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Brisbane Australia

This is the author's version of a work that was submitted/accepted for publication in the following source:

Houghton, Kirralie, Miller, Evonne, & Foth, Marcus (2013) Integrating ICT into the planning process : impacts, opportunities and challenges. *Australian Planner*, 51(1), pp. 24-33.

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<http://dx.doi.org/10.1080/07293682.2013.770771>

Appropriating digital technologies for urban planning: information and communication tools

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Abstract

Mobile telecommunications have become a key lifestyle and technological trend of the twenty first century. In the context of increased urbanism and pressure on cities for citizen engagement for the purpose of creating good public places the potential of these technologies raises critical questions for planning professionals. Even though technology has become integral to all functions within our urban environment, little is known about perceptions and relationship between urban planners and the ubiquitous, ever-present digital layer of urban data and information. This paper explores this issue, via three focus groups and an additional follow-up interview with planners from local and state government, education and private sector. This paper explores the issues of integrating information and communication technologies into planning practice and the affordances that these technologies offer for community consultation and placemaking.

Key Words

Urban informatics; urban planning; computers; digital; communication

Introduction

The two key defining lifestyle and technological trends of the twenty first century are, urbanisation coupled with increased accessibility and use of mobile telecommunication systems (Tibajjuka, 2009p3). Increased urbanisation puts pressure on infrastructure and lifestyle within cities with more than 87% of Australians (ABS, 2003), and 50% of world population living in cities, totaling more than 3.6 billion people (United Nations, 2012) predicted to increase to 6.3 billion by 2050. Telecommunication trends mean changing patterns of communication and behaviour, participation and accessibility to information. CISCO predicts there will be 10 billion mobile devices in use across the world by 2016. The average smart phone traffic tripled in 2011 (CISCO, 2012) and the Australian Bureau of Statistics calculates the strongest ICT trend is the use of mobile wireless (excluding mobile handsets), the number of which has risen to 4.8 million in June 2011 (ABS, 2011). Thus, the relationship and influences of these phenomena on the form and function of cities is a dynamic and relevant question for the good governance of our urban places in the 21st century.

Urban planners have a long traditional involvement in the management and development of urban form, the essence of urban planning is the focus on internal order of cities and place-making (Adamson & Bunnnett, 2002). Amin et al. (2000) suggest, *'what matters within cities...revolves around the fact that they are places of social interaction.'* The interplay between the various elements and needs of the city and its population demands complex and organised systems. It is here that information and communication systems may play a critical role. They are already influencing these socio-spatial relationships and offer further the potential for facilitation and management; revitalizing and coordinating the interactions that occur within the urban setting. Mitchell (2007) talks of the new intelligence of cities likening them to living organisms. He paints the metaphor of digital telecommunication networks acting as the brains of the organism; the use of embedded sensors and tags functioning as sensory organs; and the software providing cognitive competence and knowledge. These parts coming together and functioning in a coordinated way *'become a very significant expression of ideology, mediators of consciousness and instruments of power'* (p.5).

It is not just the large scale government controlled networks that influence the city, increasingly the network of personal devices, mobile and interconnected, are changing patterns of behaviour, meaning and representation of the urban setting. The introduction of smart phones and the uptake of mobile telephony generally have seen new flexibility and the extension of workplaces (e.g. people working on tablets in public spaces, checking and responding to emails on public transport), thus further blurring the lines of work time, leisure, social and community public spaces. Yet, although information and communication technology (Latreille, Chandler & Unit.) and social media provide a conduit through which many connections and interactions within urban environments can occur, little is known about how planners perceive and utilise ICT or their experiences and expectations on how urban informatics might shape current and future design of public spaces.

This paper sets out to explore the potential value of these technologies to the practice of urban planning. Through an examination of the literature presented in the framework of urban informatics that is the interrelationship of people, place and technology (Foth, Choi & Satchell, 2011; Sheth, 2009) specifically in the context of public participation and placemaking. The paper then draws on the expert experience of urban planners and designers

who through focus groups discussed their perceptions of the evolving interactions of people place and technology on their practice.

Public Inclusion

The importance of public consultation within the planning process has become a fundamental value in urban planning and the supporting literature is rich with discussion, examples and debate (Quick & Feldman, 2011). It speaks to values of inclusion, democracy, collaboration and shared ownership within community specifically and society more generally (Innes & Booher, 2004). Described as engagement, participation, consultation and inclusion the effectiveness of methods varies greatly with the classic spectrum of Arnstein's (1969) participation ladder presenting eight levels of participation, ranging from the weak level of manipulation, to strong participation where there is a measure of citizen control over process and outcomes. The International Association for Public Participation has established seven core values for the practice of public participation. These are shown in the table below:

1. <i>Public participation is based on the belief that those who are affected by a decision have a right to be involved in the decision-making process.</i>
2. <i>Public participation includes the promise that the public's contribution will influence the decision.</i>
3. <i>Public participation promotes sustainable decisions by recognizing and communicating the needs and interests of all participants, including decision makers.</i>
4. <i>Public participation seeks out and facilitates the involvement of those potentially affected by or interested in a decision.</i>
5. <i>Public participation seeks input from participants in designing how they participate.</i>
6. <i>Public participation provides participants with the information they need to participate in a meaningful way.</i>
7. <i>Public participation communicates to participants how their input affected the decision.</i>

Table 1: International Association for Public Participation – Core Principles of Public Participation (IAPP, 2012)

The dilemma of effective public participation that meets these goals has raised debate as various approaches (including those established as legal requirements in planning instruments and government policy) are arguably ineffective (Innes & Booher, 2004) and can cause more angst within the community rather than inclusion. Often participants are left disgruntled and doubting that their concerns have been heard (Innes & Booher, 2004).

Quick and Feldman (2011) suggest that there needs to be a distinction drawn between participation and inclusion, as a way of meeting the challenges of providing more effective forms of community involvement in the processes of planning (and other government initiatives). By making these distinctions a more fruitful discussion of the approaches to community involvement can evolve. They define *participation* as practices that involve the public input into programs and policies. Distinguished from *inclusion*, which is defined as a process of continuous

community involvement resulting in coproducing the policies and programs that address public issues(Quick & Feldman, 2011). Innes and Booher (2004) point to dialogue, networks and institutional capacity as the keys to successful collaborative engagement processes, processes which build networks of lasting relationships. Utilising mobile information and communication technologies [ICT] for this process becomes a natural progression as these mediums evolve as the common form of communication.

There has been significant development of citizen activation through the use of ICT. A growing expectation of meaningful participation in civic and economic matters means that the affordances of digital media provide new and exciting ways to connect with an increasingly busy and occupied community (Coyne 2009). There has been research conducted into the use of digital media as a consultation tool as well as a potential community design tool with projects like *Second life as an engagement tool* (Foth, Bajracharya, Brown & Hearn, 2009; Gordon & Manosevitch, 2010), *Discussions in Space* (Schroeter & Houghton, 2011) and Hub2 (Gordon & Manosevitch, 2010).

Coyne's (2009) theorises, that the mobile phone and social media can be used in to develop collective agency in communities, and that they provide means for a participatory design process which is both politically attuned and liberalizing. He cites examples of Obama's presidential campaign, Iran elections of 2009 and the availability of existing social media to generate a crowd through which a measure of agency can be gained. The power of the crowd, 'the smart mob' that can form and dissipate, reform and interact through the medium of a highly responsive electronic media. The exploration of this capabilities of this agency for planning matters and place governance has not been full explored and presents a range of questions for the future directions of community interactions and engagements. In order to cultivate an active participation process a cognitive connection between communities and their spaces must occur, a spatial awareness that through a process of experiential layering creates meaningful 'place' (Cresswell, 2004).

Spatiality through digitally mediated interactions

Good places are built on understanding how people interact and experience space. There have always been layers of meaning connected to public places, specific to individual, and combined in community through shared experience and perceptions – in the age of technology there are ways to share, build and leverage these meanings and nuances of place to support and even create through a process of augmentation.

Weiser (1993), coined the term "ubiquitous computing," and Greenfield (2006) furthered the discussion with the concept of 'Everyware' computing, a series of theses or arguments on the nature of the information technology that surrounds us. From an information and communication technology [ICT] perspective, discussion has been dynamic in terms of the relationships between physical place; digital telecommunications; and the affordances of mobile computing (Arnold, 2003; Aurigi & De Cindio, 2008; Bell, 2004; Brewer & Dourish, 2008; Chatzigiannakis, Mylonas & Vitaletti, 2011). Although there were many initial concerns that the Internet would destroy any sense of real place (Meyrowitz, 1985), these have largely proven to be unfounded. ICT development went wireless and the population - no longer tethered to the desktop - ventured out into the parks, streets and plazas with laptops, smart phones and more recently tablets (Hampton & Gupta, 2008). Instead of leading a virtual existence with a stylised

avatar in an artificial cyberspace, a new augmented reality and versions of hybrid reality have evolved (Marner et al., 2011). A new dynamic whereby information and communication technology (Latreille et al.) can enhance the use of public space and the engagement of the population in both spatial activities and civic discussion have emerged.

The interaction and communication of people in the urban spaces is relatively unseen barring the changing behaviour of the public in possession of the mobile phone (Burke et al., 2006; Guzzetta & Bollens, 2003; Katz, 2006). The layer of digital information is illusive to the naked eye, and yet it holds potential to build community, connect us with the historical detail of place, to inform, to invite, to entertain, and entice its users in relation to the physical place. The effect is to alter our relationship with 'place,' strategically changing the use, vision and aspirations we hold for place. Sheller (2004) linked this shifting behavioural pattern to the increased way that the 'publics' became more mobile, having two-fold implications. Firstly, the increased tendency to move between private and public modes of interaction enabled by mobile communication technologies; secondly, the opportunity to create a new public that briefly and purposefully comes together, assembles and can dissipate just as quickly as a result of 'newly emerging places and areas for communication'.

Paay and Kjeldskov (2007) who considered the way that behaviour is affected in public spaces by ICT design. Found that social and cultural meaning were built or created within the context of public places by the presence and activities of people, and that this in turn developed a sense of place. Unpacking the change and shifts of these nuances in how technologies impact people, and space, and vice versa, is relevant to the discussion of the purpose, value and meaning of public space in a modern society and city (Shelley 2002). We interpret our world, our urban spaces as both physical and social, and the social nature of these spaces means that they are constantly being defined and redefined in a process of interpretation (Williams, Kibisch & Dourish 2005).

It is important for planners within a context of contemporary practice to acknowledge, understand and direct the interaction of the physical place and its digital layers. ICT offers interactive and innovative tools to connect people and places, aligning closely with the key aspirations of the planning profession. Gospodini's (2009) discussion of urban design highlights the significance of the changing patterns of behaviour and increased mobility of the public on the contemporary focus of urban design.

Dodgson and Gann (2011) illustrated the development and governance of the complex 'data deluge' (incorporating all types of ubiquitous computing from radio-frequency identification, mobile phones, integrated infrastructure systems and surveillance cameras which can provide real-time data across an urban environment). Using a case study of the IBM Corporation's smart cities approach, Dodgson and Gann discussed the systematic complexities of information of, and for the city. They highlighted the relevance of people and their networks in the future development of organisational systems of cities. Understanding the social nature of some of the most prominent internet systems (consider Facebook, Twitter, MySpace, Foursquare etc.) and the changing methods and expectations of communication within society today, leads to an observation of the need for new approaches to governance and collaborative planning processes. Technological development and design will be built though

new emergent systems of design interaction that understands and can capitalise on the opportunities of a digitally connected society.

Methodology

To understand the current relationship between planners and the changing nature of ubiquitous computing for placemaking, a series of three qualitative focus groups were held with urban planners. Based in Brisbane Queensland one of the fastest growing regions in Australia, it provided a case study of a planning context under fast paced development pressure. Using the planners own perspectives, a phenomenologist's lens that is "concerned with understanding social and psychological phenomena from the perspectives of people involved" (Welman & Kruger 1999, p. 189), the study aimed to contextualise the perception and use of ICT for place management from a practicing urban planner's perspective, development processes and the cultural nuances of the planning profession. The focus groups involved a total of twelve planners from a range of backgrounds including three local governments, state government, private sector consultants, community planners and educators (see Table 1). Table 1 shows a breakdown of the gender, professional perspective and ages of the participants.

[INSERT TABLE 1 HERE]

Planners were recruited through the convenience of known networks (including the Planning Institute of Australia and University contacts) to ensure a mixed sample covering the various perspectives of the profession. Recruits were emailed and offered gift card incentives to participate and thank them for their time. The focus groups were held at the university, and ran for approximately 90 minutes each. The time was broken into two distinct parts. The first focused on the potential use of location based mobile media for public consultation, a particular program for short message in-situ consultation was demonstrated and discussed ('Discussions in Space', see Schroeter, 2012; Schroeter & Houghton, 2011) and the second part was directed at understanding how the planners currently understood and interacted with social media and ICT media in their daily professional context, as well as what potential or concerns they had about its use in the future.

Although these areas provided a guide of key issues to be covered, a semi-structured approach was purposely utilised to ensure the focus group moderator (first author, KH) had the flexibility to probe emergent issues and adapt questions as required to fully explore and understand participants' perspectives.

The sessions were videotaped for transcription and analysis, with a thematic analysis conducted to identify meaningful categories or recurring themes that emerged from the data.

Results

Through each of the focus groups it emerged that there was little if any current engagement of planners with the affordances of ICT in their professional practices. There was a range in the level of exposure to technology in daily

life, affecting the understanding that planners had of technology. In exploring the potential and barriers to engagement with ICT a number of themes evolved, these included: the opportunity to connect with users of public spaces; the potential to share information in and about place with the public and the ability to adapt places in swift and temporary ways. While the barriers to use identified were knowledge and skill, agency and time constraints.

The potential of ICT for planning

As one may expect, there was a wide variety of awareness about the potential of ICT and any potential vision was greater where the planner had a personal experience and use of technology, such as smart phones and tablets. One key issue that kept arising for planners was the need to interpret the community visions and aspirations of public places. Identifying ways that ICT could elicit this information from the public was a priority for each of the focus groups. All planners could foresee that there was '*something there*' but the question of 'what' remained.

Planners' roles focused on gleaning community aspirations (in traditional ways) about place and balancing it with political, financial and physical limitation, as well as juggling a wide variety and sometimes opposing and contradictory visions, views and expectations as they emerge from community. The idea of place and ownership, progress and development was complicated by the variety of views, the role of power, of governance and competing interests in place. A clear common purpose of planning unfolded that is the '*unpacking the variety and complexity of interests*' [AC 6] in order for good design to suit the community as a whole, and providing a voice for the greater community interest.

Some expressed the belief that as technology evolved community acceptance and take-up would lead the use of ICT in community engagement on its own terms, rather than proactively being initiated by councils or planners. The planners were concerned about perceived risks and questions of control over a consultation process, expressing fears that '*something may be unleashed without the control or perspective of the bigger picture*' [1]. That like traditional media interactions, emotive public response could facilitate '*out of control*' engagement, where issues are blown out of proportion or the key issue is 'railroaded' by political agendas or unsubstantiated fears. There was also a concern that the overload of information would limit the meaningful use of systems such as the Council twitter account, and the personalisation or streaming of the discussion was required.

"if you think about the way Brisbane City is engaging in Twitter at the moment, it is kind of like there is one twitter account, who wants to know necessarily about all these diverse things, there is probably a lot of diverse audiences out there, they want more tailored communication, to purpose, and to place, and to their interest. Once that diversity occurs I think a lot more people will engage and there will be more need for public screens in public places." [UP1]

The use of technologies to allow people to voice a reaction, to be heard, to be publicly acknowledged was also discussed by planners, who saw this as a legitimate function of community participation. The planners felt that the need to converse and debate was considered for many citizens being less important than being heard. One interesting example was described reflecting on a showcase artistic event where comments were projected on a live screen, an idea that could be used as a possible means of allowing the community to voice their opinions and concerns on planning matters.

'In an artistic sense, a playful sense it had a therapeutic role where people could say something and put it out there... there will be some of those spaces that will be an outlet and it is not necessarily conversation' [UP 3]

A key influence identified by planners was the question of ownership, including the reality that much of the public space of our urban environments is privately owned, for instance the shopping centres, cinemas, and entertainment places. They felt that ICT could be seen as a matter for the day-to-day management of these places, rather than the role of the urban planner.

'Suburban environments are so aggressively privatized the idea of public space is very different to urban spaces, and shopping centers are the public spaces... You need platforms to raise a different kind of awareness of public space in those environments' [AC6]

The vision of the potential to use ICT as a tool in placemaking grew throughout the focus group discussion. As the group saw the ideas and suggestions of others, the applications and use of urban informatics in an urban environment inspired the planners own thoughts and notions. Some had heard of ways that ICT had activated certain spaces with events like, flash mobs, 'occupy' rallies, national uprisings. The interesting point for the planners was the ability for decision makers to 'connect dots and making linkages' from community information. As one explained, the opportunity was in 'how the public and the private owners of property are prepared to 'make' their spaces and what sort of connections are they prepared to start mapping across communities and larger catchments.' [AC6]

When thinking about relevant design considerations for public places in response to ICT one planner commented:

'Council is rolling out a lot more wireless to all the regional libraries where previously they only had it in metropolitan libraries, so presumably the spaces outside the libraries are going to go through a change' [UP1]

The encouragement of more people into places of wireless connectivity was seen as a positive way to activate place and put eyes on the street, the State Library of Queensland was referred to in this context as a good example. Wi-Fi access was seen as playing 'a role in enhancing and making a place more desirable and safer' [AR7]. In this way, Wi-Fi was identified by the planners as a potential tool to draw people into public spaces, as well as a way to discover or create new experiences that enhances the experience of place through added information which could be of historical interest, advisory, entertaining or just for socially connecting. One thought that excited younger planners particularly was a concept of 'spontaneity of place', where an ad hoc use of place could develop through the affordances of ICT social networks. They described how 'people become more fluid in their plans and this (was) being accelerated with Twitter and Facebook and other telephone based, immediate communications' [UP1].

'There is probably going to be more things where you know you've got your iPhone that's location enabled and you've got your Facebook account and your Facebook account's got your preferences ... I think there will be a lot more of that uncovering new places by digital means than previously.' [UP1]

Traditionally, we see places developed in concrete and mortar, permanent and unyielding to change. Their form limits their use at any given point in time, essentially designs lack a robustness of form. There is limited ability to change a space be something else, to evolve and transform in relation to community needs. However, as one planner observed, ICT has the potential to enrich robustness:

'It does open up the opportunity to actually investigate temporal and temporary spaces, you know where you can even drive a new type of architecture where you have demountables, and big trees in pots so you can move them around. Or even new public spaces where you can move the furniture ...so it becomes a really engaging and interactive space, and it depends on people's moods and what they actually want to do with the space, the people who actually use it – there is a great opportunity.' [UP3]

The use of space or the creation of flexible spaces is one of the most exciting and conceptually significant influences of ICT on 'place'. The notion of flash mobs and spontaneous organisation of people, were raised by planners. They suggested that their use has the potential to creatively build community. Working with place in this way involves many players including the landowners and community, creative vision and co-ordination for this type of activity was seen as beyond the planners' scope of professional involvement, input and agency.

Some of the participants were aware that there have been some initial attempts at incorporating ICT networks in new suburbs, through the incorporation of broadband networks into neighbourhoods, or the development of community social networks localised to the specific area. One planner suggested, like the examples given of Springfield Lakes and Craigieburn, this was done from the beginning of development. Planners felt this provided an example of an important way in which ICT can aid the planning and development of urban (and regional) areas, supporting new or older developed areas.

Barriers

Who has the agency to engage, to use, to determine what technology influences place? Within each of the focus groups, the question of agency was raised. Planners viewed that they were tightly controlled by regulation and process in terms of what new and innovative approaches they could use and felt that they often had to wait for the system or legal processes of law to catch up with the technological developments. There was a feeling that the planner is given a specific set of guidelines for how they operate and beyond that they had little influence. Few of the planners within the group were able to see themselves as designers; even in strategic planning roles the development of policy saw planners as regulators, not creators.

The discussion included legislative frameworks that govern planning, effectively establishing the level of agency of their positions. In contrast, ICT development was seen as fluid and fast paced, while moving the legislative framework is a slow and often complex process. There are many good reasons for the framework of legislation and the role it plays within a structure of civil society, but it did create for the planner a sense that they lacked the autonomy for creative innovation. The view predominating that, planners were often the 'meat in the sandwich'; between the politics and the community, left with a role of co-ordination and negotiation. The issue of agency was not limited to ICT development necessarily but any type of innovation. Indeed, finding a tangible relationship between the physical environment and the digital was not something the planners had given much thought to,

making the idea of how the two could potentially support and enhance each other new: until the focus group discussion, the planners' paradigm had not included a link between ICT and planning.

While planners demonstrated a knowledge or interest in the types of data that might be available from other agencies or companies, such as the telecommunication sector, there was a perceived barrier in access to that information preventing further exploration of its use by planners.

'... if Brisbane City Council could get access to that information for data of the population of Brisbane to evaluate its use to public spaces in a time sense and a number sense, we do counts, you can't get good data to argue good things and you might find where your real key good places are to do further research into those areas'. [UP1]

Discussion

The function of planning to coordinate community needs and views can potentially benefit greatly from the key affordances of ICT and social media in its capacity to build networks and share community knowledge. While initial use of social media may appear to have focused on trivial daily happenings, there is an increasing pattern of its use to support, inform and build community, in real time and place that is in physical localities (Foth, Forlano, Satchell & Gibbs, 2011). Such networks provide a rich source of data and strong existing networks for urban planning as a process, to plug into or to further develop to create the types of spaces and applications that provide a platform for civic discourse on strategic planning matters. They also offer the opportunity to collect data on meaning and value of places for people from within a social context.

Inspiration and Exposure to Potential of ICTs

Whether it is by individual initiative or team development, a measure of leadership and vision for place, and about place, is required, as well as the supporting governance structure. The necessary catalyst of passion and personal drive can come from planners and designers, community workers or general public. Planners, however, are in the position to see potential and act to lead people in relation to the use and perception of place. In some cases to see it within the scope of their role, that as local government increasingly becomes aware of the benefits of place making, urban informatics can be used to augment community aspirations.

However, as this research has illustrated, urban informatics and planning are not necessarily perceived as being linked or connected. Our sample of Brisbane planners explained how the planning paradigm to date has not included the use of ICT or social media, and they had significant concerns about the agency, knowledge and ability of planners to lead in the innovation and application of ICT in public places and spaces. It was also noted that there is little or no scope to learn about urban informatics within the formal planning education or as an ongoing professional development, with scope to build capacity in both of these areas. Whilst they saw many opportunities with ICT, a sense that leadership in this area was not their core role and, to date, the level of use within the community may not warrant expensive exploration. Three functional barriers to their involvement in ICT development included: the legislative focus of their roles which govern and control the context and limit innovation, the existing complexity of their occupation leaving little time for creative innovation in ICT, and limited exposure either during initial training or beyond.

Typologies of urban informatics support

Evaluating the feedback from planners was used to develop a model for the types of uses of ICT as a support mechanism for planning. These typologies of support are broken down into three categories as illustrated in Table 2. The first is the analysis of place in areas such as traffic management, heritage values, development assessment, where ICT can be a highly effective tool to gather data and improve our understanding of places. Secondly its use within the context of place to enhance and enliven places while the third is about communication channels with the public.

INSERT TABLE 2 HERE

As ICT continues to develop at a fast pace the inclusion of more tools and potential will also increase but these key typologies provide a framework within which the planner can understand and utilise these new tools and assess their merit for the profession.

The way forward

There is a broad range of urban planning functions, responsibilities and foci; these capture the urban planners' time and attention. Concentrating on the detail and complexities of individual issues and circumstances in land use developments may limit their potential capacity for experimentation or innovation in areas untested or under utilised by the community (such as Internet connectivity through the use of mobile phones). The ability to connect with the community's future visions and interpreting technological trends, while having an obvious potential connection with their work, still requires advanced interpretation and analysis to be meaningful. Much of this lies away from our training as urban planners and daily duties, hence out of the 'comfort zone'. The use of ICT in planning will require a multidisciplinary approach beyond the planners' own field to incorporate human-computer interaction disciplines. As planners juggle the social and physical constraints with given opportunities to create patterns of place, ICT's real value will come in the development of ways of gathering the available and potential data so that it can be synthesised into functional and meaningful insights, thus assisting them in the process of place creation. Technology is rapidly and constantly advancing on an international stage; yet, in contrast, planning is worked on a very localized stage, mostly focused on site or precinct specific issues, governed at a local government level. This may mean that there is no single model of application of ICT enabled projects, but a customizable approach for local needs is required. Community perceptions about the ease of involvement and interaction are also changing. Local governance will need to consider the ways of interacting with community to enable participation, as well as the levels of involvement and influence that can be generated through ICT and its various applications. Future research should explore what expectations are raised within the community through the facilitation of communication with ICT?

Planners generally focus on the "creation" of place, where key urban design principles are established and proven. How technology influences spatial design is an area underexplored and ripe for further rigorous assessment. Table 2 shows the three key areas for ICT use within a planning context and provides some examples of existing

tools for application in these areas. This is just the beginning with the steady growth and development in this field there will be new and exciting developments and, with the application of planners' expertise, there is the potential to tailor the use and application to provide meaningful input into the planning process. Although the role of ICT in 'placemaking is emerging in the communication fields (Gordon & Manosevitch, 2010), much remains experimental in that few occasions of computer simulations and community involvement have led to real results in place. There is much scope for further research documenting case studies and testing prototype development of planning with urban informatics tools

The research was limited to a relatively small number of planners in one city and the collective experience of the group about ICT and new applications was limited. This low level of exposure meant that time needed to be spent explaining and demonstrating some of the potential of ICT. Given more time and a demonstration of a wider range of ICT possibilities the planners may have envisaged further potential uses within their field.

The ability of urban planners to understand, direct and utilise the collection and flow of data will determine efficiencies and, potentially, an ongoing and different role for planners utilising ICT to shape place. Now is the time for planners to consider this technological sphere to utilise it to its full potential, directing that potential and staking a claim in the management of urban informatics. Planners need to emphasise their understandings of the systems of cities and relationships between people and place, specifically how it offers an interpretive basis for developing and utilising the wealth of urban informatics' data that is becoming more and more readily available. As the age of information and creativity burgeon into the urban environment, planners must forge new interdisciplinary relationships with ICT professionals. Given the significant impact and potential of ICT, planners must engage with these new technologies in order to understand and influence how they will alter the form and look of our cities and how we understand and use our spaces as a result.

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