Promoting International Digital Government Research Collaboration: an Experiment in Community Building

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Abstract

Global issues present many opportunities for digital government (DG) researchers to form long-lasting relationships that lead to shared research agendas focused on questions of international importance. However, the relatively young DG community has little experience and few guiding strategies or methods for encouraging these kinds of investigations. As a result, the practical feasibility of international DG research partnerships is of interest for both investigators and funders. This paper reports the evaluation of an experiment to create sustainable international digital government research collaborations by providing legitimacy and modest funding within a minimal set of structural and management requirements. Participants rated the experience as highly positive, contributing substantially to their research productivity, community building, international awareness, and professional growth. While the working group strategy is not a substitute for direct research support, it is a readily replicable method to build international research communities, and to stimulate and enhance their scholarly work.

Categories and Subject Descriptors
K.4.1 [Public Policy Issues]

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Management, Measurement, Performance, Design, Experimentation

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International digital government research, collaborative research, virtual research teams

1. Introduction

Globalization of the economy, international health and environmental issues, multi-cultural populations, cross-border flows of goods and information, and a host of other trends are indicative of an increasingly networked world. Universal concerns such as privacy, identity, and good governance exist around the globe.

Many of these concerns involve information policies, tools, and strategies that need to take into account different cultures and languages, as well as separate or incompatible processes and information systems. Consequently, research questions that cross the boundaries of nations are growing in number and importance.

This changing global landscape represents an opportunity to explore important international digital. government (DG) research questions. However, unlike in other long-established domains, the DG community has little experience and few guiding strategies or methods for encouraging these kinds of investigations.

International DG research collaborations are difficult to establish and sustain for several reasons. First, due to the relative newness of the digital government field, there has been less interaction among researchers in different countries compared to what one finds in more established scientific disciplines. Second, although this domain already involves scholars from all the disciplines needed to investigate these topics, there are very few support mechanisms and forums to engage in joint or coordinated work. In addition, once a potential collaboration starts that could lead to joint research efforts, it is logistically and financially difficult to sustain it to the point of integrated research proposals and reliably funded projects. Instead, separate funding and support programs exist in different countries that are difficult or impossible to harmonize into sustained collaborative efforts.

Despite these difficulties, the development of international DG research is trending upward as measured by publications that address comparative and transnational topics [5]. This body of work is explicitly international in nature and addresses questions that focus on understanding topics and solving problems that cross the jurisdictions, cultures, or customs of different countries. However, the absolute number of these publications represents only a small fraction, about nine percent, of all digital government research published between 1994 and 2008 [5]. International work includes benchmark rankings on a variety of e-government maturity indicators as well as comparative studies that seek universal theories and transferable practices by studying a defined topic in a variety of cultural settings. Transnational studies are also present but in much smaller numbers. These look at an issue or problem that involves either planned or unexpected interaction among two or more countries.

Most of this work has been conducted by individual scholars working on topics of personal interest. That interest is also expressed in symposia and panels at conferences such as the International Digital Government Research Conference (dg.o) and the e-government track in the Hawaii International Conference on System Sciences (HICSS) where discussions about international research design, methods and funding are becoming more frequent.

The practical feasibility of international DG research has been a topic of interest for both investigators and funders. For example, in 2004, a group of American and European researchers together with US National Science Foundation (NSF) and European Commission (EC) research sponsors discussed the emerging need for international research in domains such as democracy and governance, public health, and international law that span multi-

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national or even global dimensions. Combined with digital government research themes, including information use and integration, citizen services, and technology and knowledge transfer, these globally important domains provide a setting for new relationships within the research community and between researchers and government professionals. The participants concluded with a call for a both formal and informal efforts to support these kinds of international investigations [1].

NSF and EC research sponsors also experimented with a program of linkages between pairs of separately funded projects. However, these linkages faced considerable hurdles for both engagement and sustainability because the projects had not been designed for international collaboration and were already well under way [12] when the opportunity for collaboration was offered.

Taking a different approach, in 2005 NSF awarded a four-year grant to The Center for Technology in Government at the University at Albany to create a framework for a sustainable global community of digital government scholars [14]. The goal was to create opportunities for DG researchers to form long-lasting relationships that lead to shared research agendas focused on international questions. The project included an experimental strategy for enabling international DG working groups through a combination of formal recognition, a few structural requirements, and modest travel funding. This paper presents an evaluation of that strategy to encourage and support multi-disciplinary international DG research collaborations. The remainder of this paper reviews relevant literature on the challenges of distributed research teams, describes the experimental strategy, and presents the methodology and results of an evaluation of the experiment from the perspective of the participants. We conclude with a discussion of the findings and their implications for fostering future international DG research.

2. Challenges for Distributed, Multi-Disciplinary, Research Teams

A strong trend in science and technology policy in the hard sciences has been to encourage research programs that feature collaboration among investigators, institutions, and disciplines [9, 3]. One stream of research has addressed the complexity of coordination in geographically distributed research teams. Most of the empirical focus in this area is on scientific teams or research and development teams in the hard sciences that span institutional and national boundaries. This work has identified significant challenges as well as certain elements and factors that are critical to success.

Walsh and Maloney [9], for example, outlined various factors driving these collaborations including a growing interest in scientific problems that span disciplines, advances in communication and transportation technologies that make collaborations easier to sustain, an increasingly international migration of graduate students between countries, and government policies that encourage collaboration, especially between universities and firms.

However, physical distance remains an issue for coordination. While information technology tools for communicating across distance were initially hailed as a potential breakthrough for effective communication across distributed groups, subsequent research indicates that there are both benefits and barriers to electronically mediated communication in distributed research collaborations [2,7]. Olson and Olson [11], determined that cultural and time zone differences, and the limitations of available information and communication technologies for interpersonal communication, contribute to serious problems for collaboration. Reinforcing the difficulties imposed by physical distance, Cummings and Kiesler [2] found that co-location is more important to the success of collaborations than the diversity of disciplines represented, and that collaborative projects suffer fewer negative effects if researchers are located at the same university. I

Scholars have also found that the coordination problems of geographically and institutionally dispersed groups reflect cultural differences and local work setting norms. The issues are manifest in the different expectations and ways of working in the various local settings which tend to cause problems for the formation and integration of the research group [2, 9]

In more general terms, professional groups in many academic disciplines and work fields attempt to overcome similar obstacles. These communities of practice (CoPs) are networks of individuals that form around common interests, commitment, mutual trust and collaboration [10]. With continuing advancements in technology and the effects of globalization, CoPs, whose original structure envisioned co-location of participants, have now also emerged within virtual environments where the interactions of geographically dispersed members are mediated by information and communication technologies [8]. Kimble and Hidreth [6], analyzing the functionality and differences between traditional and virtual CoPs, conducted an international case study comparing the US, UK, and Japan. Three key findings emerged, namely the significance of the role of shared artifacts in the process of creating, sharing and sustaining knowledge; the role such artifacts played in facilitating participation; and the importance of building and sustaining personal relationships between the members which is often accomplished only through face-to-face meetings.

The National Science Foundation has a strong ongoing interest in furthering international science and engineering collaborations and has funded research projects designed to look specifically at the effectiveness of these research collaborations. One such project studied the results of NSF's Information Technology Research (ITR) program which linked investigators within the US in several hundred collaborative projects. Cummings and Kiesler [2] described the potential benefits that come with investigating difficult research problems by bringing multiple networks of researchers together, but they also found that the costs of coordination in multidisciplinary, multi-university collaborations are high. The need to overcome distance, spend time arranging logistics for travel, and figure out ways to keep communicating all add costs and barriers. Consequently, communication tended to fall off as many investigators discovered it was easier to work on their own. Projects employed a variety of mechanisms for coordination, but face-to-face supervision and coordination were especially important in achieving sustainability. Moreover, explicit coordination activities such as division of responsibility for tasks and knowledge transfer among investigators predicted project outcomes (i.e., those that employed these mechanisms were more likely to produce new knowledge, create new tools, and train students). However, a greater number of universities involved in a collaboration predicted fewer coordination activities and fewer project outcomes [13]. The researchers suggest that success depends on developing strategies that deal effectively with physical distance and the division of labor among researchers; address cultural, linguistic, and varying world views; and find routines to solve problems, schedule activities, and monitor progress [4].

Finally, an assessment of international supplements to link US and European researchers via existing European Commission and NSF ITR grants, found that major institutional support for transatlantic research collaborations is difficult because the funding institutions support research for somewhat different reasons, tend to encourage proposals of different size and scope, fund them for different periods of time, and apply different rules and restrictions to project budgets. For example, NSF funded relatively small projects, mostly involving universities, for longer periods with fewer requirements placed on the grantees. The EC-funded work was for shorter periods, but involved more partners and much higher amounts of funding. European projects were also expected to deliver new products and services and the frequent involvement of industrial partners added special considerations for intellectual property protections. In addition, the projects included in the transatlantic collaborations were already in operation and had already committed most or all of their resources. The evaluation team recommended that new mechanisms for enabling international research collaborations be sought that would at least partially address these formidable challenges [12].

The findings of these last two assessment efforts and the related research on distributed collaboration all demonstrate that active coordination, communication, and face-to-face engagements are predictors of successful collaborations. They also document the major challenges of trying to harmonize established institutional approaches across national funding bodies. Accordingly, we set out to experiment with an alternative strategy that starts at the grass-roots level where essential relationships are formed and to see if groups formed in this way lead to sustainable research collaborations.

3. An international working group strategy as an experiment

An experiment with international working groups described in this section was in direct response to these challenges to coordination and productive collaboration. The overall objective of the international working group strategy was to create and test a framework for encouraging digital government scholars to develop productive and sustained relationships with international colleagues in order to jointly address comparative and transnational DG topics. International digital government is rooted in a diverse set of disciplines and targeted at addressing problems that occur in many countries, in multiple cultures, and across a wide range of social and technical topics. As described above, this complexity generates important comparative and transnational research questions, but at the same time it discourages collaboration and joint research across national borders..

3.1. Elements of the Strategy

The literature just reviewed on collaboration across distributed groups found that active coordination, frequent direct communication, and face-to-face encounters were predictors of successful collaborations. Accordingly, a competitive solicitation process was launched for time-limited international working groups with complete freedom to choose topics and participants, but with specific requirements for structural, management, and implementation components. The formal call for proposals was distributed widely to NSF digital government grantees as well as to the listservs of related professional societies.

Each proposal was required to identify an international topic, problem, or domain and explain its relevance for digital government research; identify an international group of members from senior and junior ranks as well as graduate students and, where appropriate to the topic, practitioners. Proposals had to name co-chairs from the US and at least one other country, describe deliberate plans for coordination outlining how participants would communicate and cooperate across distances as well as how they would manage themselves as a distributed community of scholars. In addition, they were required to include a plan for periodic public presentations of progress, to prepare annual reports, and to demonstrate that all participants had the support of their institutions for professional time, travel costs of non-US participants, and other resources that would help them achieve their goals. Moreover, groups were required to plan five face-to-face meetings over a three-year period.

Thirteen proposals for international working groups were received and each proposal underwent a blind peer review process involving an international and multi-disciplinary group of more than 30 reviewers. Each proposal was reviewed by at least three people and ranked based on intellectual merit, group makeup, resource commitment, and probability of sustainability. Three proposals were selected for support and each was awarded access to modest travel support ranging from $62,000 to $76,000. Because the funds were provided by a US federal government agency, NSF, they could be used to support only participants from US institutions.

3.2. Description of Working Groups

The three international working groups addressed different topics and goals, and encompassed a wide variety of countries and disciplines.

3.2.1. Online Consultation and Public Policy Making

This e-consultation working group focused on ways to evaluate the policy and other social impacts of online citizen consultation initiatives aimed at influencing actual government decision making. They aimed to determine how the optimal design of such initiatives is affected by cultural, social, legal and institutional contexts. To that end, they considered the impacts of online consultations on government agencies and policy makers, on public participants and civil society organizations, and on the relationship between the design of consultation and its impacts. Of particular interest was the ways in which legal, political and institutional context shape prospects for success. The 17 group members comprised senior faculty, junior faculty, and graduate students from the US, United Kingdom, Israel, Italy, and France. Their disciplines included law, political science, public administration, information technology, and communication. The group convened five times in cities in the US, UK, and France between 2007 and 2009. Each meeting was divided between time devoted to the group's research and a related scholarly event open to the public.

In addition to presenting papers, panels, and posters at international conferences, this working group's main goal was to produce a multi-authored book to identify and measure successful e-consultations and describe how the approach to process design and evaluation of a specific consultation should be tailored to legal, political, and cultural contexts. The forthcoming book, *Connecting Democracy: Online Consultation and the Future of Democratic Discourse* is a collaborative volume that presents a

multi-disciplinary and international look at online consultations and draws the on the individual and collective experience of the group in 18 chapters co-authored by group members.

3.2.2. North American Digital Government Working Group

This group's goal was to produce a digital government research agenda that addresses comparative and transnational questions germane to North America. As such, it focuses on how to advance research across proximate geographic and political boundaries. The 20 group members include senior and junior faculty, practitioners, and graduate students from Canada, Mexico and the United States. Fields represented include public administration, informatics, management, and computer science. The North American Digital Government Working Group (NADGWG) convened four times, at least once in each of the member countries between 2007-2009. In each meeting, invited government officials gave presentations on key issues and new initiatives and engaged in discussion of their research potential.

Early in the time period, NADGWG organized two topical subgroups based on participant expertise and interest. A subgroup focusing on border regions is working to understand the information sharing and interoperability issues and challenges faced by governmental agencies in the border regions of Canada, Mexico, and the United States. Specific issues include transnational business processes and collaborative cross-border initiatives. The second subgroup has a focus on full information product pricing and is investigating the roles of government policy, trust, and information and communication technologies in the promotion of emerging North American distribution networks for goods such as organic and fair trade food. .

At the same time, the group has continued to develop a more comprehensive North American digital government research agenda and has successfully applied for funding from both Mexico and Canada to continue to support the group beyond the term of the working group experiment.

3.2.3. Digital Governance and Hotspot Geoinformatics for Monitoring, Etiology, Early Warning, and Management

The Geoinformatics Hotspot Working Group focused on developing a prototype geoinformatic hotspot surveillance system that relies on advanced software and statistical techniques to detect emerging crises. The work involves five case studies and illustrative applications in such areas as public health, watershed management, persistent poverty, and the security of networked infrastructure.

Over the course of the experiment 54 senior faculty, junior faculty, graduate students and practitioners from the US, Italy, India, Indonesia, China, and Japan participated. Their disciplines include statistics, computer science, public health, forestry, and public administration. The group's expertise was mainly focused on the practical challenges of watershed management in rural India where it involved not only university faculty and students but also public officials and civil society organizations.

This group also leveraged other research projects that were already in progress to pull together findings, tools, and other resources that could be re-used in the working group context. The final products include progress toward a set of software tools, a case book, and extensive and replicable practical impacts on watershed management in India. Between 2007 and 2009, the group held six extended meetings in the US and India that included not only research efforts , but also classroom instruction and various forms of engagement with local and national government officials..

4. Evaluation Methodology

The evaluation of the working group strategy addresses two goals. The first goal is to determine the efficacy of the WG strategy for establishing transnational DG research collaborations that are innovative, diverse, sustainable, and influential on research practice. The second goal seeks to identify replicable actions, resources, incentives, strategies, stakeholders, relationships, and methods that lead to efficacy. This paper presents the results of a survey administered to participants at the end of the experimental period that addresses the first evaluation goal. It represents the aggregate of individual experiences and opinions. A second qualitative study, in progress, addresses the second goal through case studies of the three groups as collaborative organizations.

The survey was completed in October 2010. It was sent to 91 participants identified as current members of the three working groups. In total, 55 participants responded (a 60 percent response rate, including at least 50 percent from each group). The survey consisted of 35 Likert-type scale items, three questions regarding certain kinds of academic outputs, two open-ended questions, and a set of demographic items. The 35 items are derived from the requirements placed on proposals for working group support (e.g., periodic meetings, senior and junior participants) and the overall goals of the experiment (i.e., to understand how the strategy affected participants' interest, ability, and opportunity to address international digital government problems). Together they covered the following topics:

- Opinions about general and specific elements of experience with the working group
- Assessment of the value of certain features of the working group strategy, such as the value of face-to-face meetings
- Identification of research products such as journal articles and grant proposals associated with participation in the working group
- Interactions in the DG community during the time of the experiment such as conference participation and academic exchanges
- Demographic questions such as amount of international experience, discipline, institutional location, and rank
- Several open-ended questions covering personal and professional benefits or achievements, and other community building activities

We analyzed the data using both descriptive and inferential methods. Additional variables were created or calculated in order to assign respondents to groups according to citizenship (US versus non-US), and length of experience with transnational and comparative research, DG research, and international DG research (i.e., five or fewer years versus six or more). In addition, three multi-item scales were created to represent key concepts in the experiment: working group requirements, international awareness, and individual career effects.

5. Survey Findings

Respondents represented all three working groups, all academic ranks and types of positions and a dozen academic disciplines including law, applied statistics, demography, e-government, forestry, informatics, information science, management information systems, organizational studies, political communication, political science, and public administration. Sixteen (30 percent) of the respondents were US citizens, a factor of importance to NSF's goal to increase international exposure and engagement by American scientists and engineers. More than three-quarters (42 respondents) were university faculty or university-based researchers (26 of these were senior academics, 16 junior level). Five respondents were PhD students at the time of survey, and six other respondents received their doctoral degrees while members of a group.

WG members had varying amounts of experience in DG and international research ranging from zero to 40 years. The mean length of experience in DG research before engaging in a WG was 8.3 years (median=6). The mean experience for all kinds of comparative or transnational (i.e., international) work was 7.84 years (median=4), and the mean for international DG research was 4.8 years (median=3).

The survey results indicate that the WG strategy had a highly positive effect on the participants. As shown in Table 1, respondents gave high scores to nearly every measure of value. They rated the overall experience as highly beneficial (a mean score of 4.58 on a 5-point scale). All but three items scored higher than 4.0, including such topics as the usefulness of working with ideas outside ones own field (4.47), greater understanding of the practical challenges of international digital government (4.47), contribution to individual research goals (4.44) and a sense of international community (4.43) and long-lasting professional relationships (4.42). Other highly rated items addressed the added value provided by the face-to-face meetings, opportunities to engage in collaborative work, and increased interest in DG research.

Similarly, most of the logistical and practical elements received high positive ratings, including the physical location of the meetings (4.21), and the name recognition and associated legitimacy of NSF (4.25), which in turn helped secure additional travel funding (4.21) and other resources (4.20) from other institutions. Even the three lowest scoring items were rated above the mid-point of the scale: influence of the WG experience on awareness of cultural factors in teaching (3.83) and methods of supervision or mentoring (3.71) and the value of online collaboration tools to support the group's work (3.38).

These overwhelmingly positive effects of the experience hold up across different groups although the effects are more strongly pronounced for some types. For example, on 29 of 32 measures, junior (untenured) scholars perceived the experience to be more highly positive than senior scholars. These differences are statistically significant (t-test, $p<.05$) for the six items noted "a" in the last column of Table 1. These include increased interest in international DG research generally, in international DG research, in interdisciplinary work, in transnational and comparative studies, in the value of practitioner involvement, and in the value added by meeting locations. All of these opportunities are less likely to be accessible to early career scholars which may explain the higher value they placed on these elements of the WG experience.

It appears that the more experienced DG researchers felt better able to take full advantage of the working group opportunities for enhancing their research range, skills, and or more years of general DG experience by the end of experiment; about 56 percent of the respondents) perceived the experience to be more highly valuable than those with five years or less. The more experienced participants recorded higher mean scores on 21 of the 32 measures These differences were statistically significant (t-test, $p<.05$) for the three variables noted "b" in the table. The value of the overall experience and the likelihood of having established long-lasting professional relationships were rated higher, and the value of online collaboration software was rated lower. Scores were more consistent across levels of international research experience and US vs. non-US participants. The mean scores of non-US participants tended to be higher overall, but none of these differences was statistically significant.

While the scale items shown in Table 1 measure the perceptions and opinions of the respondents, Tables 2 and 3 present research productivity and scholarly engagement effects of the strategy as measured by reports of specific products associated with the working groups such as journal articles, scholarly visits, and jointly developed conference panels, software, and curricula. Of particular note, are the number of respondents who reported serving on dissertation committees (17), writing joint research proposals (18), or engaging in long scholarly visits (33), or joint curricula development (16). These kinds of activities indicate stronger and more long-lasting relationships than would be expected from more typical activities such as jointly authored journal articles and conference proposals. As shown in both tables, despite the fact that no funding was provided for research activities or salaries, the total number of outputs reported is more than three times the number of survey respondents, indicating substantial productivity and a high rate of collaborative activity over the three-year span of the experiment.

Moreover, the majority of respondents reported that they would have been unlikely (31 percent) or very unlikely (29 percent) to have engaged in these collaborations if their working group did not exist. In addition, these scholarly products and relationships appear to have been generated without extraordinary effort. For 56 percent of respondents, the WG effort took less than 10 percent of their time; for 30 percent it consumed less than 5 percent.

Table 1. Mean ratings of value as perceived by working group members				
Variable	**Mean[1]**	**N**	**Std. Dev.**	**Significant differences[2]**
Rating of overall working group experience	4.58	52	0.750	b
Introduced me to useful ideas outside my main field	4.47	53	0.504	
Improved my understanding of practical international DG challenges	4.46	54	0.818	
Contributed to my own research or professional goals	4.44	52	0.698	
Fostered a sense of international community	4.43	53	0.844	
Built long lasting professional relationships	4.42	53	0.865	b
Value of face to face meetings	4.40	53	0.862	
Increased my opportunity for collaborative research	4.40	53	0.631	
Increased my interest in international DG research	4.40	52	0.774	a
Will prompt me to do future comparative or transnational DG research	4.38	52	0.771	a
Value of mixing senior, junior & student scholars	4.37	54	0.784	
Increased my interest in collaborative research	4.36	53	0.787	
Increased my opportunity for international DG research	4.34	53	0.783	
Increased my opportunity for interdisciplinary research	4.33	52	0.648	
Increased my interest in interdisciplinary research	4.32	53	0.803	a
Increased my opportunity for DG research	4.28	53	0.769	
Enhanced my ability to work across disciplines	4.26	54	0.732	
Increased my interest in DG research	4.26	53	0.788	a
Increased my awareness of cultural factors in research	4.25	52	0.711	
Value of NSF name recognition	4.25	48	0.838	
Will prompt me to do practice-oriented research	4.23	52	0.854	
Locations of physical meetings added value	4.21	52	0.977	a
Value of travel funds, other than from NSF	4.21	43	0.940	
Value of support from organizations other than NSF	4.20	51	0.939	
Value of practitioner involvement	4.19	53	0.810	a
Increased my interest in research-practice collaborations	4.13	53	0.810	
Encouraged faculty-student collaboration	4.10	52	0.774	
Increased my opportunity for research-practice collaborations	4.09	53	0.838	
Encouraged engagement with practitioners	4.08	53	0.781	
Increased my cultural awareness in teaching	3.83	53	0.727	
Will influence the way I supervise and mentor others	3.71	52	0.766	
Value of online collaboration software used	3.38	47	0.990	b

[1] 5-point scale where 1 is most negative and 5 is most positive

[2] Differences: a=Senior vs. Junior scholars, b=more vs. less previous DG experience, Significance determined by t-test, p=.05

Table 2. Research productivity: individual reports of sole or jointly authored scholarly work related to the WG theme

	N of respondents reporting scholarly activity related to their WG			
Type of research activity	In progress	Under review	Accepted or published	Total
Journal articles	31	17	25	73
Conference papers	24	22	26	72
Book chapters	20	23	18	61
Total by status	75	62	69	206

Table 3. Scholarly engagement: individual reports of collaboration with at least one other WG member

	N of respondents reporting		
Type of engagement	planned	in progress/ complete	total
Joint manuscripts	11	31	42
Dissertation committees	1	16	17
Long scholarly visits	10	8	18
Short scholarly visits	9	15	24
Joint research proposals	13	20	33
Joint conference panels	5	18	23
Jointly developed software or other tools	7	6	13
Jointly developed curricula	7	9	16
Total by status	63	123	186

Table 4. Thematic Scales

Scale	WG requirements	International awareness	Individual career effects
Items included	Value of face to face meetings Locations of physical meetings added value Value of mixing senior, junior & student scholars Value of practitioner involvement Value of travel funds, other than from NSF Value of support from organizations other than NSF Encouraged faculty-student collaboration	Fostered a sense of international community Will prompt me to do future comparative or transnational DG research Increased my interest in international DG research Increased my awareness of cultural factors in research Increased my awareness of cultural factors in teaching Improved my understanding of practical international DG challenges	Built long lasting professional relationships Contributed to my own research or professional goals Introduced me to useful ideas outside my main field Increased my opportunity for DG research Increased my opportunity for international DG research Increased my interest in collaborative research Increased my opportunity for collaborative research Increased my interest in interdisciplinary research Increased my opportunity for interdisciplinary research Enhanced my ability to work across disciplines Increased my opportunity for research-practice collaborations Will influence the way I supervise and mentor others Value of NSF name recognition Increased my interest in research-practice collaborations Will prompt me to do practice-oriented research Increased my interest in DG research Encouraged engagement with practitioners
	7	6	17
Reliability	0.903	0.879	0.954

We used the items shown in Table 1 to construct multi-item scales representing key constructs in the study. These are shown in Table 4 below. The scales represent three themes: The first is the required features of the working groups which capture the seven structural elements of the strategy as required by the call for proposals and the subsequent review and selection process. The second theme, growth in international awareness and expertise is represented by six items that encompass opportunities to experience and understand other cultures in the context of scholarly work including research and teaching. The last theme, individual career effects, encompasses the personal development and community building aspects of the working group experience as represented by 17 items such as contributions to multi-disciplinarity, personal networks, and the ability to relate research to practice. The reliability of these thematic scales is very high (0.93, 0.879, and 0.954 respectively) as indicated by Cronbach's alpha, a measure of the internal consistency of the items or the likelihood that they are related to a shared underlying concept.

Further, as shown in Table 5, all three scales have strong and highly significant positive correlations with the overall experience rating. The scales are also highly and significantly correlated with one another, suggesting they reinforce one another as a package of effects. Taken together these correlations provide substantial confirmation of the effectiveness of the working group strategy for encouraging and supporting an international digital government research community.

Table 5. Correlation of key themes with overall rating of experience

	Overall Experience Rating	sig
Required WG features	0.732	.000
International awareness building	0.714	.000
Individual career effects	0.795	.000

6. Discussion and Implications

This paper presented a quantitative evaluation of a strategy to encourage the development and growth of an international digital government research community. It reported the results of a participant survey which is one part of a more complete evaluation process that will also include qualitative case studies now in progress.

The strategy constituted an experiment in which three international working groups with diverse membership and research interests, selected through a competitive peer review process, worked for three years under a small set of structural requirements. Beyond the few standard features (i.e., a management plan, periodic face-to-face meetings, and a mixture of senior, junior, and student scholars), the three groups varied considerably in size, structure, focus, goals, and methods. Each group received modest travel funds for the participants from US institutions from an NSF grant. Travel support for participants from non-US institutions was provided by other organizations or by the participants themselves. No funding from any source was provided for salaries; however, each working group did secure some monetary and in-kind support for meeting logistics, often provided by the host sties.

This portion of the evaluation addresses the efficacy of the WG strategy for creating international DG research collaborations that are innovative, diverse, sustainable and influential on research practice, as viewed by the participants themselves at the end of the three-year period. The following section summarizes the implications of the survey findings.

6.1. Discussion of WG Strategy Results

The WG strategy included a set of required features as laid out in the call for proposals. These features represented a conscious effort to aid the groups in overcoming the known challenges of collaboration across geographically distributed, multi-disciplinary research teams. We observed three major impacts:

Modest structural requirements create a supportive framework for both scholarly productivity and professional development. The proposal requirements appear to have provided incentives and benefits to the participants. Participants strongly agreed that the diverse mix of scholars, in terms of discipline and career stage, and the periodic face-to-face meetings in different countries all had beneficial effects on the experience. In addition, from the survey comments, it also appears that the fact that everyone had to find some level of resources in order to participate put them on a more equal footing and motivated them to become and stay engaged.

Moreover, without dedicated funding for research activities or salaries and regardless of the topic or specific characteristics of each individual working group, productivity was high in terms of preparing journal articles and book chapters, developing conference panels or securing grant funding for additional collaborative work. Likewise, working group members were able to forge personal and professional relationships that signify long-lasting connections through such activities as dissertation committees, joint curricula development, and long scholarly visits that allowed them to work intensively in each other's work settings and cultural environments.

Face-to-face engagement is essential to the success of international research teams. Reinforcing the findings of earlier studies of distributed research teams, **t**he majority of respondents (60 percent) reported that they would have been unlikely or very unlikely to have engaged in these productive collaborations absent their participation in their working groups. These opportunities for short term immersion in relevant local settings were seen as highly beneficial. Participants rated the value of the physical location of the meetings at 4.21, reflecting appreciation of the opportunity to experience the home cities and work environments of their colleagues, including in many cases the chance to meet not only with local scholars but also local government professionals. In addition, the informal activities that accompanied most meetings served to build shared personal experiences that tended to strengthen professional relationships. Online collaboration tools did have some benefit, but only in combination with opportunities to meet in person. As one respondent put it, "Competition for time and attention to projects 'back home' is just too great to sustain such distance work without the impetus of periodic meetings."

Scholars at all career stages benefit from participation and junior scholars appear to reap special benefits. Participants ranging from provosts to endowed chairs to tenured and untenured

faculty to doctoral students engaged fully in the working groups. The survey results indicated a highly positive experience regardless of rank or amount of previous DG or international experience. Participants rated highly the value of working with ideas outside of their own fields and having an opportunity to examine practical DG challenges first hand in the different locales in which they met. For several variables in the survey, junior participants indicated significantly higher levels of benefit. In comments, they attributed these to early career opportunities for international and multi-disciplinary research, as well as engagement in mentoring relationships and sustained personal interactions with experienced senior scholars, some of them leaders in their fields.

6.2. Implications for Research Sponsors

The working group strategy also holds lessons for research sponsors seeking to encourage interdisciplinary, multi-institutional, and international collaborations:

Modest funding for face-to-face engagement can generate substantial scholarly results and network effects. Each working group spent less that $75,000 spread out over three years to support travel for the participants from US institutions. That small amount, however, combined with the legitimacy of the peer review process and the NSF "brand" helped others to acquire enough resources to participate as well. Once the groups formed, the structural requirement to meet five times over the course of three years helped to cement the group together and keep it moving toward specific goals associated with these milestone events. The three-year time period seems to have been sufficient to create incentive and sustain momentum. It also set a shared expectation about a definite end point for either completing their work or moving it to the point where it could be sustained by the network of relationships and access to other funding sources. A follow up after several more years would be necessary to confirm the staying power of this effect.

The international working group strategy can stimulate and enhance research partnerships and results, but it is not a substitute for direct research funding for international investigations. While the three groups in the experiment were motivated to find new funding or to use existing resources in innovative ways, the need still remains for research sponsors to lessen the institutional barriers to international research collaborations. The working group strategy brings individual scholars together to build relationships that are ripe for collaboration, but their ability to work together in a sustained way is still limited by the need to meet the separate (and different) rules and routines of the sponsors in their home countries.

The basic international working group strategy is readily replicable as a way to build international research communities.
By combining a mixture of simple basic requirements, a reasonable length of time, and modest funding directed at creating opportunities to engage face-to-face across boundaries, the working group strategy is readily replicable. Our findings suggest that this low-cost package of design elements creates an environment for encouraging collaboration, discovery, and innovation across national boundaries regardless of topic. It provides a simple structure which can accommodate many different disciplines and participants pursuing any type of substantive investigation.

7. Conclusions and Future Research

In this paper, we described an experimental strategy to encourage the emergence of a sustainable international digital government research community. We presented a quantitative evaluation of that strategy based on a survey of the participants in three time-limited international working groups. The survey results show that community building is attainable through deliberate design and modest investments. While the literature on international research collaborations often measures success solely in terms of tangible scholarly outputs such as papers, articles and research grants, this experiment shows that carefully designed, low-cost collaborations can produce similar results, while also forging lasting networks of relationships as well as long-term career benefits that should continue to return both kinds of dividends.

This study is part of a larger evaluation effort which will use both qualitative and quantitative methods. The main limitation of this survey portion of the study is its reliance on the reported experiences and opinions of the participants as the main source of data – it tells us what participants did and what they think about the experience, but it does not tell us why or how the results were obtained. The next phase of our research addresses this limitation through a case study approach which makes use of observations, documentary evidence, and individual and focus group interviews of each working group. In that qualitative phase, our goals are to identify specific actions, resources, strategies, stakeholders, relationships, and methods that appear to be associated with successful elements of each group. We will consider aspects such as leadership, management, goals and incentives, meeting structure, activities between meetings, and technology use to try to understand the dynamics, challenges, and accomplishments of each of the three groups. A second goal for the case studies is to determine the extent to which these characteristics or activities of the groups are replicable by others. We also plan a full evaluation report to be shared with NSF and other institutional digital government sponsors to convey the results and make recommendations for future research programs that invest effectively in international investigations and research teams.

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