A Logistic Multilevel Model for Civic Engagement and Community Group Impact in the Digital Age

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A Logistic Multilevel Model for Civic Engagement and Community Group Impact in the Digital Age

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ABSTRACT
Prior research has demonstrated that a citizens’ socioeconomic status is a significant determinant of the extent of citizen involvement via ICT [18]. Others have focused on its impact on civic engagement in terms of community group impacts, finding that such groups play an important role in increasing citizen involvement within democratic processes [8]. Thus, previous research has examined effects aggregated at the ‘individual level’ and ‘group level,’ respectively. This paper seeks to reconcile these levels in order to assess the impact of ICT on civic engagement. Our study examines the interplay of individual level and community group level factors through analysis of the data from a household survey (N=717) taken in Blacksburg, Virginia in 2005. This study identifies the idiosyncratic influences at both levels by applying a multilevel model (specifically, a logistic hierarchical linear model). In particular, we verify the positive impact of community groups utilizing ICT in increasing civic engagement. This research will be used to form the basis of a comparative study of civic engagement through eGovernment portals, mobile technology and social media, and to assess their impact on facilitating group communication and sensemaking.

Categories and Subject Descriptors
H.5.3 [Information Interfaces and Presentation]: Group and Organization Interfaces-Collaborative Computing

General Terms
Measurement, Human Factors, Theory

Keywords
E-Governance, Civic Engagement, Information and Communication Technology, Community Group Impact, Hierarchical Linear Model

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1. INTRODUCTION
Information and communication technology (ICT) has the potential to significantly increase citizen participation within democratic community processes [6, 9]. Such technology has also been credited with establishing new forms of social interaction among citizens and governmental agencies. Web 2.0 technologies are also providing new mechanisms for civic engagement, political expression and public discussion [19], while others have found that these technologies are important for facilitating and augmenting the dynamics of political and civic engagement [9, 12]. The use of ICT can be used to as a mechanism to reverse the decline of social capital in community groups. Putnam [13] describes the steady decline of group membership in the United States, which has led to a complimentary decrease in community involvement. Though he attributes some of this decline to the isolation effect of internet communication, paradoxically online communication can also be used to foster civic engagement and political expression, particularly when it is used to acquire and share information within community groups. [8, 9].

Previous research has focused on exploring the effect of ICT on civic engagement, modeling its effects at the ‘individual level’ and ‘group level’ respectively. This study applies a multilevel model to analyze the community group impact on civic engagement, in an effort to reconcile their effects. Therefore, the main research question is; Does the use of ICT affect the nature of civic engagement for citizens affiliated with community groups? Additionally, this study also examines; What effects do different types of community group affiliations, group ICT use (email, listserv, online discussion boards and websites, including blogs) have on the civic engagement of individual citizens? To study and discuss these questions in more detail, this paper is divided into four sections. First, this paper explores previous studies about the relationship between ICTs and online civic engagement in general. Next, we provide an overview of our research methods, with an emphasis on our explaining our hierarchical linear models. Then, the preliminary findings are presented before we discuss the implications of these findings.

2. CONCEPTURAL BACKGROUND
2.1 Civic Engagement in the Digital Age
This study focuses on the civic engagement through the use of Information and Communication Technology (ICT). When we discuss the relationship between ICT and civic engagement, there are three different perspectives we use to explore this relationship: two polarized (optimistic or utopian and negative or pessimistic)
views and a skeptical standpoint [1, 7]. Optimists insist that interactive ICT improve connections between citizens and public bureaucrats, improve public policy-making processes and grow trust by promoting government transparency and accountability. With the adoption of interactive technology, improvements to public deliberation and participatory democracy can be realized [2, 17]. Therefore, ICT is viewed as a means for invigorating democracy. Conversely, pessimists argue that such mechanisms for discourse are less likely to mobilize citizens and more likely to reinforce the power and status of political elites [4, 12]. The promise of true participatory democracy online is thus undercut by the problem of demographic representativeness; those who use it are significantly younger, wealthier and more educated than the average person [4].

Finally, scholars representing the skeptical viewpoint argue that the ICT neither improves nor reduces civic engagement [1, 14]. Margolis and Resnick suggest that ICT is taking on the features of ordinary life [11], and Putnam [14] insists that such measures are likely to displace personal engagement and thus fail to generate social capital. Furthermore, some argue there is little evidence to support a significant relationship between the evolution of ICT use and levels of civic engagement [1]. As suggested by the dispute among the polarized perspectives and the skeptical view, the nature and extent of the impacts of the ICT on civic engagement are not yet fully understood. Each point of view has shortcomings. Nevertheless, it can serve a useful supplementary function. The ICT had not yet profoundly impacted social trends, but felt it would play an important part of explaining the contemporary context of a person’s overall civic and political life. Subsequent developments such as Facebook, iPods, instant messaging, and text messaging have shown that citizens, particularly younger generations, are particularly “plugged in.”

2.2 Bridging Individual and Group Levels of Analysis: A Logistic Multilevel Model

Past studies have investigated the relationship between ICT use and civic engagement by modeling behavior at the individual level, while also considering effects at the group (contextual) level. By examining both levels through the same level of analysis, the results were potentially in significant or underestimation of variability across levels. According to Katz level, while also considering effects at the group (contextual) trust by promoting government transparency and accountability.

Interactions between ICT and other variables have been studied by many authors. Several studies suggest that ICT use can have both positive and negative effects on civic engagement. For example, Margolis and Resnick [11] argue that ICT is taking on the features of ordinary life, and Putnam [14] insists that such measures are likely to displace personal engagement and thus fail to generate social capital. Furthermore, some argue there is little evidence to support a significant relationship between the evolution of ICT use and levels of civic engagement [1]. As suggested by the dispute among the polarized perspectives and the skeptical view, the nature and extent of the impacts of the ICT on civic engagement are not yet fully understood. Each point of view has shortcomings. Nevertheless, it can serve a useful supplementary function. The ICT had not yet profoundly impacted social trends, but felt it would play an important part of explaining the contemporary context of a person’s overall civic and political life. Subsequent developments such as Facebook, iPods, instant messaging, and text messaging have shown that citizens, particularly younger generations, are particularly “plugged in.”

3. METHODS

In order to achieve a more in-depth investigation of citizens affiliated with community groups, this paper uses a logistic multilevel analysis (a two level model) with a single binomial dependent variable, volunteer. The outcome individual averages that are used as 1 group level variables are often interpreted as ‘direct and contextual effects.’ To facilitate contributions to the reconciliation between these levels of analysis, the following hypothesis is examined:

- Hypothesis: Individual civic engagement (volunteer work) would be greater in local groups with higher group ICT (email, listserv, online discussion boards, and websites, including blogs) use, taking into account individual citizens’ psychological characteristics (the level of political efficacy and the extent of social trust) and socioeconomic variables (age and education).

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1 To develop a parsimonious model, we included variables which focused on our research question. However, we also tested control variables which were revealed significant effects in prior studies such as education, income and age. We then excluded statistically insignificant controlling variables.
3.1 Dependent Variable

**Civic Engagement**: (Variable name: volunteer\(^2\)); “whether you (individual citizens) are doing volunteer works or not” (Scale: 0=no, 1=yes).

3.2 Independent Variables

3.2.1 Individual Level Variables

**Political Efficacy** (Variable name: poleff): the extent to agreement that “sometimes local politics and government seem so complicated that person like me can’t truly understand what’s going on” (Scale: 1-4) (1=strongly agree, 2=somewhat agree, 3=somewhat disagree, 4=strongly disagree)

**Social Trust** (Variable name: rtrust): the likelihood of answering to “what extent do you think most people in the local area can be trusted” (Scale: 1-4) (1=not at all, 2=not very much, 3=somewhat, 4=very much)

**Control variables** (education and age): the answer of “what is the highest level of formal education you have completed” (converted scale: years) and the answer of “in what year were you born” (converted scale: years)

3.2.2 Group Level Variables

**Group ICT Use** (Variable name: grpictu): with your local group, group use of ICT for communication (email/listserv, online discussion boards, and websites including blogs) (scale: 0=never used all three items at any groups - 9=used all items at all three groups)

3.3 Data and Measures

This study is based on household telephone survey data from the town of Blacksburg, Virginia and surrounding areas in 2005 (spring 2005; N=717; 40% response rate). As part of larger research project (National Science Foundation IIS-0429274), survey questions cover current ICTs use and practice among local citizens, local community groups and government representatives. In particular, the author is interested differences among individual citizens affiliated with local groups and their ICT use for civic engagement.

4. FINDINGS

This study examined a logistic multilevel model for detecting the local group effects on civic engagement, with respect to the individual citizens’ likelihood of doing volunteer work. To understand the effect of ICT use of community groups, the model takes into account individual citizens’ political efficacy, level of trust on other local people, the level of education and age in the lower individual level. Group Internet use constitutes the group level variable. The following shows the results of logistic multilevel model without two.

Applying the logistic transformation \( \beta = \frac{e^\beta}{1 + e^\beta} \) to these estimates produces an estimated volunteer rate of 81.9% (\( \frac{e^{0.601}}{1 + e^{0.601}} \)) based on all individual citizens (typical probability). The result shows that there is statically significant intraclass correlation (random effect: \( p<0.05 \)).

<table>
<thead>
<tr>
<th>Table 1 Group ICT Use Logistic Model</th>
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<tbody>
<tr>
<td>Fixed Effects (Unit-specific model with robust standard errors)</td>
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<tr>
<td><strong>For Initial Status</strong> (( \beta_0 ))</td>
</tr>
<tr>
<td>Intercept (( \gamma_0 ))</td>
</tr>
<tr>
<td>Group Internet Use</td>
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<tr>
<td><strong>For Political Efficacy</strong></td>
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<td>Intercept</td>
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<td><strong>For Trust</strong></td>
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<td><strong>For Education</strong></td>
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<td>Intercept</td>
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<td><strong>For Age</strong></td>
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<tr>
<td>Intercept</td>
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</tbody>
</table>

*p<0.05, ** p<0.01

By using the logistic transformation, \( (p)=\ln (p/(1-p)) \). The predicted values are on a scale that ranges from - \( \infty \) to + \( \infty \). The logistic function transforms these predictions into values between 0 and 1 which can be interpreted as the predicted probability.

For political efficacy variable (individual level predictor) is associate with the rate of doing volunteer work, 0.141. Thus, the corresponding of probability is \( e^{0.141} = 1.3531 \). So, as individual citizens’ one unit of political efficacy increasing, the rate of doing volunteer work also increases 0.3531. For trust, it turned out to be insignificant.

Group-level predictor group internet use is associated with higher the rate of doing volunteer works, 0.601. Thus, by using the logistic transformation, the corresponding of probability is \( e^{0.601} = 0.6558 \). Thus, ‘group internet use’ also turns out to be positive influence on the likelihood of doing volunteer work.

5. DISCUSSION

The preliminary findings show that individual citizens are influenced by the extent of community group ICT use on their civic engagement (volunteer work). There are intraclass correlations between civic engagement and group ICT use and (our hypothesis is supported), thus ICT use is helpful for becoming more involved in volunteering at the community level. Additionally, these findings help verify the premise that
Community groups play important roles in democratic civil society through aggregating, shaping, and cultivating collective public interest, will, and competence via ICT in the digital ages. The results suggest a positive association between citizens' involvement in community groups of their civic engagement with group ICT use. Although there are several limitations such as small sample size and limited group level data, this paper presents ways to adapt and to present the potential use of multilevel analysis to examine civic engagement through logistic multilevel models. This study seeks to contribute to the understanding of growing evidence that ICT can be used as a useful mechanism for increasing the civic engagement of citizens affiliated with community groups.

6. REFERENCES


