of other Australians. This 'Indigenous field' is created through objectification, and also legally and administratively by the Federal Government. The administrative construction of the Indigenous agent is broken down into a three part identity definition. For a person to be considered Indigenous they must meet the following criteria. They:

- must be a member of the Aboriginal race,
- identify as being Aboriginal,
- are accepted by the Aboriginal community as being Aboriginal.

While this three part test is not federal legislation, it has been used for many years and is now universally accepted across all jurisdictions within Australia as the 'test of Aboriginality' (Gardiner-Garden, 2000; High Court of Australia, 1983). This 'test' is also accepted by the Aboriginal community and is used by Aboriginal organisations to both confirm an Indigenous person's Aboriginality and to establish membership of organisations, such as Aboriginal Land Councils (NSW Aboriginal Land Council, 2012).

The Indigenous community is also constructed through objectification. Objective structures in this context take many forms but also include intangible structures. These encompass government policy, such as Indigenous education and employment policies. Objectification is also realised in the physical world through tangible structures such as Indigenous schools, Aboriginal Land Councils and Aboriginal Medical Services.

Until Australia's 1967 referendum, Indigenous people were recognised separately in the Australian Constitution. Under section 51 (xxvi) the Federal Government had the power to make laws with respect to 'the people of any race, other than the Aboriginal race in any State, for whom it is deemed necessary to make special laws'. This became known as the 'race power' in Australian law. Post the 1967 referendum, the same passage of the constitution was amended to read 'the people of any race, for whom it is deemed necessary to make special laws'. However, section 51 (xxvi) is still used to make special laws for Indigenous people under what is still known as the 'race power' (High Court of Australia, 1983).

RESEARCH METHODS

This research undertook a case study approach using Glaserian grounded theory techniques (Glaser, 1992, 1998; Glaser & Strauss, 1967; Yin, 2003), starting with a topic of interest and entering the field with little knowledge of what to expect. The only qualification and background information that was held was the assumption that there was a household ICT adoption gap between the Indigenous and non-Indigenous communities.

The case study text is based on twelve interviews which produced just over 7 hours and 39 minutes of interview recording. When transcribed these interviews produced 151 pages of text. These interviews were conducted over a period of 16 days; however, the total time in the community was 34 days. The length of time is directly related to the issues of working with Aboriginal communities, in that it is very easy to obtain data in a short period of time, but to capture richer data it is first important to establish a rapport with the local Aboriginal community and individuals to gain their trust. Thus, establishing trust in an Aboriginal community is vital to good data collection. The first 18 days in the community were dedicated to establishing trust. This was achieved by visiting Aboriginal community organisations, such as the Aboriginal Medical Service, Aboriginal Radio Station and the Aboriginal Land Council. From these organisations, I was referred to two Elders. After visiting the Elders, they suggested a visit to a number of others in the community to establish trust. After 19 days of being in the community and establishing trust, the first two interviews were undertaken. These interviews were conducted within four hours of each other. Once the interviews were recorded, they were transcribed. These were then loaded into ATLAS.ti (Qualitative Software package) where open coding began as well as memoing. Over the ensuing days, an additional ten interviews were conducted using the same method. By the time the eleventh interview was completed case saturation was achieved, but it wasn't until the twelfth interview that this was totally apparent. It should be noted that the first four interviews were undertaken quite quickly; however, it was five days before the next interview was undertaken. During this time it was quite difficult to find Aboriginal people who were willing to be interviewed.

Interviewees were chosen at random where opportunity permitted and by referrals from the previous interviewee. However, it was imperative that the next interviewee simply was not the next member of the family as to avoid the snowballing effect (Yin, 2003). While simply choosing the next family member would have been much easier and quicker, capturing a broader set of interviewees assisted in developing a more robust model. The time taken for each interview varied but on average was 45 minutes in duration. The interviews were conducted at a number of locations including community organisations, schools, in the local forest areas owned by the local Aboriginal Land Council and in homes. Interviews were only undertaken with Aboriginal Australians. No participant identified themselves as being Torres Strait Islander. In determining Aboriginality each participant self-identified. The university's Human Ethics Committee suggested that initial community contact should occur through community organisations. The participants were aged from mid 20s to late 70s and included a mix of both males and females. Drawing on previous IS research and following the Glaserian GTM, interviews were recorded, transcribed and coded and the themes informed the next interview. The majority of participants were from the main township, with only three participants residing on the old mission – which is a small Indigenous community on the outskirts of the township.

CASE DESCRIPTION

The town for this case study was specifically chosen as it is indicative of many rural Indigenous communities, in that it has is a sizable Indigenous population living within the non-Indigenous community as well as an Indigenous community living on the periphery of the township on what is known as the 'old mission'. To understand the concept of a mission it is important to discuss this further. Missions were used as a 'holding place' for Aboriginal people during less tolerant times in Australia's political history when the Aboriginal populations were subject to the *Aborigines Protection Act 1909*. While there is no longer a Government requirement for Aboriginal people to stay on the 'mission', many Aboriginal people still choose to live in these locations albeit with modern infrastructure. The distance between the old mission and the main township in this case is approximately five kilometres. The rural New South Wales township in this research has a total population of approximately 17000, with an Indigenous population of approximately 1100. The Indigenous population represents 6.5% of the population (Australian Bureau of Statistics, 2006a). While the ICT adoption gap is better than the national average, there is still a significant gap in this location (see table 1).

Table 1: % of homes with internet, Number of Homes in total (ABS 2006a)

% with Internet in home	Indigenous	31%
	Non-Indigenous	46%
Number of Homes	Indigenous	451
	Non-Indigenous	6319

DATA ANALYSIS

The interview 'text' was open coded into 172 categories. Once all interviews were finished, the codes were examined and these were reduced to 135 re-assigning codes which were duplicated during the 16 day process. During the theoretical coding 16 core categories emerged. These core categories are list below (see table 2).

Table 2: Emergent Core Categories

Core Categories	
Education	Poor Financial Management
School Aged Children	Face to Face Communications
Employment	Community Based Issues
Flexible Payment Method	Technology Robustness
Being Young in Age	Cost Associated with Technology
Other Family with ICT in their Home	Substance Abuse
Savings Through ICTs	Appropriate ICT Training
Racial Issues	Technical Issues

The core categories fell into two emergent domains, namely Motivators and Inhibitors. The two domains emerged from the data during the analysis of the case and are grounded in the data. After examining the core categories and through constant comparison of the interview data, it was clear that a number of the core categories enabled the adoption of ICTs in the home while other core categories prevented the adoption of ICTs in the home. There was a clear divide between the motivators and inhibitors.

The upper level concepts of motivators and inhibitors are an attempt to better reflect the dynamics of Indigenous practices regarding ICT use in the home. Therefore, the term motivator here is used to assert that there are aspects of the Indigenous field that motivates an agent to undertake practices to engage in ICTs in the home. Conversely and concurrently, the same applies to inhibitors within the Indigenous field. That is, inhibitors are those particular aspects of the Indigenous field that leads to a particular practice of not engaging in ICTs in the home.

When the emerging practices of the Indigenous field are divided into the two domains the core category table looks like this (see table 3):

Table 3: Domains and their core categories

Motivators	Inhibitors
1. Exposure in Environment	1. Behaviour
1a. Education	1a Substance Abuse
1b. Employment	1b. Poor Financial Management
2. Family Orientation	2. Individual Needs
2a. Children	2a. Face to Face Communications
2b. Occupying Children	2b. Appropriate ICT Training
3. Cost Flexibility	3. Affordability
4. Keeping Culture	4. Race
3.a Family History	
	5. Technology Limitations

As discussed above, the two domains emerged from the core categories, and with the distinction between the two, it can be better viewed how and what either motivates a particular Indigenous agent's practice, or what inhibits an Indigenous agent's practice with respect to home adoption of ICTs. Motivators are those things that provide a motivational influence on Indigenous agent's practices to engage with ICTs in the home, whereas inhibitors are described as those things that prevent a practice by Indigenous agents from engaging in ICT use in the home. It is important to understand that these domains and the subsequent categories do in fact interact with each other.

The domain Motivators first started as the concept Effective Use. This later became Motivators during theoretical coding.

'Up until now I have been using the word effective use to describe conceptually the aspects of ICT use by Aboriginal people. This is because I asked a question about what do they think is good use of ICT for Aboriginal people. Most of the replies come from what they currently do now. That is, they didn't speculate on what might be good use but told me what aspects of their use are good for Aboriginal people. Therefore, I have decided to remove the term effective use from my codes and replace it with the word motivation. Because when I examine the data more critically it looks like effective uses are really the motivation to use the technology or at least the reasons to use the technology'
Memo

MOTIVATORS

The following core motivator categories summarised below are the factors that motivate use of ICTs in Aboriginal households:

1. *Exposure in Environment* relates specifically to an individual's immediate environment but not just the house they live within. Rather, it relates to an individual's extended family and friends house as well. *Education* is a core sub-category that relates to those who are currently studying some form of education regardless of their age. This includes those studying on campus at the local Technical and Further Education College (TAFE) as well was those who were engaged in training courses like those offered by the Commonwealth Development and Employment Program (CDEP) or those who study externally via correspondence. *Employment* is a core sub-category that relates to those who are currently using ICTs in their employment. The use of ICTs in employment is conceptually the same as in education, in that it is the everyday use of ICTs in the workplace that provides the exposure in the environment.

2. *Family Orientation* is a core category that is to do with parents providing more than just the basic necessities to their family. *Children* is a core sub-category that relates to where there is children present in the home. *Occupying children* is a sub-category that relates to the use of ICTs as a way of keeping kids safe by providing an enticement for parents to get children to be inside off the streets. Here ICTs can be considered a tool to elevate boredom and prevent kids getting into trouble on the streets.

3. *Keeping Culture* is a core category that relates to preserving the Indigenous culture through ICTs, whether that is language, stories or images. *Family History* is a sub-category that relates to an individual family and the artefacts that can be obtained, created or stored through ICTs.

4. *Cost Flexibility* is a core category that relates directly to the payment method of ICTs in the home. In the context of this study, flexible payment methods refer to a mode of payment that is more acceptable to the Indigenous community – a method that is much easier injected into a household's budget by instalments.

These four categories have emerged during the theoretical coding process and are considered the core categories that motivate Indigenous agents towards home based use of ICTs.

INHIBITORS

The following core inhibitor categories summarised below are the factors that inhibit use of ICTs in Aboriginal households:

1. *Behaviour* is a core category that relates directly to an individual's behaviour in their environment – it is their practices. There are two aspects of behaviours. *Poor Financial Management* is a sub-category that relates to the ability to manage the cash flow of the household. In the context of this paper, it relates to the management of finances to enable access to ICTs. In some cases poor financial management relates to other activities in the Aboriginal community, not just inside the household. *Substance Abuse* relates to the issue of substance abuse by individuals in the Aboriginal community. This is an interrelated sub-category which relates partly to Poor Financial Management and is the first step in a cascading effect on household use of ICTs. Substance Abuse leads to Poor Financial Management.

2. *Individual Needs* are an agent's emergent needs. *Face-to-Face Communications* relates to the preferred form of communication for individuals. Face-to-face has many aspects that are associated with how an individual builds a relationship and trust. *Appropriate ICT Training* relates to the appropriateness of ICT training. This is not an uncommon issue. With all types of training and teaching, if it is appropriate and relevant, then it is considered good; conversely, if it is not considered appropriate nor relevant, then the opposite is realised and not only does an individual feel disempowered, but often leaves them feeling the technology is even more complicated than they thought before attending the training.

3. *Affordability* relates directly to the initial and ongoing associated costs of ICTs. This core category is associated with the initial investment costs of ICTs, which can be a considerable up-front cost. It is also associated with ongoing costs of repairs, virus protection, internet charges, and phone line charges.

4. *Race* relates to racial issues in the broader environment, whether they are perceived or real. It is a biological fact that Indigenous people are racially different from non-Indigenous Australians, and as such, are considered a separate race of people. It is universally accepted by state and federal governments, and is recognised in both the Australian Constitution and Australian legislation. The core concept relates specifically to the perception of Aboriginal people of themselves in the context of the labour market. That is, the core concept of Racial Issues relates directly to, and has a strong interrelationship with, the core concept Exposure in Environment in the Motivators domain.

5. *Technology Limitations* relates directly to the robustness of ICTs which takes into account the environment the ICTs live within. This core category is concerned with the appropriateness of technology in the area that it is situated. *Technical Issues* are the issues that an individual perceives as inhibitors to the use of ICTs, and relates directly to the architecture of the ICTs, in that there is a need to have telephone infrastructure connected to the house to enable Internet access, and once established, there is a requirement for ongoing anti-virus software for protection.

DISCUSSION OF FINDINGS USING HABITAS AS THE THEORETICAL LENS

The findings demonstrate that there are technical and socio-technical dimensions to Indigenous household ICT adoption. The affordability of ICTs was found to be an inhibitor, and cost flexibility was found to be a motivator where households could enter into a fixed term payment method to purchase the hardware associated with ICTs. As these two aspects of the Indigenous household adoption process are opposite sides of the same concept, these two can eliminated from the developing model (Weick, 1995). However, other costs such as the ongoing costs associated with having the internet connected, such the cost of an ISP or the cost of maintaining a telephone landline to have an active internet connection, remains to be an issue for most households, and this dimension of cost is discussed further below.

The other dimensions of the Indigenous household adoption process draws on habitus theory as a means of understanding both the Motivators and Inhibitors from an Indigenous perspective.

DISCUSSION OF MOTIVATORS

It was found that *Exposure in Environment* played a major role in the uptake of ICTs in Indigenous households. By having this exposure, Indigenous people observe the use of ICTs both within and outside the Indigenous field, and within their regular environment. Through this exposure, Indigenous agents develop dispositions regarding ICTs and Indigenous agents simply reproduce the practices that they observe. However, these practices can only be reproduced if the technology is readily available. It is the dispositions and practices that create the force to purchase the technology.

Similarly with family orientation, Indigenous agents observe what is acceptable practice within their 'field' and simply mimics these practices. The dispositions and practices associated with family orientation not only makes it acceptable to provide ICTs to children, but based on the acceptable practices by other Indigenous agents makes the adoption of ICTs into the household desirable.

The concept of *Keeping Culture* relates to the normal practices of Indigenous agents. That is, keeping culture is practiced by many Indigenous agents whether that is through speaking Aboriginal language, performing dance, or maintaining a family genealogy. Keeping culture is simply a set of practices that Indigenous agents perform on a regularly basis. It emerged that these normative practices could be enhanced through the use of ICTs and, as such, both the dispositions and practices exert a force on the agents to purchase ICT for the household.

DISCUSSION OF INHIBITORS

It was found that *Behaviour* is an inhibitor to Indigenous household ICT adoption. This concept is associated with poor financial management and substance abuse. Many participants reported difficulty in paying bills on time, but supported their actions by stating that plenty of other Aboriginal people have the same problem. Substance abuse, particularly excessive consumption of alcohol, is argued by some to be not only a normal practice, but an 'Aboriginal value'(Gray & Saggers, 2002, p.26). Moreover, it is argued that those Indigenous people who refuse to drink often face claims that they are acting too white (Brady, 1995). Literature demonstrates that there is a strong link between financial management and substance abuse (Alexander, 1990). This demonstrates a relationship between the two concepts.

It can be strongly argued that the excessive consumption of alcohol is a normative practice for many Indigenous people and that Indigenous agents affected by this practice hold durable dispositions about the consumption of alcohol. Moreover, Indigenous agents simply mimic acceptable behaviour within the Indigenous field. However, these durable dispositions and subsequent practices act as an inhibitor of Indigenous household ICT adoption.

Face-to-face communications was found to be an inhibitor of Indigenous household ICT adoption. Indigenous people will often drive to meet with another Indigenous person unannounced, even when ICTs are readily available. Again, in this context, Indigenous agents are simply mimicking the acceptable behaviours that they observe within the Indigenous field.

Race is associated with Indigenous people being excluded from the labour market. In the year of the data collection, the ABS recorded Indigenous unemployment of 34.8% and non-Indigenous unemployment at 10.1% (ABS 2006a). While it could be argued that the exclusion of Indigenous people from employment is about the Indigenous agent's normative practices, the reality is that it goes to the normative practices of the potential employer (Hunter, 2004, 2008; Hunter & Gray, 2004). But it could be argued exclusion from the workforce could as be partly attributed to the durable dispositions and subsequent practices that are associated with an Indigenous agent being consistently rejected for employment, in that once rejected Indigenous people seem to be affected emotionally and accept the employment is unachievable (Hunter, 2008).

CONCLUSION

This research has drawn on habitus as the theoretical lens to understand key aspects of the Indigenous household ICT adoption process in the rural context. The 'Indigenous field' as described has led to Indigenous practices. More generally, Indigenous practices are a constitution of the Indigenous habitus. The salient aspects of the Indigenous household ICT adoption process discussed, demonstrate that Indigenous household ICT adoption is a

complex process with many factors that relate to both the dispositions and practices of an Indigenous agent within the Indigenous field. It should be noted that while this study has only Indigenous participants, it is likely that the results could also be applicable to non-Indigenous Australians. That is, these findings may not necessarily apply only to Indigenous households.

The developing model of Indigenous household adoption provides insights on the process by examining the diffusion process through a habitus lens. The findings highlight the complexity of Indigenous household ICT adoption. One early conclusion is that the Indigenous household adoption process demonstrates that there are multifaceted considerations for the ICT adoption gap between Indigenous and non-Indigenous households to be addressed. The findings also demonstrate that the socio-economic status and social status of individuals play an important role in the ICT adoption process. Moreover, to close the gap between Indigenous and non-Indigenous households, individual Indigenous agent's practices need to be addressed.

Further development of the Indigenous household adoption model (IHAM) is needed. This includes examining the model in remote and urban Indigenous communities. It is speculated that the habitus lens could provide novel insights on adoption of ICTs and that a broader study could assist in a better understanding the findings, approach and theoretical lens.

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