Introduction

In this paper we report on a research project which explores the prevalence and nature of research teams undertaking digital projects. Drawing upon interview and survey data, we aim to identify the benefits, challenges, and patterns of interaction used by digital projects teams in their collaborations, and to provide recommendations on how to support effective and efficient teams.

Context

Traditionally, research contributions in the scholarly field have been felt to be, and documented to be, predominantly solo efforts by academics involving little direct collaboration with others—a model often reinforced through doctoral studies and beyond (see, for example, Cuneo; Newell and Swan). However, work within the Digital Humanities (DH) and Libraries communities is an exception to this. Given that the nature of project work involves computers and a variety of skills and expertise, members of these communities are working collaboratively within their institutions and with others nationally and internationally to undertake their work. Such collaboration typically involves the need to coordinate efforts between librarians, academics, undergraduate and graduate students, research assistants, computer programmers, content experts, and other individuals as well as the need to coordinate financial and other resources. This inherent diversity of perspectives, skills, vocabulary and methodology in DH projects creates tensions that may not be present to the same extent in other types of teams where there is more homogeneity. The collaboration is further complicated by the presence of academics who often bring an "I know best" attitude to projects (L. Siemens "Team"). However, too little is known about how these teams work or the support they need to be successful.

That said, efforts toward understanding the organizational context in which digital projects are situated is beginning in earnest. Two large-scale survey projects (R. Siemens *et al*. "Credibility"; R. Siemens *et al*. "Humanities") have highlighted issues of collaboration, among other topics, and Warwick found that the organizational context has had an impact on the manner in which Digital Humanities/Humanities Computing centres developed in the United States and England. An initial qualitative research project found that Digital Humanities research is accomplished within research teams, which are developing tools and processes to facilitate that collaboration (L. Siemens "Team"). In addition, McCarty explores the ways that computers have opened opportunities for collaboration within the humanities and has explored the associated challenges of collaboration and team research within the HUMANIST listserve (McCarty "Collaboration"). Individuals in the field are also reflecting on their own experiences in teams through conference presentations and papers (See for example: Liu and Smith; Ramsay; Ruecker and Radzikowska; Ruecker, Radzikowska, and Sinclair ; Smith and Liu; Unsworth; Liu, Tseng, and Huang). Finally, through efforts such as the University of Victoria's Digital Humanities Summer Institute, Irish Royal Academy's Digital Humanities Observatory Summer School, the University of New Brunswick/Acadia University Fall Institute for Digital Libraries and Humanities, and other similar ventures, the community is working to develop its collaborative capacity through workshops in topics like community-specific project management skills.

Our study draws and builds upon these efforts as it explores and formally documents the nature of research teams within these communities to the end of identifying exemplary work patterns and larger models of research collaboration that have the potential to strengthen this positive aspect of the community even further.

Methods

Our research project used a two-pronged inductive approach with a combination of data collection methods.

First, members of various multi-disciplinary, multi-location research teams located in Canada, the United States, and the United Kingdom were interviewed in 2008. Lasting about an hour, these in-depth interviews explored the individual's research team context with a focus on the participants' definition of teams, their experiences working in teams, and the types of supports and research preparation required to ensure effective and efficient research results. The participants were chosen through personal contacts and recommendations. Second, drawing upon themes from these interviews, a survey of members of the general Digital Humanities community was undertaken in Fall 2008 in order to establish the prevalence of research teams within the community. It was distributed to members of the Society for Digital Humanities/*Société pour l'étude des médias interactifs*, Association for Literary and Linguistic Computing, Association for Computing and the Humanities, and the Centrenet and HUMANIST listserves. The survey produced descriptive statistics on the number of teams, their composition, and perceived effectiveness; it also established a baseline against which further research in this field and others can be compared. The results from both the survey and interview include a description of the community's work patterns and relationships and the identification of supports and research preparation required to sustain these teams (as per Marshall and Rossman; McCracken). This two-pronged approach corresponds to similar studies (Amabile *et al*.; Bickel and Hattrup; Easterby-Smith and Malina;Jassawalla and Sahittal).

As discussed below, the number of respondents is small and self-selected. Further research will enlarge the size and scope of the sample.

Results

The following section will present the findings from both interview and survey respondents. The themes include reasons, benefits, challenges and methods of collaboration, as described below.

Respondent Demographics

The seven interviewed individuals have participated in a range of team research projects in terms of project objectives, team membership, geographical dispersion, and budget, both within their own institutions as well as nationally and internationally. The roles they play vary and include research assistant, researcher, computer programmer and developer, project manager, and lead investigator. Despite the diversity among their teams and roles, these individuals share several commonalities in their methods of interaction and collaboration within research teams.

In total, 36 individuals responded to the survey. The project teams in which the survey respondents have participated are often inter-departmental and often span institutions, but not necessarily across national borders. The teams also tend to be either fairly small in number of members with either three to five members (45%) or larger with more than ten individuals involved (37.5%). The teams' budgets were diverse with some (11%) having budgets of less than $50,000 (CDN) and others (37%) having significantly larger budgets of more than $250,000 (CDN). The remainder of the projects had budgets between $50,000 and $250,000. The majority of the respondents (80%) have been involved in two or more digital projects of various types in the past year. Further, approximately 66% of survey respondents indicated that they had led a digital project during the same time. The rest of the respondents were members within a team, provided technical support, or acted as project manager. Like the interviewees, they have been involved in a variety of digital projects, ranging from digitized manuscripts, electronic editions, databases, software creation, and others. Table 1 summarizes survey respondent demographics.

Table 1: Survey Respondent Demographics

Demographic (Total Responses) Number

Demographic (Total Responses)	Number
Affiliation (36)	• University (32) • Research Centre (1) • Other (3)
Language (34)	• English (28) • French (4) • Spanish (1) • Other (1)
Role within the Team (33)	• Leader (22) • Team Member (6) • Technical Support (1) • Other (4)
Team's Membership Size (33)	• 2 individuals (1) • 3-5 individuals (15) • 6-10 individuals (6) • More than 10 individuals (11)
Budget (32)	• $0-9,999 CDN (6) • $10,000-49,999 CDN (5) • $50,000-249,999 CDN (9) • $250,000 CDN and more (12)
Position (22)	• Academic (10) • Post Doctoral Fellow (2) • Programmer/Developer (4) • Researcher (2) • Student (4)
Academic Discipline (34)	• Humanities (19) • Social Sciences (5) • Library and Information Sciences (4) • Computer Science (6)

Reasons for and Benefits of Collaboration

Given the many challenges associated with team projects as discussed below, individuals who undertake this work must derive substantial benefits. From the survey, the top reasons for team work include:

- Team members have different skill sets (90%);
- Collaboration is more productive than individual work (63%);
- Different methodological approaches to research by team members (54%);

- The project schedule requires multiple staff for on-time completion (51%);
- The volume of data to be studied (42%);
- Enjoyment of collaboration (42%).

Additionally, one of the interviewees remarked that granting agencies were perceived to be demonstrating a preference for projects that require a team approach to complete due to project scale and scope by funding them over single researcher projects.

These reasons for collaboration were further emphasized in open-ended survey questions regarding the benefits of team work. The general themes of these answers focused on the development of a team spirit; the ability to be more productive and efficient while undertaking more complex and larger projects; the ability to combine different expertises, skill sets, and perspectives within the project; and the opportunity to learn from collaborators. One respondent highlighted that a team can "produce better results than solitary work because it draws on a larger knowledge base and skill set." The respondent further emphasized that "some work can ONLY be done collaboratively" (R34[2] ; emphasis in original). Further, other respondents indicated that teams allow different skills and knowledge to be combined, which is "pretty much required for digital projects" (R8). Survey respondents also emphasized the fact that "the projects tend to be more creative since people are coming from different disciplines" (R29) and one gets "to ask different sorts of questions you could not have imagined, much less answered, on your own" (R6). Finally, "working in a team helps to find better ways of working around a problem" (R36).

The interviewees also echoed these comments, with a particular emphasis on the social aspect and enjoyment of team work. One interviewee (IR1) also suggested that an additional benefit of digital team projects is the diffused sense of responsibility with a team. Given that the work is undertaken by a group of individuals, not all the work and outcomes are "on one's shoulders if it flops." This interviewee felt that this context provides an opportunity for a team to be more experimental within the project. The interviewee also felt that "interdisciplinary teams get output that is better, but is also impossible for someone with a single-discipline background." The interviewees also echoed the open-ended survey responses with a particular emphasis on the social aspects of team work, and the enjoyment to be had therefrom. In their collective opinion, research and scholarly work are often solitary and lonely. Team research provides an alternative. Another interviewee (IR5) suggested that they "work better when working with other people who are depending on you" and that the writing process becomes easier because "ideas had already been talked about at research team meetings." Given these various benefits, some interviewees acknowledged that they undertook most, if not all, their digital work within collaborations.

Challenges of Collaboration

While survey respondents did not directly indicate reasons or conditions for success in their projects, they did outline the challenges associated with team projects—comments echoed in the interviews. Some of these challenges are common to any work carried out by a group of people. These include the difficulty associated with scheduling and coordinating tasks, people, and other resources, facilitating geographically disperse team members, even if within the same organization, and interpersonal issues, such as conflict resolution and different work rhythms. Expectation management also becomes a priority. Survey respondents highlighted the importance of "making clear what the expectations are for each member" (R9) as well as "finding common goals" (R22). Teams also recognized that "some members may contribute or participate more than others" (R34) and exhibited "varying levels of commitment, among undergraduate students in particular" (R27).

However, other challenges are more directly related to the same diversity that creates the benefits in these teams. As highlighted, these teams must find methods that allow them to combine different skill sets and

academic perspectives. As acknowledged by one survey respondent, this type of team work "challenges members to think of their work through another kind of specialist's eyes" (R6). At times, there may also be a "general lack of appreciation of the value of different contributions" (R8). Other associated challenges include the variety of vocabularies used by members from different backgrounds and the necessity to train "people in disciplines and methods that aren't theirs" (R12). This is further complicated by the different cultures that may exist among team members from different disciplinary backgrounds. One participant stated that "Humanities scholars do not know a lot about computer science or technology. Computer science individuals do not know about humanities. Information scientists know about data, but not programming" (IR4). Finally, teams may need to negotiate through "different values of outcomes (e.g. publications)" (R13). As a result, when representatives from these different disciplines work together, time must be spent ensuring that they understand each other and their respective roles within the digital project.

A final challenge is related to the need to build specific "team" skills, particularly within an environment where management skills and structure may be lacking. Academic teams often operate without formal lines of reporting, a traditional management tool. All of these challenges mean that team projects take more time and are "hard" as acknowledged by both survey and interview respondents.

Factors Contributing to Collaboration Success

Building on the discussion of challenges, interviewees also explored factors that contribute to project success (or in some cases, non-success). Generally, digital projects are perceived to be successful when the project outcomes are met while the team is still able to maintain strong interpersonal relationships. Project success appears more likely when every member of the team has a stake in the project. However, this stake does not necessarily have to be equal among team members, as stressed by several respondents. The interviewees also stressed that team members must have the skills and knowledge necessary to undertake the required tasks as well as understand their respective place within the project. In this regard, one survey respondent suggested that "it is good to create and support a team environment where all voices, regardless of traditional authority, are respected and encouraged" (R18). To this end, important team skills include flexibility and patience. Both the interviewees and survey respondents tended to focus on success as defined by the team process. As IR3 stated, a difference exists between the team and the project outcomes. Projects were often unsuccessful because of other factors such as an "ineffectual leader" (IR4) and "personality conflicts" (IR7), rather than failing to accomplish the intended goals and objectives.

While not addressed specifically within the survey, the interviewees discussed the role and impact of training in team success. The interviewees indicated they generally had received very little formal training in team skills such as communication, negotiation, conflict resolution, and others. Instead, most individuals had learned to work in teams directly from projects completed as students or while working in other settings. This reality reinforced to many the importance of "good people" (R12) in a team project because not everyone may be able to work as part of a team. One interviewee commented that they "were very choosy about whom they worked with" (IR4), especially after encountering some unpleasant experiences. Another survey respondent echoed this attitude by suggesting that one should "make sure you've got good people; good people make a good team make good projects. Everything else is secondary" (R12). In addition, several interviewees also commented that collaboration was a state of mind. Finally, another survey respondent stated that "it [teamwork] calls upon a working style and management skills that are often lacking in the environment/training of team members" (R6). Ultimately, individuals working within teams need to be open-minded, flexible, and patient as noted above.

Patterns of Interaction in Collaboration

Both the survey and interview respondents provided insight into methods of interaction and collaboration.

Communication patterns for these teams become particularly important. Survey respondents indicated that they relied on email and face-to-face meetings for most of their communication with relatively little use of online collaboration tools. Interestingly, given the digital nature of the work, the respondents generally rated face-to-face meetings as being "very effective" at a higher rate than they did their email exchanges. This finding was reinforced in the interviews where interviewees reported a high use of email for communication, a tool which is particularly useful for record keeping, while feeling that face-to-face communication was more important for project planning and team development. As one interviewee (IR2) commented, the most effective forms of communication are the "face to face, lunch, coffee, and the walk across campus." Although email may be used more frequently it cannot convey "emotion and tone," which are important for developing working relationships.

The teams varied in their use of formal documents that outlined roles, responsibilities, decision-making methods, and conflict resolution mechanisms. In terms of decision making, survey respondents evaluated the importance of various decision-making mechanisms to their particular research team. Reflecting on their experiences, 79% of respondents found decision making by the project leader as important or very important to the team as compared to decision making by consensus (73%) or decision making by a few select individuals (66%). These results might reflect the large number of self-identified team leaders in the survey sample. Further, most of the digital teams did not have a formal document outlining the organizational structure. Only 38% of respondents indicated that they did. Of this subset, the majority indicated that they felt that the organizational structure was well understood and effective.

The survey respondents were also asked about a team charter or formal document that outlines roles and responsibilities of team members. Like the formal document outlining team structure, only 30% of respondents indicated that their team had one. Of this subset, 70% agreed or strongly agreed that the role and responsibilities were well understood.

Finally, research teams did not generally have formal documents outlining decision-making processes or dispute resolution. Only a small fraction indicated that their digital projects team had either in place. However, when these documents were negotiated, they were generally viewed as well understood and effective. The opposite situation is true for formal project plan/project management documents that outline project goals, outcomes, and timelines. In this case, 65% of respondents indicated that their team had such a document. Of this subset, 69% agreed or strongly agreed that processes and steps required to meet the project goals were well understood. In addition, 80% agreed or strongly agreed that the project goals were well understood. Finally, 64% agreed or strongly agreed that the mechanism for setting and sharing project goals was effective.

Despite the lack of formal documentation, the survey respondents reported that they were satisfied or very satisfied with the organization and processes of their digital projects team. In terms of project success, 71% felt that their digital project was successful or very successful. Notably, approximately 12% felt that their project was neither successful nor unsuccessful. A small number (6%) reported that their digital project was very unsuccessful. The interviewees shared the same perceptions.

Advice for Other Collaborations

By way of summary and conclusion to the survey and interviews, participants were asked for advice for teams undertaking their first digital project. The advice given echoes the discussion of benefits and challenges related to team projects. In particular, the importance of organization was reinforced; as one survey respondent stated, "the point though is to be as organized as possible and to document as much as possible" (R9). Planning plays an important role in this regard. Here, survey respondents suggested that one should "plan as much as you can before you begin" (R11) and "set up a structure and deadlines with milestones"

(R19). The comments also focused on ensuring that "goals and expectations are clear from the beginning" (R29) and that each team member must understand his or her role within the project. In terms of developing working relationships, the respondents advocated "enough F2F (face-to-face) time and opportunities to build trust and working relationships before relying heavily on electronic methods of interaction and communication" (R34).

Discussion

This research contributes to a larger discussion regarding the nature of project teams within an academic setting. In an article examining academic-practitioner collaboration in management research, <u>Amabile *et al.*</u> suggest it is necessary to explore the nature of collaboration and those factors which contribute to its success while minimizing the potential difficulties. <u>Kraut, Galegher, and Egido</u>, <u>Suchman and Trigg</u>, and <u>Borgman</u> also suggest that team processes need to be understood in order to develop appropriate software tools, services, and polices for information access and sharing.

Digital projects are being undertaken by teams of individuals from a variety of academic disciplines with various skills and perspectives. In addition, people involved in this work are engaged in multiple projects at one time, meaning that they cannot commit 100% of their time to a single project, thus adding to the challenges. They find benefits and advantages to this approach to digital work, despite the associated challenges. As identified in the survey and interviews, digital projects demand a team approach to provide the variety of skills and satisfy the content and methodologies required. Finally, the respondents and interviewees feel that their projects have been primarily successful.

These experiences correspond with other studies on academic project teams, including an earlier study within the Digital Humanities/Humanities Computing community (<u>L. Siemens "Team"</u>). As confirmed within this sample, collaboration enhances the project work by increasing the quality, depth, and scope of the scholarly work (<u>Kraut, Galegher, and Egido</u>; <u>Newell and Swan</u>; <u>Northcraft and Neale</u>). The identified challenges are also similar to other contexts. Academic teams often identify difficulties and challenges associated with the various professional subcultures due to differing academic languages and research methodology (<u>Newell and Swan</u>; <u>Northcraft and Neale</u>).

Given the survey and interview results, several conclusions regarding work patterns of these teams are worth highlighting. First, these teams appear to be operating with relatively little formal documentation of roles, responsibilities, structure, and decision-making process. The exception is documents that outline project goals, outcomes, and timelines, which are generally required for grant applications. This may not be surprising given that nearly 50% of the teams in which the survey respondents are involved are comprised of three to five members and are predominantly based at one institution. The challenges that flow from having little formal documentation may become more apparent when project scope, membership, and budget increase in size and complexity. For example, several very large digital projects are being undertaken at present. Some of these have over 30 team members and budgets in the millions of dollars. Documentation becomes more important at this scale of project to ensure the team can reach their research objectives (See <u>L. Siemens and INKE Research Group</u> for an example of governance language). The importance of documentation is also reinforced when considering the identified challenges and advice in the survey and interviews. The survey respondents and interviewees all focused on the importance of planning, scheduling, and organization.

Second, these results reinforce the value of different forms of communication within team work. While we feel comfortable in the digital world with email, wikis, and other forms of electronic communication, the importance of face-to-face communication cannot be underestimated, or overstated. As the survey respondents and interviewees stressed, in certain contexts, face-to-face is more effective than email; this is

particularly true for planning, resolving difficulties, and addressing anything of an ambiguous nature. Yet email, electronic mailing lists, and other forms have their place, particularly as record-keeping tools. These findings reinforce earlier studies undertaken in this field ([L. Siemens "Balance"](); [L. Siemens "Team"]()).

Ultimately, these findings suggest the need for digital project teams to maximize the benefits that flow from team member diversity, while finding methods to minimize the associated challenges. By starting with the assumption of differences, rather than similarities, a dialogue to determine common ground can be opened between the various team members. As argued by [Liu and Smith]() and [Lutz and Neis](), team members must be open to differences, much in the same manner as an ambassador, who must learn a new culture and language when moving to a new country. The importance of face-to-face meetings is also reinforced within this context. These discussions, much better than email, provide the time and context necessary to negotiate differences, establish new working vocabularies specific to the digital project, and establish project objectives, outcomes, and tasks ([Bracken and Oughton]()). To highlight the need for this, even a common term such as "model" or "book" can be very differently understood depending on the discipline, and must be negotiated in advance to prevent misunderstandings and confusion ([Derry, DuRussel, and O'Donnell](); [R. Siemens "Cultures"]()).

Third, individuals involved in digital projects have, for the most part, learned team work and associated skills by doing it. This suggests a "trial and error" approach, which may not be the most efficient way of learning. Given the limited resources, including money, time, and staff, associated with many digital projects, this approach may lead to an inefficient use of resources. Having said this, opportunities may exist to capitalize on the learning that has already occurred by sharing it with other digital projects ([Ruecker and Radzikowska]()).

Finally, the survey respondents and interviewees in particular reinforce the importance of identifying the right people with whom to collaborate on digital projects. This suggests that while the technical components and content are important to a digital project, the project's ultimate success (or failure) may rest on interpersonal factors. Some tension may exist between team members' views of the fun and social aspects of team work. A greater number of survey respondents (42%) within the DH community indicated that they "enjoyed collaboration" than did respondents to a similar survey within the Digital Libraries community (18%) ([L. Siemens *et al*.]()). This may simply reflect the fact that more academics and scholars responded to the survey within the DH community. This community, as opposed to librarians and archivists, tends to undertake more solitary work, and therefore, collaboration may be seen as a welcome change.

Implications for Practice and Conclusions

The following recommendations are designed to support and reinforce the already strong team work processes that are in practice. As [McGinn *et al*.]() argue, these implications for practice serve as models and "food for thought" rather than strict rules for teams. Each team needs to determine the method of interaction and collaboration that works best for its particular membership, project objectives and context, among other factors.

First, teams should ensure that they have strong communication processes in place, both face-to-face and electronic. In particular, teams might schedule regular face-to-face meetings, the frequency of which will be dictated by a specific project. As stressed in the interviews, these meetings are not only important for sharing information and making decisions, but also for reinforcing the sense of the team and the nature of the joint undertaking. In addition, teams should ensure that they build the cost of these types of meetings into funding applications. Teams that encompass a variety of different skill sets and academic perspectives might also benefit from a "translator" who can help navigate the language and culture gap between the various perspectives by understanding the discipline-specific culture, language, and methodologies. As a result, as project leaders establish digital project teams, along with the specific skill sets that are required, they could

ensure that someone is present who is able to speak across various disciplines. At the same time, the team should be aware that this process takes times.

In addition to this, teams might make conscious efforts to exploit the benefits of diversity within their digital project teams. Project leaders could ensure that the required skills and perspectives are represented and create an environment that encourages all to participate fully within the project. They need to create a space that allows different perspectives to be voiced, thus gaining creativity, learning, and deeper and richer projects than perhaps originally planned. They must also acknowledge the challenges that will come with this diversity and take active steps to minimize these.

Second, teams—particularly larger ones (as measured in terms of budget, membership size, or project scope)—might consider more formal documentation of team and project structure and plans, decision-making processes, and dispute resolution mechanisms. This move supports the suggestion of one survey respondent to plan as much as possible in advance of undertaking the project work. The ultimate goal of the documentation is to maximize the benefits of collaboration while reducing the associated challenges. The process of determining the formal mechanisms should occur in the early stages of working together. Strong communication processes, both face-to-face and electronic, can facilitate this. In particular, face-to-face meetings provide the opportunity to explore these differences and establish the common understanding necessary to undertake the work. These teams may also find it beneficial to codify the common vocabulary, project plans, and work processes in formal documents ([L. Siemens and INKE Research Group](#)).

Third, this community might consider more formal training directed to the particular needs of digital project teams. This training would move beyond content and methodology and include courses and workshops in project management, communication, negotiation, problem solving, and other areas as need is identified ([Amabile *et al*.](#); [Cheng](#); [Pearson](#)). There is a growing realization that collaboration requires new skills on the part of the researchers since a team works differently than an individual ([Bennett and Kidwell](#); [Hara *et al*.](#); [SSHRC](#); [Fennel and Sandefur](#); [Kraut, Galegher, and Egido](#)). An opportunity also exists to incorporate this skill development more formally into course curriculum. Besides training students in particular content and methodology, academic programs play a role in preparing students for employment both within and outside the academy. Given that students are likely to work within teams after graduation, steps should be taken in advance to prepare them accordingly ([Pearson)](#). Moreover, because students play an active role in the digital projects already underway, the project leaders could also use these opportunities to develop related team skills in the students, much in keeping with the "learning by doing" model already in place.

These training sessions might also be an opportunity to explore the differences within varying perspectives and establish common understanding among individuals and disciplines. One interviewee (IR1) also suggested a workshop that examined ways to "balance creativity while keeping things moving." There may also be an opportunity to ensure that students are exposed to the various disciplines and skill sets within the course work so that they are better prepared to work within these kinds of teams during their academic training and beyond.

Finally, given the present "learning by doing" model, more team- and self-reflection could be incorporated to ensure active learning from the projects. At the end of any digital projects, teams could engage in a reflection process to explore the factors that contributed to project success and those that did not. It would also be an opportunity to evaluate the performance of team members and determine potential partners for future collaborations. As highlighted in the introduction, several digital teams have undertaken this activity and transferred knowledge to subsequent team endeavours (see, for example, [Ruecker and Radzikowska](#)). Individual team members could also reflect on their own performance and determine if they are developing the appropriate collaborative mindset. As highlighted in the interviews and survey results, the "right" people for collaborative digital projects are those who are able to see the value in other perspectives and able to

capitalize on the many benefits associated with digital team work.

Research teams are widely used to undertake various digital projects. The teams in which these participants have been involved have successfully managed many of the various challenges associated with this type of work. This study marks one step towards understanding the nature of these research teams while recommending several best practices.

Notes

[1] We would like to thank the Social Science and Humanities Research Council of Canada (SSHRC) for funding the Image, Text, Sound and Technology grant, which made this research work possible.

[2] Survey respondents will be identified by R while interview respondents will be identified by IR.

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