

12-14-2013

Affordances and agentic orientations: An examination of ICT4D users

Antonio Diaz Andrade

Auckland University of Technology, antonio.diaz@aut.ac.nz

Bill Doolin

Auckland University of Technology, bdoolin@aut.ac.nz

Follow this and additional works at: <http://aisel.aisnet.org/globdev2013>

Recommended Citation

Andrade, Antonio Diaz and Doolin, Bill, "Affordances and agentic orientations: An examination of ICT4D users" (2013). *GlobDev 2013*. 1.

<http://aisel.aisnet.org/globdev2013/1>

This material is brought to you by the Proceedings Annual Workshop of the AIS Special Interest Group for ICT in Global Development at AIS Electronic Library (AISeL). It has been accepted for inclusion in GlobDev 2013 by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

Affordances and agentic orientations: An examination of ICT4D users

Antonio Díaz Andrade, antonio.diaz@aut.ac.nz

Bill Doolin, bdoolin@aut.ac.nz

Auckland University of Technology, New Zealand

Paper Category: Research Paper

ABSTRACT

This study aims at understanding how resettled refugees interact with computer technology. In particular, the objectives of this research project are twofold. First, it analyses how information technology users interpret the affordances of computer technology in relation to their unique needs and goals. Second, it scrutinises how information technology users exercise their agency to act upon the materiality of computer technology. The combination of the concepts of affordance and temporal agentic orientation provides the theoretical foundations for this research. Data, obtained through in-depth, face-to face, semi-structured interviews with 53 participants across four locations in New Zealand, was thematically analysed. The findings show that user's past experiences, current circumstances and evaluation of future outcomes significantly influence the perceived affordances of computer technology and, consequently, shape the way it is used.

Keywords: affordances, agency, temporal agentic orientation, ICT4D, refugee communities

INTRODUCTION

What information and communication technology can do to improve people's living conditions has attracted the attention of a considerable number of researchers worldwide. It is no longer in the exclusive realm of governments, non-governmental organisations and international donors. Information and communication technology for development (ICT4D) has gained the credentials of a research area on its own. However, how computer technology is interpreted and appropriated by the alleged beneficiaries of the existing ICT4D initiatives has to be properly understood yet. The traditional dichotomous conceptualisation of the digital divide in terms of material access to ICT has been replaced by the need to understand the meaning of computer technology in ICT4D initiatives and how it is used to enable or inhibit particular actions.

ICT4D initiatives are aimed at improving people's living conditions – cf. Avgerou's (2008) transformative socio-economic process of ICT4D. In a broader sense, development is about producing personal fulfilment on the individual (Sen, 1999). This conceptualisation of development has two conceptually and practically interrelated implications. First, it recognises the need for certain social arrangements to be in place for the betterment of the individual. Second, it recognises that it is the individual who makes decisions, within the constraints of the existing social arrangements, on the course of action for their betterment. Understanding how ICT4D can realise the developmental promise is an intellectual endeavour that calls for recomposing the invisible elements of computer-mediated information in order to understand how it is interpreted and used in a particular context (DiMaggio, Hargittai, Neuman, & Robinson, 2001; Mansell, 2002; Stehr, 2000).

This paper examines how individuals, who entered New Zealand as refugees and received computer access and training, perceive what computer technology offers for their betterment and how they exercise their agency when acting upon these perceptions. In particular, we are interested in how these individuals orient their intentionality and agency post-settlement in their new home, and how computer technology is implicated in this process. To address this issue, we put forward two research questions:

How do users interpret the affordances of computer technology in relation to their needs and goals?

How do users exercise their agency to act upon the materiality of computer technology?

This manuscript is organised as follows. The next section presents the theoretical foundations of this study, which are based on two concepts: affordances and agentic orientations. The subsequent section describes the background to the study. The fourth section outlines the methodological procedures used for data collection and analysis. The fifth section presents the findings and analysis, while the last section offers a concluding discussion.

THEORETICAL FOUNDATIONS

Understanding how computer technology is implicated in the everyday practices of specific social groups requires recognising the nature of the mutually interactive relationship between technology and human actors. Technology does not exist in a vacuum (Heidegger, 1977); it is developed, modified and appropriated (or not) in diverse and complex social settings. In contemporary society, computer technology increasingly mediates human action. Individuals do not engage with computer technology as merely passive subjects with no sense of purpose. Users exercise their judgment through critical consciousness in order to assess how and to what extent computer technology features can help them address their needs and achieve their goals (Robey, Raymond, & Anderson, 2012). It is at the juncture of this interaction between humans and computer technology that human and material agencies are ‘imbricated’ (Leonardi, 2011). Human intentionality activates the material properties of computer technology, which in turn open up new possibilities to its users in a recursive fashion (Leonardi, 2012). This interaction between humans and technology is part of an all-encompassing information ecology (Kallinikos, 2006), which is affected by the existing social structures (Sassen, 2004; Wilson, 2004). Understanding how computer technology mediates and shapes human action in the constitution of a ‘sociomaterial’ agency (Orlikowski & Scott, 2008), requires a way of bringing the materiality of computer technology into the analysis of human intentions and agency. The concept of affordances offers such a mechanism.

Material properties and affordances

Computer technology is an artefact. As any other technology, it has been designed by humans. Understanding its implications requires explicitly recognising its material properties (Orlikowski & Iacono, 2001). The material properties of computer technology include not only both tangible

elements (e.g., keyboards, monitors) and intangible elements (e.g., software, representations on the screen) but also a set of physical characteristics that may engender different interpretations and uses (Markus & Silver, 2008). In order to understand how the material properties of computer technology are interpreted and shape different patterns of use, we utilise the notion of affordance from ecological psychology.

Affordance is “a combination of physical properties of the environment that is uniquely suited to a given animal” (Gibson, 1977, p. 79). Gibson (1977) makes explicit that affordances are invariable; they are there regardless of the actions that observers may take upon the objects of affordance: “The affordance of something does not change as the need of the observer changes... The object offers what it does because it is what it is” (p. 78). This statement does not imply an objectivistic view of affordances. Gibson (1977) unambiguously states that affordances involve a reciprocal relationship between the object and its user, since it is the latter who perceives the possibilities for action the former offers. Chemero (2003) makes a subtle yet important distinction on this reciprocal relationship: affordances “are relations between particular aspects of [users] and particular aspects of situations” (p. 184). It is the actor, influenced by the specific circumstances they face, the one who grants meaning the physical environment. In this sense, affordances can be understood as opportunities for action, which can be as diverse as the users’ needs and goals (Markus & Silver, 2008).

An analytical distinction needs to be made here between affordances and material properties. The later represents the particular arrangement of physical or digital substances, which persists across differences in place and time (Leonardi, 2012). Material properties do not constitute affordances themselves. Affordances represent the relationship between the technical object and the user (Markus & Silver, 2008). Effectuating affordances entails a negotiation process between the actor and the artefact. By adopting an anti-essentialist stance, we stress that depending on the individual needs under specific circumstances, certain affordances are perceived and subsequently actuated – cf. Chemero (2003); Hutchby (2001). Hence, affordances are both functional because they enable or constrain actions and relational because they differ both from person to person under different circumstances. For instance, computer technology can be used for processing numeric data, producing textual documents, surfing the web, accessing structured data, communicating with work colleagues via email and keeping in touch with friends and family via social networking sites, among others – of course, a combination of all or any of these

is possible. The designer's intention of each of these applications is narrow by comparison to the large menu of options that the user has available. What the user actually does depends on their goals and needs, which are influenced by their contingent circumstances. Affordances only become manifest when the individual activates them.

Although affordances are subject to social conventions and rules governing the use of the objects, "... we need to pay more attention to the material substratum which underpins the very possibility of different courses of action in relation to an artefact; and which frames the practices through which technologies come to be involved in the weave of ordinary conduct" (Hutchby, 2001, p. 450). Technologies may have embedded in them their designers' intentions (Introna, 2007), but designers and users do not necessarily share similar purposes. The material properties of a technology afford different courses of action depending on different users' interests and needs. As Robey et al. (2012) elucidate, "material artifacts are functional to the realization of social consequences, both desired and unintended, by 'affording' those consequences" (p. 218).

The material properties and unique characteristics of computer technology offer a dense and variable set of affordances to its users. Suchman (2007) describes the nature of the relation between humans and computer technology: "Insofar as the machine is somewhat *predictable*, in sum, and yet is also both *internally opaque* and *liable to unanticipated behavior*, we are more likely to view ourselves as engaged in interaction with it than as just performing operations on it or using it as a tool to perform operations upon the world" (our emphasis, p. 42). The outcome of our interaction with a computer can be predicted to a certain extent in the sense that this technology is reactive (e.g., by selecting the option "send" on a message, the machine will proceed to send an email accordingly). Its opaque properties are inherent to the computer machine, whose behaviour is composed by countless possible events that occur in a combined fashion (e.g., sending an email entails a complex arrangement of computers, servers and protocols) – cf. Latour's (1999) black-box. Computer technology is also liable to unanticipated behaviour since the same action from the user can lead to dissimilar outcomes (e.g., two Google searches at different points in time are likely to produce different hits) – sociomaterial arrangements are neither stable nor predictable (Latour, 1987). In this sense, computer technology can be perceived as an inviting and interpretively flexible artefact to be used by human agents.

Agents and agentic orientations

The antecedent discussion invokes the need to define human agency. Understanding the way that human actors enact agency in their interaction with their environment requires the scrutiny of people's goals and their available tools in a particular context (cf. Engström, 1999).

Human agency is “the temporally constructed engagement by actors of different structural environments – the temporal-relational contexts of action – which, through the interplay of habit, imagination, and judgment, both reproduces and transforms those structures in interactive response to the problems posed by changing historical situations” (Emirbayer & Mische, 1998, p. 970). By making explicit the contingent circumstances of human agency (i.e., temporal-relational orientation), this definition provides the conceptual elements for the analysis of the research problem at hand. It allows us to scrutinise the predominant temporal orientation of the actor – i.e., past experiences, current situation or imagined future – when they interact with computer technology.

The internal composition of agency and its temporal orientations reveal the changing ways actors relate to problematic situations they face in the course of their lives. Emirbayer & Mische's (1998) definition of human agency brings to the foreground the “double constitution of agency and structure”, by which contextual circumstances “support particular agentic orientations, which in turn constitute different structuring relationships of actors toward their environments” (p. 1004). It explicitly recognises that individuals are not passive entities; they try to influence the conditions they live in. As Bandura (2001) observes, when facing fortuitous events, actors “exercise some measure of control over their self-development and life circumstances” (p. 11). At the same time, this definition of human agency recognises that contextual circumstances predispose responses that privilege or exclude certain behaviours. In order to understand the complex recursive interaction between actors and their circumstances, Emirbayer & Mische (1998) put forward three constitutive elements of agentic orientation: iterational, practical-evaluative and projectivity, which are described next.

The iterational orientation “refers to the selective reactivation by actors of past patterns of thought and action, as routinely incorporated in practical activity, thereby giving stability and order to social universes and helping to sustain identities, interactions, and institutions over time” (Emirbayer & Mische, 1998, p. 971). The predominant agentic orientation under this temporal-

relational context is the past. Consequently, the courses of action that individuals take are heavily predisposed by past experiences. The available possibilities are contingent to the actors' internalised dispositions, shaped through their life time, to certain activities. In Cousins & Robey's (2005) study of how nomadic computing users manage the boundaries between their personal and business lives, the iterational orientation explains why some individuals prefer using somewhat obsolete technologies over newer ones, even though the former are in the process of being phased out.

The practical-evaluative orientation “entails the capacity of actors to make practical and normative judgments among alternative possible trajectories of action, in response to the emerging demands, dilemmas, and ambiguities of presently evolving situations” (Emirbayer & Mische, 1998, p. 971). The continuously changing situation requires the actors to adjust their routinised actions based on an evaluation of current conditions. Under these circumstances, the predominant agentic orientation is the present; thus, actors' actions are largely influenced by the existing context in which these actions are continuously negotiated. For instance, the synchronisation of different mobile devices to overcome the difficulty of keeping track of them reveals how individuals respond to present situations and is an instance of the practical-evaluative orientation – cf. Cousins & Robey (2005).

The projectivity orientation “encompasses the imaginative generation by actors of possible future trajectories of action, in which received structures of thought and action may be creatively reconfigured in relation to actors' hopes, fears, and desires for the future” (Emirbayer & Mische, 1998, p. 971). The ambiguities that actors face in life encourage them to hypothesise future scenarios as a result of their conceivable actions. In this case, the predominant agentic orientation is the future, so the actors' actions are mainly informed by the imagined possibilities. It reveals the aspirations of agents in the “space of possibles” (Bourdieu, 1993, p. 64), where agents subjectively assess their chances to achieve their goals. An individual's willingness to acquire new technology to enhance his or her work performance represents a projectivity orientation – cf. Cousins & Robey (2005).

An integrative framework: Affordances and agentic orientations

The combination of the theoretical concepts of affordance and temporal agentic orientation provides the theoretical foundations for this study. The intricate relation between affordances and

actors requires seeing them as two conceptual components of a theoretical unit. We assume a sociomaterial reality in which humans and technology are inextricably linked (Orlikowski, 2010; Orlikowski & Scott, 2008). The term sociomateriality is a reminder “(a) that all materiality is social in that was created through social processes and it is interpreted and used in social contexts and (b) that all social action is possible because of some materiality” (Leonardi, 2012, p. 32).

Figure 1 summarises the relational interaction between users and material artefacts in terms of agentic orientations and affordances. Affordances shape “the possibilities for agentic action in relation to an object” (Hutchby, 2001, p. 444). Consequently, affordances can only be scrutinised when the individual takes certain actions in the presence of material artefacts. With no material artefacts, affordances would be absent. Similarly, the actions taken by individuals are endowed with agency properties and these actions also need to be assessed in order to render a plausible account of the relational interaction. Intentionality – a sense of purpose – and forethought – consideration of the current circumstances based on past experiences and future scenarios – are inherent to human agency (Bandura, 2001) and shape the way that users interact with computer technology.

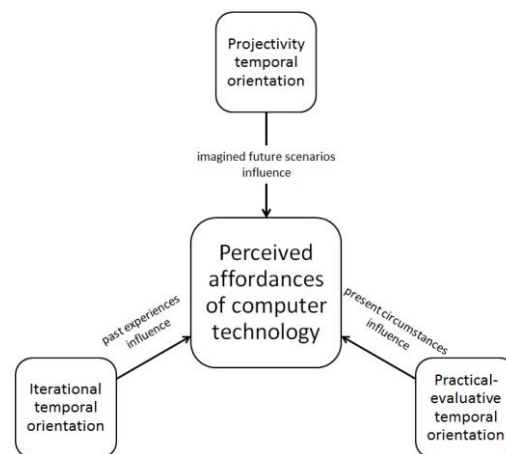


Figure 1: Relationship between temporal agentic orientations and perceived affordances

Ultimately, the affordances of the material properties of computer technology and the actions taken upon them by users constitute an interrelated phenomenon. It must be recognised, however, that while both human and nonhuman actors can leave a trace, intentionality can only

be attributed to human actors (Bandura, 2001; Latour, 2005). The conceptualisation of temporal agentic orientations stresses the role of the actor's agency in relation to existing structures (Emirbayer & Mische, 1998).

BACKGROUND TO THE STUDY

The focus of this research is on understanding how individuals interpret and act upon the affordances that they perceive in relation to computer technology. The unit of analysis for this research project is a certain group of participants in a New Zealand programme called *Computers in Homes*. The declared goal of this government-funded ICT4D initiative is “to provide all New Zealand families who are socially and economically disadvantaged with a computer, an Internet connection, relevant training and technical support” (Computers in Homes, 2012). Since its pilot in 2000, more than 8000 families from the lowest socio-economic segments in New Zealand have participated in the *Computer in Homes* initiative. A specific part of this initiative is the *Refugee Families* programme, whose beneficiaries are, in the main, recently-arrived refugee families with school-aged children. The programme offers them a 30-hour basic computer-training course, which covers topics such as logging on to a computer, using a web browser, and creating and using an email account. Upon the successful completion of the course, the participants receive a refurbished desktop computer and software, as well as broadband connection and technical support free of charge for one year.

The participants of the *Computers in Homes – Refugee Families* programme represent an intentionally sought sample. While they come from different parts of the world and may have different cultural backgrounds and refugee back-stories, they all share the experience of being hosted by a new country. In virtue of international agreements, New Zealand receives 750 refugees every year. Those individuals who enter the country under the refugee quota system are automatically granted permanent residency. As permanent residents, they are eligible for the same assistance as any other permanent resident or New Zealand citizen. This assistance includes access to government-provided health and education services as well as the social welfare benefit if they are unemployed. In other words, technically they are no longer refugees; they are legal residents and upon the satisfaction of residency time in the country can become New Zealand citizens.

New Zealand consistently ranks near the top in the world in terms of human development index (HDI). It provides an interesting context in which to examine how individuals, who come from conflicted areas of the world, interpret and act upon the affordances that they perceive in relation to computer technology while adjusting to a new life. In 2012, New Zealand ranked sixth in the world with an HDI score of 0.919 (UNDP, 2013). By way of comparison, Table 1 shows the HDI scores of the countries of origin of those refugees who participated in this study.

Table 1: Human Development Index (HDI) of participants' countries of origin

Countries of origin	HDI (2012)
Colombia	0.719
Iraq	0.590
Bhutan ¹	0.538
Burma ²	0.498
Rwanda	0.434
Ethiopia	0.396
Eritrea	0.351
Democratic Republic of Congo	0.304

Regardless of the country where the refugees came from, they all had a long journey before entering New Zealand, including waiting for the United Nations High Commissioner for Refugees (UNCHR) to make a decision about their host country. The Rwandans and Congolese stayed in Uganda, the Burmese in India, Thailand or Malaysia, the Ethiopians and Eritreans in Sudan, the Iraqis in Syria and the Colombians in Ecuador. Some participants spent many years, as many as 19 years for one of them, living in refugee camps, where major life events occurred: couples met, got married and their children were born there.

The contrasting living conditions between New Zealand and the participants' countries of origin did not go unnoticed by them. Participants not only highlighted the material progress they witness in their host country (e.g., roads, hospitals, schools) but also the intangible aspects of a stable democracy and largely tolerant society, characterised by a high sense of fairness and respect for human rights. One of the participants expressed the contrast between what he left in his country and what he found in New Zealand as: "When I came here I found peace". A couple

¹ The refugees from Bhutan – known as Lhotshampas – were born in Bhutan, of Nepalese extraction. In the 1990s, interethnic conflicts forced the Lhotshampas out of Bhutan, with some 100,000 people ending up in refugee camps in eastern Nepal. Ironically, they were not recognised as Nepalese citizens.

² Although the official name given to the country by the military government is the Republic of the Union of Myanmar, we use here Burma, as our participants from there call their country.

commented, “After we came to New Zealand, we learned the true meaning of human life because we are respected”. For most of the participants, their political liberties and opportunities for economic development were seriously curtailed in their countries of origin. For some, it was simply a matter of survival; they had to flee because their lives were in danger. As one participant explained, going back to her country is not an option, not even for a short visit – “I would be killed as soon as I landed there”.

There is a general feeling of appreciation for the support that the participants receive from government agencies. One participant said, “I am happy for my children; they can go to school [here]”, while another remarked: “Here we have the opportunity to study at our age, not in other countries”. The sentiment of gratefulness also extends to the charitable organisations and individuals who “give us a lot of support”. One participant explained, “When I arrived in Nelson and looked inside my [new] house, it was a surprise... It got everything like, bed, TV, sofa... I cried”. Another participant summarised the sense of accountability for the support they received: “We do not want to waste resources here”.

However, no matter the infrastructure and social services that a country has to offer, entering it as a refugee is not a trouble-free experience. All participants had to leave their belongings (if any), dreams, stories, friends and families behind to enter a new and unfamiliar country. Upon their arrival in New Zealand, refugees spend six weeks at a Refugee Resettlement Centre in Auckland, where they are introduced to local culture, informed about their rights and the services offered by government agencies, and receive introductory English lessons before being relocated to state houses. While this assistance is intended to make their resettlement smooth, the transition imposes serious challenges. The experience of one participant illustrates the struggles that are faced: “I had a good job, good money and good life in Sudan [where he stayed for a few years while waiting the UNCHR decision to allocate him a definite country]... I got an eight-day notice before traveling to New Zealand with my family... I was confused, afraid... It is about starting all over again”. He then became frustrated because he spent “three years doing nothing, just laid on the couch all day... very stressful experience”. This participant had represented his country at the 1980 Moscow Olympic Games as a swimmer and had worked as a swimming instructor at a foreign embassy in Sudan for a number of years before entering New Zealand. He

perceived that his main problem was his lack of confidence to communicate in English, even though he can speak three other languages fluently and a fourth one at an intermediate level³.

Above all, language represents the major barrier for many participants. For instance, while in their countries of origin they used to approach government agencies whenever they needed to; New Zealand largely operates under a system of appointments, which are mainly made on the telephone. This practice, intended to simplify an everyday life activity, imposes a stressful experience on the new arrivals, who lack the confidence to have a conversation in English. As one participant reflected, “We are still living as refugees, even though in much better conditions than the ones we had before coming to the New Zealand”. Because of the manner participants entered the country and the fact that they are, at least for a certain period, subject to state intervention, they are still socially characterised as refugees (Hein, 1993).

METHOD

The fieldwork involved interviews with a sample of participants that had completed the training course offered by the *Computer in Homes – Refugee Families* programme. The purposive sampling strategy was intended to capture the participants’ trajectories (Morse, 2007). Because of the exceptional circumstances the participants of this study face, they find themselves at the juncture between past experiences and future prospects, where they have to act upon present evolving events. Past experiences, current circumstances and evaluation of future outcomes significantly influence participants’ agentic orientations in relation to the use of computer-mediated communication and information made available to them through their participation in the *Computer in Homes* programme. Following Leonardi’s (2011) notion of imbrications, the material agency of the computer technology is enmeshed with the participants’ agency, producing a change in people’s actions.

Participants in this study received the computer training course at different stages: three of them (one couple, plus a solo mother) received the training six years after entering New Zealand. All the rest did it within three years of their arrival⁴. In-depth, semi-structured, face-to-face interviews were conducted with participants between July 2012 and July 2013 in four different

³ It is worth noting that the interaction with him for this research was entirely in English with no need of assistance at all.

⁴ One participant did not receive the computer training course, although his daughter did. His role as the religious minister of the Chin community (an ethnic group from Burma) in Nelson made him a key informant.

locations across New Zealand. In total, 53 people participated in 39 interview sessions – including one group interview with three participants and a follow up interview with one participant. The interviews lasted between 20 minutes and 1.5 hours, depending on the richness of the data that could be collected. Table 2 shows the participants’ country of origin, the locations where the fieldwork was conducted, the number of participants and the number of interviews.

Table 2: Fieldwork information

Country of origin	Place of residency	Number of participants	Number of interviews
Burma	Auckland	3	3
	Hamilton	2	3 (1 participant interviewed twice)
	Palmerston North	9	5
	Nelson	11	9 (1 group interview with 3 participants)
Bhutan	Palmerston North	8	6
	Nelson	10	6
Democratic Republic of Congo	Auckland	3	2
Eritrea	Auckland	2	1
Ethiopia	Auckland	2	1
Rwanda	Auckland	1	1
Iraq	Auckland	1	1
Colombia	Hamilton	1	1

The role of the researcher who conducted the interviews was the one of a conversation partner rather than an interviewer. In at least nine instances, the interaction with the participants was closer to a family conversation than a formal one-to-one interview since their spouses – and sometimes their children – were directly involved in the dialogue, and everyone shared their experiences about using computers in a congenial way. The interview sessions were conducted in English, except for one that was conducted entirely in Spanish, the mother tongue of one of the researchers. Six out of the 39 interview sessions required the assistance of an interpreter for the length of the interview – including the focused group interview. In five other cases, family members – usually participants’ children – helped in translating specific explanations that participants found hard to express in English.

While guidelines had been developed for the interviews, participants were allowed to talk freely about their experiences using computer technology in an effort to elicit their stories flowing from the past to the present and their imagined future. An effort to capture the nuances of their

statements was made by probing the participants with more questions in order to assess the meaning of their given expressions (Duranti, 1993). While every effort was made to be an active listener, because of the cultural differences between the researcher and the participants, some nuances may have not been captured during the interviews and consequently left unaccounted in the subsequent analysis.

A flexible attitude was adopted for the data collection in order to accommodate to the participants' preferences. This approach is evidenced by the fact that 24 interview sessions were conducted at the participants' houses, 11 at a local school and two at a community centre. The interviews with the only participant who was interviewed twice took place at a fast food restaurant for the first one and at personal accommodation for the second one. Most of the 39 interview sessions were audio-recorded. Only one participant did not agree to be recorded. In five cases, given the particular circumstances in the field, it was deemed that introducing a recorder would hamper the natural flow of the conversation. In these cases, hand-written notes were taken.

Special attention was paid to the social context in which the computer technology is used and how it is used – cf. Klein & Myers's (1999) principle of contextualisation. It needs to be recognised that the technology is being used in a non-mandatory environment. The participants' previous familiarity with computer technology can be roughly classified into three levels: no experience at all, some experience, and a high degree of expertise. At the lowest end, there are participants who are illiterate (two of them) or simply had never touched a computer before the training course. Among those who got some experience with computers are the ones who learned by themselves by visiting cybercafés while living in refugee camps. The participants with the highest level of expertise with computers are those who hold university degrees or had computer training because of their previous job responsibilities. At the time of the fieldwork, most participants were employed in diverse occupations (e.g., store operator, government officer, housekeeper, interpreter, gardener), while others were studying – mainly English; 10 were unemployed. In general, participants expressed their overall satisfaction with computer technology. Those who did not know how to use computers before the computer training course in New Zealand are especially proud of their newly acquired ability. In most of the households, the computer provided upon completion of the training course occupies a prominent position in the house. It is on a desk in either the main living room or the dining room. In some cases, a

newer model has replaced the provided refurbished computer. In other cases, even if the refurbished computer has not been replaced, additional computers have been acquired. One participant exuded excitement when he explained that he had supplemented the refurbished computer with three laptops: “I want my children and wife learning how to use computers”. Another participant shared that he carries his laptop wherever he goes and has bought a tablet for his four-year old daughter for her “to explore and learn new things” (in every household participating in this study children were active computer users), while the desktop computer he received upon the completion of the training course remains at home, mainly for his wife. Furthermore, in those households where the first year of paid broadband had already expired, individual arrangements were made in order to maintain the internet access.

Variability in the way that the participants interpreted the affordances offered by computer technology was expected. The same artefact, as the subsequent analysis demonstrates, can be used for different purposes (Faraj & Azad, 2012). In order to identify patterns of participants’ agentic orientations toward the use of computer technology in the rich dataset, thematic analysis (Braun & Clarke, 2006) was applied. Notes taken during the interviews and audio-recordings, whenever they were available, were uploaded into the NVivo® software package as the data collection progressed. Data collection and data analysis were conducted simultaneously. In order to minimise the risk of decontextualising the fragments of data while performing the coding procedure inherent to thematic analysis, the principle of the hermeneutical circle (Klein & Myers, 1999) was applied, by which the pieces of data were always examined in relation to the whole research problem. Ninety-five codes emerged from the data analysis, indicating the affordances that the participants perceive from computer technology. Since these emergent codes reflect participants’ predominant agentic orientations when using computers, they were allocated to either an iterational, practical-evaluative or projectivity orientation (Emirbayer & Mische, 1998).

ANALYSIS

Our analysis maps participants’ stated intentions and performed actions in relation to the perceived affordances of computer technology. These perceived affordances, alongside actors’ socio-historical conditions, shape their agentic orientations that, in turn, may constrain their intentions and actions. When the participants use computers they do it in a selective fashion,

prioritising what elements require their attention and exploiting the perceived affordance accordingly. The analysis presented here links the participants' perceived affordances through each temporal-relational context of action: iterational, practical-evaluative and projectivity agentic orientations.

Iterational orientation and perceived affordances

The iterational orientation engenders the use of computer technology in a way that is influenced by past experiences. To a high degree, the participants in the study use computer technology to connect back to their roots. It is an indication that they perceive the materiality of computer technology as an instrument that allows them to reaffirm who they are – a recent study on migrants in New Zealand reveals that they grieve for their homelands (Pio, 2010). Participants, while conscious of their current circumstances and trying to respond to the challenges of life in a new environment, still perceive computers as a window to their personal past. Participants' iterational orientation is inferred through three salient perceived affordances of computer technology that emerged from the analysis: an informational, entertaining and networking tool.

Perceiving computer technology as an informational tool allows participants to relate to and connect with their past contexts. Via the Internet, it allows them to stay informed of current affairs in their countries of origin and the places where they stayed before entering into New Zealand. A Congolese participant makes this observation clear, "We are here but still want to know what is going on in our countries". A Burmese participant, who follows the news everyday "on the Internet because it is on my own language", learned about the visit of the Burmese president to New Zealand, which happened on the same week that he was interviewed, when using the Internet to access the BBC's Burmese website. Receiving periodic emails from an email list allows another Burmese participant of Chin ethnicity to "know what is happening in my village".

Computer technology is also perceived as an entertaining device that connects participants to their cultural roots. Watching videos produced in their countries of origin are activities that many do on a regular basis. Examples include Hindi, Nepalese or Nigerian movies, Burmese comedy, Rwandan or Ugandan TV channels, ethnic food recipes and Burmese boxing, among others. This is particularly true in the case of one illiterate participant in his 60s who came from a rural, remote environment where electricity was not available and is not able to communicate in

English at all. His children type for him the URL of his favourite websites where he can watch and listen to content in his own language. Their children said that by doing so he alleviates his nostalgic vibe.

As a networking tool, computer technology helps participants keep in touch with their friends and family back home. In this case, computers fulfil an affective need. As one participant mentions, “my wife uses Skype to be in touch with friends and family”. The fact that email, voice over Internet protocol applications (e.g., Skype) and video chat services (e.g., Oovoo) allow them to see their loved ones generates excitement – “If I had not the computer, I would not be able to be in touch with friends and relatives”, said one participant. In less happy instances, participants use computers to inquire about their missing loved ones. One participant, whose husband and parents disappeared in 2004 without leaving a trace in the context of clashes between rebels and government forces, has not stopped inquiring about their whereabouts since her arrival to New Zealand in 2008. Another participant said, “Facebook is good because you can find people you have not seen for a long time... And then you find them, and you say, ‘Oh, he still alive!’” Computer technology also affords continuity for maintaining the links established while enduring the experience of living in refugee camps and are now spread all over the world. Participants remarked that “it is really good using the computers and being in contact with friends and relatives”, so they exchange of information with people of a similar background. A Bhutanese participant emphasised that “it is good to know where they are”.

The different uses of computer technology described above gravitate around and are influenced by past experiences. In this sense, the iterational orientation informs participants’ engagement with computer technology. No matter for how long they have been living in their new country, they still identify themselves as members of the communities from where they came and have attachments to their personal past. The perceived material properties of the artefact are those that the participants are cognitively and affectively related to – cf. Bourdieu’s (1984) cultural competences. Consequently, when individuals use computer technology, they are enacting its material properties to support their cultural identities and interactions over time – see Figure 2.

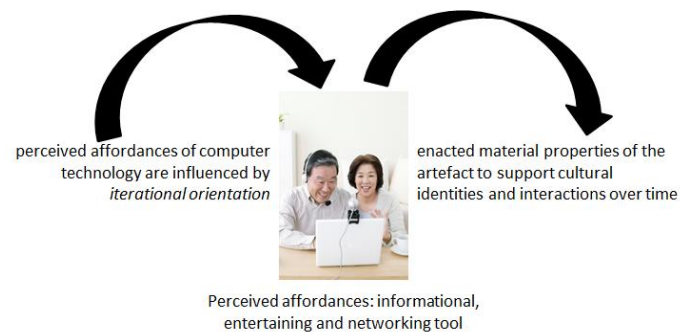


Figure 2: Perceived affordances and material properties influenced by the iterational temporal orientation

Practical-evaluative orientation and perceived affordances

The analysis of participants' behaviour through the practical-evaluative orientation reveals that the perceived affordances of computer technology allow them to evaluate their own possibilities and execute possible courses of action in the uncertain circumstances they currently face as resettled refugees and residents in a new country. From the analysis of the practical-evaluative orientation, four salient perceived affordances of computer technology emerged: facilitating integration to host country, organising communal activities, hiding vulnerabilities and overcoming disabilities.

On the whole, our participants are at a transitional stage, in which their connections in and to their host country are not yet fully established (Weil, 2001). Consequently, the participants perceive that access to computer technology can assist them in this integration process. In the course of the interviews, most of the participants spontaneously shared expressions such as “If there are things that I do not know about New Zealand, I can get them from the Internet” or “I learned about Māori culture and New Zealand history through computers”⁵. Another aspect of this integration process is the use of computers for learning English. The use of online programmes, dictionaries and tutorials to learn and improve English is a common occurrence. “I use the computer for improve my English; to learn how to speak, how to write”, explains one participant, while another one reflects that using online dictionaries “helps me be in touch with my contacts in New Zealand”. These examples illustrate the recursive nature of the social interaction that computer technology contributes to: participants use computers for refining their language skills in order to belong to a network, which in turn improves their language skills. A

⁵ Māori are the indigenous people of New Zealand.

case in point is the Burmese participant who serves as a bilingual assistant for his community and wants to become a qualified translator. He took an English course online and, at the time of the interview in February 2013, had already started a 10-month diploma in business. Beyond being knowledgeable about the culture, history, lifestyle and language of their host country, participants also perceive that computer technology also gives them the opportunity to conduct their lives in a new environment. They use computer technology in a number of ways: conducting online transactions (including banking), translating information from their own language into English and vice versa, preparing themselves for the driving test, communicating with children's school teachers, preparing documents, looking for study opportunities, making appointments, emailing "the church band" and even "looking at maps for checking addresses". Those participants who are currently employed use email to communicate with their colleagues and exchange work-related information. Through their engagement in this communicative process they can assess different courses of action before committing themselves to one of them. For instance, one participant explains that when he detects a mismatch between the information on his electronic payslip and the actual payment that he verifies via online banking, he proceeds to email the employer to raise the discrepancy.

The fact that our participants want to be integrated into their host society does not imply that they are not interested in establishing and maintain connections with their compatriots also living in New Zealand. Rather, they perceive that computer technology affords the possibility to organise communal activities. Email lists for communal groups and groups on social media have been created for keeping the community informed and engaged in communal activities. Interestingly, the coordination of these activities is at the intersection between the online and offline worlds – see Lloyd, Kenna, Thompson & Qayyum's (2013) discussion on alternative approaches for information dissemination among refugees in Australia. For instance, the Bhutanese Society in Palmerston North produces a newsletter, both in English and Nepali. So far, the newsletter has been prepared electronically but distributed by post mail because the newsletter editor is aware that a segment of the Bhutanese community is not able to use a computer yet. However, a test run using electronic distribution is planned. Equally interesting is the case of a Burmese participant who is rather competent using computers. From his home in Palmerston North, he provides assistance in the use of computers to other Burmese nationals, not only to those living in Palmerston North but also to those living in Auckland and Wellington.

Computer technology is also perceived as tool that allows participants hide their vulnerabilities. Computer technology, in this case, allows participants to observe and be part of the activities happening in their host country without necessarily disclosing their alleged vulnerabilities to other members of the community – in particular, not being a native English speaker. For instance, one participant explains that she prefers to receive work-related information (i.e., day and time of work shifts) by email instead of by phone. She wants to make sure that she understands the message correctly. Another participant emails rather than calls a government agency because he does not want to go through of the embarrassing situation of not being understood by the person at the other end of the line.

Some of our participants also perceive that the material properties of computer technology help them overcome disabilities. There are two personal stories that illustrate this point in a compelling way. They reveal how computer technology helped participants to break the tyranny of physical disabilities. In the first case, a 14-year old girl, who suffers from a neuromuscular disorder, is able to feel more comfortable and be more productive in her writing activities by typing on a keyboard as opposed to using a pen. In the second case, a 17-year old boy who has hearing and speech impairments uses video conferencing and sign language to communicate with other people with the same disability in New Zealand and overseas. This opportunity to transcend space has broadened his network of contacts; in the past he was restricted to communicate with his mother and just a few others in his proximity who could interpret sign language.

The analysis of the perceived affordances of computer technology through the practical-evaluative orientation reveals that our participants are using computers to pioneering new courses of action. The aforementioned instances illustrate how agents superimpose the computer technology affordances they perceive to their contextualised social experience. Through a reflective process they decompose and then reconstruct computer-mediated information as well as engaging in an exchange of computer-mediated communication in light of particular situations. Consequently, by using computer technology, individuals are enacting its material properties to figure out ways to manage the uncertainties of their current changing circumstances and achieve their desired outcomes in adjusting to life in New Zealand – see Figure 3.

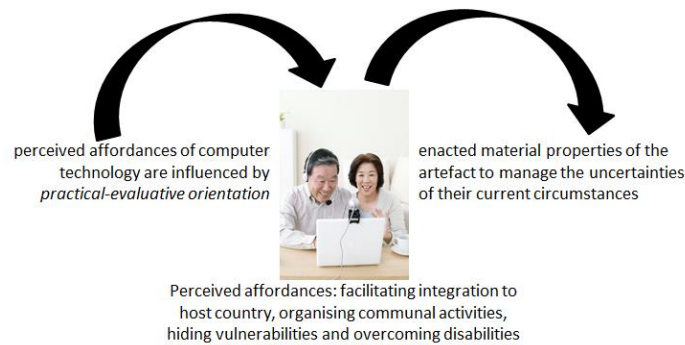


Figure 3: Perceived affordances and material properties influenced by the practical-evaluative temporal orientation

Projectivity orientation and perceived affordances

Analysis of participants' behaviour through the projectivity orientation scrutinises how individuals imagine future scenarios through the computer technology affordances that they perceive. This examination imposes methodological challenges since our participants had to elaborate, using narrative repertoires, on something that has not been materialised yet but is considered attainable. What became apparent during the interviews and in the subsequent analysis is that the perceived affordances of computer technology for imagining future scenarios mirror the ones identified through the iterational and practical-evaluative orientations. Participants are aware of what can be achieved by using computer technology, even though its affordances have not been enacted yet. The analysis through the projectivity orientation reveals one prominent perceived affordance of computer technology: empowering individuals.

The overall tone of participants' expressions reflects that computer technology is perceived as a powerful artefact that can help individuals achieve their goals and needs in the future. For instance, a recently arrived Burmese couple anticipates that knowing how to use computers may help them set up a business in the future. In general, participants project the opportunities computer technology brings for improving their living conditions in the future – e.g., “It can help me in my future for jobs”, “I could learn something new”. After elaborating on the things that he does and could do with a computer, a participant closed with the following remark, “Not having the computer would make me unhappy”, because his options for being connected and informed would be severely restricted. Another participant said, “We cannot survive without the computer. If I do not have it, I have to buy another one”. This sentiment is backed by the fact that many

participants did acquire additional computers to the refurbished one provided by the *Computers in Homes* initiative.

Without exception, the participants expressed their satisfaction at having their children learning how to use computer technology – e.g., computerised educative games for learning mathematics and English, and computer technology in general for completing school homework. They believed that not having access to this technology would make their children's lives harder. A Burmese couple articulated the importance of their children being competent computer users so they are “able to catch up with other children”. Moreover, a Bhutanese participant argued that the *Computer in Homes – Refugee Families* programme should be extended to every new refugee entering the country and not just for those with school-aged children: “[The programme] is a starting point... [From there... participants] can develop their skills [further]”. He concluded that this would allow them to enhance their opportunities in life.

Individuals do not imagine future scenarios in a vacuum. They are always related to a concrete social reality. For instance, an Auckland-based participant says, “I taught my wife how to use computers, set an email account, use email, go to supermarket websites...” The intention behind his action goes beyond the mere interest in making a family member a computer literate person. He reasons that being computer literate is just the means conducive to a superior goal: “We can learn more... and become more integrated to the New Zealand society”. Moreover, participants are always contrasting the affordances of computer technology against existing institutional structures. As a participant acknowledges, the possibility to do online transactions is there (“I could order a pizza online”), but the reality makes the desired occurrence impractical (“because I do not have a credit card”). This expression reveals an understanding of the different elements that make possible the imagined future and the existing institutional constraints that go beyond merely having access to computer technology.

In summary, the perceived affordance of computer technology through the projectivity orientation is the one of an empowering tool. The material properties have not been enacted yet but they mirror the ones identified through the iterational and practical-evaluative orientations – see Figure 4.

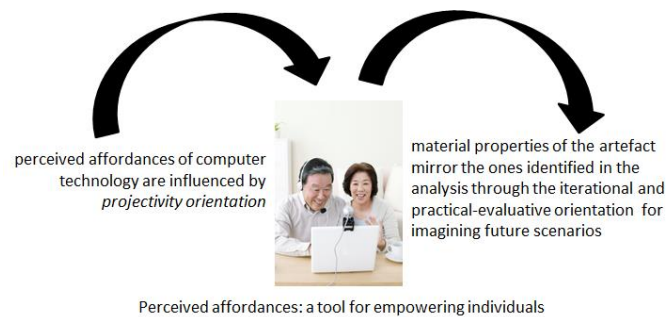


Figure 4: Perceived affordances and material properties influenced by the projectivity temporal orientation

CONCLUDING DISCUSSION

The participants in this study have experienced exceptional circumstances. These have made them lose a great deal of control over their lives. After being forced to leave the places where they were born, they live through the challenges of settling down in a new country, about which most of them had not even heard about before. This situation intensifies the complexity of their relational setting, where personal and social histories, pressures imposed by the current and constantly changing conditions and prospects of imagined future scenarios intertwine. It is against this background that they were given access to computer technology, which they use in adjusting to their new lives.

In their engagement with computer technology the participants perceive certain affordances that favour particular set of actions. As the analysis shows, the perceived affordances of the material properties of computer technology and the consequent actions are not uniform. Computer technology is interpreted and used in different ways depending on the actors' goals and needs, which in turn are influenced by superimposed temporal dimensions. This explains the differential use of computer technology depending on the predominant agentic orientation. The iterational orientation reflects the uncertainty that recognising themselves as different produces. Accordingly, computer technology is perceived as a tool that makes possible keeping links with the past alive. The practical-evaluative orientation manifests actors' intention to adjust their actions depending on their assessment on the current conditions. Thus, computer technology is mainly perceived as both a repository of information and a communication channel that offers multiple opportunities and allows actors to make decisions for subsequent action. The projectivity orientation makes possible the envisioning of future scenarios. Hence, computer

technology is perceived as a medium that unlocks the prospects to bring about betterment and help realise personal aspirations in a new social environment.

The perceived affordances of computer technology and the corresponding user agentic orientations are not static. Users may perceive specific affordances and espouse one orientation for a particular situation and perceive a different set of affordances and spouse another orientation for a different situation. In this study, the predominant agentic orientation of one group of participants is the iterational one. Yet, other participants negotiate the transition from one temporal orientation to another one in a flexible way. This evolving process makes evident the changing ways actors relate to the problematic situations they face in the course of their lives and how they shift their agentic orientations depending on the circumstances. Consequently, how actors perceive the affordances of computer technology for interacting with their environment cannot be analysed in a deterministic way. The evidence suggests that the projectivity orientation enfolds the other two orientations. In other words, actors perceive computer technology affordances for the future in relation to their own present circumstances and past experiences.

In conclusion, the analysis of the perceived computer technology affordances in relation to temporal agentic orientations has proved to be useful in order to give visibility to the complex recursive interaction between actors, in this case resettled refugees, and their situations. The findings of this study have practical bearing on public policy. The opening paragraphs of this paper highlight the importance of autonomy and self-determination of the individual within the social group they belong to as the central characteristic of development. Computer technology provides the material resources to circulate information and connect people that facilitate the integration of refugees into a new society while at the same time keeping the connections with their cultural and affective roots. Recognising the differential perceptions of computer technology affordances informed by differential agentic orientations individuals take contributes to our understanding of how individual freedom can be enhanced, the ultimate goal of ICT4D.

REFERENCES

- Avgerou, C. (2008). Information systems in developing countries: A critical research review. *Journal of Information Technology*, 23(3), 133-146.
- Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52, 1-26.

- Bourdieu, P. (1984). *Distinction: A social critique of the judgement of taste* (R. Nice, Trans.). Cambridge, MA, USA: Harvard University Press.
- Bourdieu, P. (1993). *The field of cultural production: Essays on art and literature*. New York, NY, USA: Columbia University Press.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101.
- Chemero, A. (2003). An outline of a theory of affordances. *Ecological Psychology*, 15(2), 181-195.
- Computers in Homes. (2012). *The Computer in Homes story - Founding missions and goals*. Retrieved 7/Jul, 2012, from <http://www.computersinhomes.org.nz/about-us/founding-missions-a-goals>
- Cousins, K. C., & Robey, D. (2005). Human agency in a wireless world: Patterns of technology use in nomadic computing environments. *Information and Organization*, 15(2), 151-180.
- DiMaggio, P., Hargittai, E., Neuman, W. R., & Robinson, J. P. (2001). Social implications of the Internet. *Annual Review of Sociology*, 27, 307-336.
- Duranti, A. (1993). Truth and intentionality: An ethnographic critique. *Cultural Anthropology*, 8(2), 214-245.
- Emirbayer, M., & Mische, A. (1998). What is agency? *American Journal of Sociology*, 103(4), 962-1023.
- Engström, Y. (1999). Activity theory and individual and social transformation. In Y. Engström, R. Miettinen, & R.-L. Punamäki (Eds.), *Perspectives on activity theory*. Cambridge, UK: Cambridge University Press.
- Faraj, S., & Azad, B. (2012). The materiality of technology: An affordance perspective. In P. M. Leonardi, B. A. Nardi, & J. Kallinikos (Eds.), *Materiality and organizing: Social interaction in a technological world* (pp. 237-258). Oxford, UK: Oxford University Press.
- Gibson, J. J. (1977). The theory of affordances. In R. Shaw & J. Bransford (Eds.), *Perceiving, acting and knowing: Toward an ecological psychology* (pp. 67-82). Hillsdale, NJ, USA: Lawrence Erlbaum Associates.
- Heidegger, M. (1977). *The question concerning technology, and other essays* (W. Lovitt, Trans.). New York, NY, USA: Harper Torchbooks.
- Hein, J. (1993). Refugees, immigrants, and the state. *Annual Review of Sociology*, 19, 43-59.
- Hutchby, I. (2001). Technologies, texts and affordances. *Sociology*, 35(2), 441-456.
- Introna, L. D. (2007). Maintaining the reversibility of foldings: Making the ethics (politics) of information technology visible. *Ethics and Information Technology*, 9(1), 11-25.

- Kallinikos, J. (2006). *The consequences of information: Institutional implications of technological change*. Cheltenham, UK: Edward Elgar.
- Klein, H. K., & Myers, M. D. (1999). A set of principles for conducting and evaluating interpretive field studies in information systems. *MIS Quarterly*, 23(1), 67-88.
- Latour, B. (1987). *Science in action: How to follow scientists and engineers through societies*. Cambridge, MA, USA: Harvard University Press.
- Latour, B. (1999). *Pandora's hope: Essays on the reality of science studies*. Cambridge, MA, USA: Harvard University Press.
- Latour, B. (2005). *Reassembling the social: An introduction to actor-network-theory*. Oxford, UK: Oxford University Press.
- Leonardi, P. M. (2011). When flexible routines meet flexible technologies: Affordance, constraint, and the imbrication of human and material agencies. *MIS Quarterly*, 35(1), 147-167.
- Leonardi, P. M. (2012). Materiality, sociomateriality, and socio-technical systems: What do these terms mean? How are they different? Do we need them? In P. M. Leonardi, B. A. Nardi, & J. Kallinikos (Eds.), *Materiality and organizing: Social interaction in a technological world* (pp. 25-48). Oxford, UK: Oxford University Press.
- Lloyd, A., Kennan, M. A., Thompson, K. M., & Qayyum, A. (2013). Connecting with new information landscapes: Information literacy practices of refugees. *Journal of Documentation*, 69(1), 121-144.
- Mansell, R. (2002). From digital divides to digital entitlements in knowledge societies. *Current Sociology*, 50(3), 407-426.
- Markus, M. L., & Silver, M. S. (2008). A foundation for the study of IT effects: A new look at DeSanctis and Poole's concepts of structural features and spirit. *Journal of the Association for Information Systems*, 9(10/11), 609-632.
- Morse, J. M. (2007). Sampling in grounded theory. In A. Bryant & K. Charmaz (Eds.), *The Sage handbook of grounded theory* (pp. 229-244). London, UK: Sage Publications.
- Orlikowski, W. J. (2010). The sociomateriality of organisational life: Considering technology in management research. *Cambridge Journal of Economics*, 34(1), 125-141.
- Orlikowski, W. J., & Iacono, C. S. (2001). Desperately seeking the "IT" in IT research - A call to theorizing the IT artifact. *Information Systems Research*, 12(2), 121-134.
- Orlikowski, W. J., & Scott, S. V. (2008). Sociomateriality: Challenging the separation of technology, work and organization. *The Academy of Management Annals*, 2(1), 433-474.
- Pio, E. (2010). *Longing & belonging: Asian, Middle Eastern, Latin American and African peoples in New Zealand*. Wellington, New Zealand: Dunmore.

- Robey, D., Raymond, B., & Anderson, C. (2012). Theorizing information technology as a material artifact in information systems research. In P. M. Leonardi, B. A. Nardi, & J. Kallinikos (Eds.), *Materiality and organizing: Social interaction in a technological world* (pp. 217-236). Oxford, UK: Oxford University Press.
- Sassen, S. (2004). Towards a sociology of information technology. In C. Avgerou, C. Ciborra, & F. Land (Eds.), *The social study of information and communication technology: Innovation, actors, and contexts* (pp. 77-99). Oxford, UK: Oxford University Press.
- Sen, A. K. (1999). *Development as freedom*. New York, NY, USA: First Anchor Books.
- Stehr, N. (2000). Deciphering information technologies: Modern societies as networks. *European Journal of Social Theory*, 3(1), 83-94.
- Suchman, L. A. (2007). *Human-machine reconfigurations: Plans and situated actions* (2nd ed.). New York, NY, USA: Cambridge University Press.
- UNDP. (2013). *Human Development Report 2013 - The rise of the South: Human progress in a diverse world*. Retrieved 7/April, 2013, from <http://hdrstats.undp.org/en/countries/profiles/NZL.html>
- Weil, S. (2001). *The need for roots: Prelude to a declaration of duties towards mankind*. New York, NY, USA: Routledge.
- Wilson, E. J., III. (2004). *The information revolution and developing countries*. Cambridge, MA, USA: The MIT Press.