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Edited by
**Martha Ladly
Philip Beesley**

Riverside Architectural Press

MOBILE NATION

The Mobile Digital Commons Network and Mobile Nation

Sara Diamond

Ontario College of Art & Design

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Concordia University

Mobile Nation partner the Mobile Digital Commons Network (MDCN) connects research, arts, and industry focused on mobile, wireless, digital technologies in Canada. Funded by Canadian Heritage through its New Media Research Networks Fund, the goal of the network over two rounds of funding has been to facilitate interdisciplinary research and innovative industry development; foster cultural production and public participation in culture through the use of mobile technologies; strengthen relationships to wilderness, heritage, and urban parks through enriched experiences in these spaces; and develop forward-thinking Canadian policy on wireless technologies. It has invented applications and technologies that facilitate the design of mobile content and experiences.

The MDCN is a collaborative research project originally launched by Concordia University and the Banff Centre's Banff New Media Institute, and now including York University and the Ontario College of Art & Design. The projects bring together an interdisciplinary group of computer scientists, engineers, technology and communication scholars, artists, and designers, as well as commercial partners in Canada and abroad, in order to explore wireless communication in the context of urban studies, prototype development, commercial applications, art installations, participatory public authoring, design methodology, and social research.

The MDCN has created policy reports on Canadian mobile infrastructure and investment. It has developed a comprehensive guide to the use of participatory design and user-based evaluation in mobile research and design. The network has undertaken two conferences, and published extensively on mobile research through *Wi*, its digital journal, and in other academic venues.

Mobile Nation celebrated the completion of a three-year research project for MDCN. It offered diverse experiences from keynotes to workshops, panels to student symposia, parties to exhibitions. We hope you enjoy the celebration, in retrospect, through this publication.

Design Research and the Mobile Experience

Douglas MacLeod and Robert Woodbury

Canadian Design Research Network

The Canadian Design Research Network (CDRN) is pleased to offer its support for Mobile Nation. The interactive technologies embedded in the concept of mobility suggest a new generation of responsive designs that will transform the world we live in. In this context, the CDRN provides a forum for sharing information, personnel, and resources connected to design research in this area and acts as a vehicle for disseminating that research through events such as Mobile Nation.

Funded through the government of Canada's Networks of Centres of Excellence New Initiative program, the CDRN is a pan-Canadian consortium of academic institutions, government agencies, and industrial partners that is promoting good design as the best means to improve the social, physical, and economic well-being of all Canadians.

In particular, we are committed to supporting and connecting the activities of graduate students in all disciplines who are exploring the design issues associated with these mobile technologies. GPS, Radio Frequency Identification, and Wi-Fi networks all define a new kind of space that demands the kind of innovative design research presented by Mobile Nation.

Through conferences such as Mobile Nation, the CDRN aims to foster the development and maturation of the discipline of design by networking across both distance and discipline. To this end it includes faculties of design, architecture, engineering, computer science, environmental design, construction, and landscape architecture. We work together to provide the research that will transform the practice of design in the twenty-first century.

Mobile and interactive technologies are clearly part of that transformation and in concert with other CDRN research themes such as digital fabrication, collaborative visualization, and advanced design technologies we hope to address critical issues such as productivity and sustainability, and to lead in the creation of economic advantages and environmentally responsible solutions in Canada.

www.cdrn.ca.

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Mobile Nation

creating methodologies for mobile platforms

Sara Diamond and Martha Ladly
Ontario College of Art & Design

Dialogues about commercial applications for the mobile platform, new technological innovations, and market development often occur in separate forums unrelated to scholarly dialogues about the sociology of mobile use and creative practices outside of the contemporary commercial market. Researchers, developers, and investors in these areas all have specific approaches that they seldom have an opportunity to share. For this reason, this Mobile Nation anthology brings together very different communities to share a dialogue about their methodologies and approaches to this growing field. Our hope with it is to foster an increased capacity to work together to build the creative, technical, and social capacity that mobile computing will bring. The Mobile Nation conference, upon which this anthology is based, provided an innovative and rigorous context within which to consider appropriate research methods, including their epistemology and their application. It also offered an opportunity to develop new and appropriate methodologies for this challenging, complex, and important field of inquiry.

Researchers have created platforms such as cellular telephones, MP3 devices, and PDAs, and these have become leading consumer products. They have invented communications technologies such as Wi-Fi and Bluetooth, sensor systems such as Radio Frequency Identification (RFID) and GPS, and networks (such as personal area networks). These in turn enable the development and combination of new tools to create content. Examples include new forms of fashion that can respond to social context, environment, or wearer, and new architectural expressions such as interactive billboards. Other researchers are analyzing this growing mobile phenomenon from a social and business perspective.

The wider context of increasingly social media sets the stage for the current growing collaboration of artists, scientists, designers, and engineers. The challenges of designing mobile experiences and technologies are many, requiring teams with a range of disciplinary knowledge and skill, as well as the ability to manage constant changes in platforms, complexity of programming languages and challenges of building content appropriate to mobile devices. There are added challenges when the content is location-based rather than generic, or collaborative rather than individual. This framework requires the expansion of hardware and the development of

interactive capacity, hence significant code development and the creation of interactive content, all within a context of understanding and anticipating users' cultures and practices.

The Mobile Nation conference created an environment for researchers, companies working in mobile content and technology development, and users of the resulting products to share their interests and their actual approaches to conducting research in this fast-changing field. For example, effective research for a mobile experience that occurs outdoors requires that a mixed team of content creators, such as game designers, documentary producers, or creators of mobile walking tours, work closely with engineers to brainstorm, build, and test their designs with users on site. They must consider the actual physical location as their set, with all of its possibilities and technical limits, instead of working in the studio. They must understand the limits of GSM coverage and GPS accuracy and undertake actual engineering at the location of the intended experience.

The Mobile Nation anthology surveys five broad themes:

1. Participatory culture, ethnography, participatory design, and the end-user
2. Creating for the multi-platform context and challenges of media and place
3. Pervasive and social computing
4. Mobile communication and education
5. Engineering methodologies and solutions meeting humanities and social science approaches

More specifically, Mobile Nation considers how we can meet the challenge of integrating variable media (television and mobile for example) into the specifics of place; how we design for technical platforms where we expect to communicate and share content, with ethnography and participatory design providing specific tools for researchers and industry alike; how mobile media serve the changing context of informal and formal education; how ubiquitous computing (or ubicomp) results in the reorganization of social experiences; and how, in turn, this field can benefit from mobile capacities, that is, how new designs engage physical environments, whether built or worn. Finally, it asks how social scientists' methods of analysis of behaviours, particularly of adoption and usage patterns, can be combined with engineering solutions to build better research and innovation, and more marketable products.

Working Methods

By providing a focus on 'methodologies,' the conference threw an international light on mobile research and commercialization, afforded opportunities for high-level exchange between national and international players, and highlighted the work of leaders in the field of mobile scholarship. For this reason Mobile Nation attracted a diverse group of individuals from

different professions, such as architects, educators, broadcasters, designers, representatives from infrastructure companies who provide the networks to deliver content, health researchers, advertisers, and leaders from technology companies. In our commitment to innovation across these fields, Mobile Nation offered a workshop on sensors and interactive technology and an introduction to a new prototyping tool developed by engineers and designers at the Mobile Digital Commons Network (MDCN), the Mobile Experience Engine (MEE).

The field of mobile design requires new levels of both research collaboration and engagement with end-users. Mobile experience design demands the full integration of participatory design into the research and innovation chain. Participatory design emerged in northern Europe during the sixties as a means to engage workers in planning and implementing technological change within their workforce.¹ It emerged side-by-side with participatory action research, where communities of use or study are integrated throughout the research process.² Since then, participatory design has caught on as a means to engage end-users in the process of creating both technologies and experiences. Participatory design strategies suggest that researchers have the responsibility to engage in the research project with their subjects in order to transform the matter that they are acting on.³ Participatory design is also described as ‘user-centred design,’ recognizing the importance of the end-user and incorporating them into the design process from the conception to the evaluation of the final product, although ‘the forms and degree of involvement vary (representative or direct involvement, consultants, or collaborators)... [It] aims at involving future users of a computer-based system in decisions during system development.’⁴

Participatory design processes are deeper than market research methods that concentrate on surveys or one-time focus groups, although these methods can provide a tool for usability testing. In participatory design, researchers engage participants in context, finding metaphors for the experience or technology that they are building in order to engage participants’ imaginations or understand relevant social phenomena. A core group may work with researchers throughout the research project to achieve a depth of engagement. Participants in the design process may feel that they should dictate the framework of the final product. Participatory design walks a fine line, as designers and inventors still need to mobilize their professional knowledge to create new experiences.⁵ Participatory design can be used to effectively balance the views of designers, engineers, and end-users.

Participatory design advocates have devised a variety of techniques to facilitate the communication and testing of new technology possibilities to users. These techniques include the use of mockups and role-playing activities, as well as technologically aided methods such as the use of photos, images, videos, or animations to stimulate the patterns of interaction with a new interface or system.⁶ Participatory design methods include ethnographic study of users in their working environment or during field

trials that simulate the experience that a technology is designed to address.⁷ Recent trends in art and design research encourage workshop activities and the making of artifacts such as collages, mind maps, and models. Structuring and presentation of the resulting data is a key part of the researcher’s work.

A core tool of participatory design is brainstorming. Brainstorming is a value-neutral, conceptual free-for-all where discussion members are encouraged to put their wildest ideas on the table. Once a topic or problem to solve is chosen, all ideas are encouraged without criticism, in order to allay fear and loose the imagination. So-called ‘blue-sky’ notions can turn out to be appropriate solutions.

Another, more recent technique, bodystorming, draws from performance art. In bodystorming, participants use physical improvisation to explore forms of interaction, emotional content, and relationships between individuals and groups. Place-storming or location-storming is a technique first formalized by Urban Tapestries, a London-based organization that designs participant-driven, location-based historical experiences in specific neighbourhoods.⁸ They design in situ with their participants in order to bound the imagination of users and designers within an actual location.

The design charette is an extended approach to these processes that designers and architects use. The charette combines the language-based approaches of brainstorming with the expectation that an actual series of designs and even prototypes will emerge. The charette format allows for the collaborative participation of artists, designers, engineers, and stakeholders.⁹

Iterative design is an engineering method aligned with extreme software programming in which an engineering solution is built in small increments, tested, and improved by a team through the process of development. This method allows constant adjustment of the technology to the actual circumstances of application. It is less likely to result in a technology that has no relationship to the needs of users or the context of use.¹⁰ It is a technical proximate to participatory design in an engineering context. When problems are found in user testing, as they will be, they must be fixed. This means design must be iterative: there must be a cycle of designing, testing and measuring, and redesigning repeated as often as necessary. Participatory design, bodystorming and location-storming, charettes, and iterative design are a range of methods that were explored at Mobile Nation.

Research

The Mobile Nation conference celebrated the completion of a three-year research project, the MDCN, funded by Canadian Heritage through its New Media Research Networks Fund. The Ontario College of Art & Design (OCAD), as a member institution of the MDCN, is a leader in the development of mobile technologies and content. The MDCN con-

¹ T. Winograd, *Bringing Design to Software* (Boston: Addison-Wesley, 1996); A.G. Bjerknes and T. Bratteteig, ‘User Participation and Democracy: A Discussion of Scandinavian Research on Systems Development,’ *Scandinavian Journal of Information Systems*, 7 no. 1 (1995) : 73–98.

² P. Reason and H. Bradbury, eds., *Handbook of Action Research: Participative Inquiry and Practice* (New York: Sage, 2002).

³ J. Greenbaum and M. Kyng, *Design at Work: Cooperative Design of Computer Systems* (Hillsdale: Erlbaum, 1991).

⁴ Bjerknes and Bratteteig, ‘User Participation and Democracy’

⁵ R. Wakkary, K. Newby M. Hatala, D. Evernden, and M. Droumeva, ‘Interactive Audio Content: The Use of Audio for a Dynamic Museum Experience Through Augmented Audio Reality and Adaptive Information Retrieval,’ in *Museums and the Web 2004: Selected Papers*, 55–60 (Toronto: Archives and Museum Informatics, 2004); D. Schuler and A. Namioka, *Participatory Design: Principles and Practices* (Hillsdale: Erlbaum, 1993).

⁶ M. Muller and S. Kuhn, eds., participatory design special issue, *Communications of the Association for Computing Machinery*, 36 no. 4 (1993).

⁷ C. Wasson, ‘Collaborative Work: Integrating the Roles of Ethnographers and Designers,’ *Human Organization* 59 no. 4 (2002): 377–388.

⁸ Proboscis, ‘Bodystorming,’ <http://research.urbantapestries.net/bodystorming.html>.

⁹ M. Aurand, ‘What is a Charette?’ www.library.cmu.edu/Research/ArchArch/Charette/what.html.

¹⁰ S.N. Wakeford and E. Churchill, ‘Framing Mobile Collaborations and Mobile Technologies,’ in *Wireless World: Social and Interactional Aspects of Wireless Technology*, eds. B. Brown, N. Green, and R. Harper. (London: Springer, 2001).

nects research, arts, and industry focused on mobile, wireless, and digital technologies in Canada. The network facilitates research and innovative industry development; fosters cultural production and public participation; and develops forward-thinking policy on wireless technologies. This project has seen the creation of numerous exciting prototypes for new forms of content and experiences that occur in urban and national parks, using mobile devices as a key component. The Mobile Nation conference was an opportunity for participants to explore experiences that included annotated and illustrated walking tours, historical ghost stories, private-to-public ephemeral graffiti, and collaborative sound games.

This conference provided an opportunity to disseminate the MDCN's collective efforts in the creation of the MEE, a technology that will greatly assist in future design of mobile games for cellphones. Developers can benefit from the knowledge that our research teams gained. MEE has been created to radically simplify the process of creating and managing media-rich, interactive mobile applications, and in particular location-based applications using GPS and peer-to-peer applications such as Bluetooth. By removing most of the engineering from the design cycle and enabling designers to create complex applications using simple XML language, MEE makes rapid prototyping a reality for mobile applications and takes mobile application product development into new domains. At the Mobile Nation conference, the MEE was introduced to the community, and developers and designers had the opportunity to create their own mobile applications.

By applying humanities and social science knowledge and methods to the analysis of the emerging mobile content and platform worlds, we can innovatively engage design theory, communications studies, social geography, cultural studies, and ethnographic research methodologies. In bringing experts and scholars together, Mobile Nation enables more comprehensive, effective, and integrated research and inquiry.¹¹

The Canadian Design Research Network (CDRN), a National Centre of Excellence for the dissemination of and training in design research, was a partner in the creation of the Mobile Nation conference and publications. The CDRN presented an interactive sensor and technology workshop, a special poster and symposia events for students, industry panels, and outreach to communities that can make use of the discoveries at the conference through Mobile Nation publications.

The conference subtext, 'creating methodologies for mobile platforms,' intentionally uses the term 'creating' as a double entendre. Mobile research methods must allow collaborative 'creating' on the part of designers, engineers, and users. At the same time, mobile research requires the 'creating' of unique, cross-disciplinary methodologies and tools that will enable all manner of new innovation in the field. We hope that you find this collection of essays connected to the Mobile Nation conference to be useful and stimulating.

Mobile Nation

key themes and key thinkers

Martha Ladly

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The key themes for Mobile Nation are:

1. Participatory culture, design, and ethnography
2. Creating for the multi-platform context
3. Pervasive and social computing
4. Mobile communication and education
5. Engineering meets humanities and social science

Mobile Nation chose our key-theme thinkers because their insights would allow readers and participants to bridge practice and theory. They are all eminent scholars or practitioners who share insatiable curiosity and an ability to think across disciplinary, cultural, or technological boundaries. Our choice of a geographer, a sociologist, a communication scholar, a leading analyst and creator of social media, and a filmmaker and ethnographer who is also an entrepreneur suggests the complexity of the field of mobile media. It acknowledges the need to approach research and innovation in this field from very different perspectives. We believe that our thinkers provide direction on difficult questions in ways that are clear and understandable. At the same time, they pose new, sometimes unconventional, questions and suggest new directions for creative, technical, and business practice as well as scholarship.

The Mobile Nation key-theme thinkers share an impressive range of experience and expertise: Marc Davis, a social media theorist and garage cinema researcher, focused on creating the technology and applications at Yahoo! Research Berkeley that will enable daily media consumers to become daily media producers; James E. Katz, a communication scholar and expert on mobile media, is chair of the Department of Communication at Rutgers University, where he also directs the Center for Mobile Communication Studies; Nigel Thrift, a professor emeritus, fellow of the British Academy, and leading theorist of social geography, is the vice-chancellor of the University of Warwick; Nina Wakeford, a sociologist, is director of the Incubator for Critical Inquiry into Technology and Ethnography (INCITE) and reader in sociology and social methodology at Goldsmiths College, University of London; and Parmesh Shahani, a contemporary ethnographer, author, and innovator, is director of the Mahindra Incubation Laboratories, Mumbai, and gave the North American premiere of his film *Ctrl Alt Del* at Mobile Nation. You will discover that their essays and insights move us more deeply into the mobile context.

¹¹ K. Cohen, 'Translation: Sociology: Design' (paper presented as a visiting lecturer to the Oxford Internet Institute, Oxford, UK, 2003); K. Cohen, 'Applying Collaboration Theory to Social Spaces' (presented at BRIDGES Conference II, Banff Centre for the Arts, Banff, AB, October 4–6, 2002).

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