Generational Differences in Information Technology Use and Political Involvement*

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ABSTRACT

A structural equation model analysis of data from a 2003 national random sample survey (n = 478) on informational technology (IT) reveals important direct and indirect effects of generational demographic and attitudinal differences on electronic forms of political participation. Younger respondents reported more support for IT and fewer technological disadvantages compared to older respondents. Younger respondents showed more desire for public IT availability and e-political participation, whereas older respondents preferred traditional electoral involvement. The more educated held more favorable views of IT generally and of public IT access more specifically. Better-educated respondents were more active civically in both traditional and electronic forms of participation. Supportive technological views led to greater e-political participation and stronger interest in e-elections. Respondents with less concern and fear about IT were more likely to act as digital citizens and were more involved in e-politics and e-elections. Proponents of public IT access were more supportive of e-elections. Our model suggests that e-citizenry will compound existing ~~social~~ divisions, as non-electronic voices are marginalized and electronic voices are amplified.

Keywords: generational change; informational technology; political activity; SEM

INTRODUCTION

Past research has demonstrated that generational differences play an important role in linking IT literacy and usage with political outcomes such as partisanship, elections, or public policy decisions (Fox,

2004). Other sociodemographic differences, together with generational effects, define what has become known as the *digital divide* (Castells, 1999; Warschauer, 2003). Attitudes toward the availability and use of information technology (IT) play an important role in contemporary political theory and outcomes regarding political participation.

In this article, we define IT literacy operationally as a self-reported ability to use computer hardware and software for self-expression, communicate with other individuals and organizations, locate and process information electronically, and engage in problem-solving activities. Past research demonstrates that IT literacy is greater among younger members of society, those with higher incomes and more education, more advantaged ethnic groups (white non-Hispanic and Asian), and those with IT resources more readily available at home, at work, or in readily accessible public locations such as libraries or other public buildings (Mossberger, Tolbert & Stansbury, 2003; Norris, 2001; Servon, 2002). A number of studies have identified unequal levels of IT literacy as a significant barrier to equity in citizenship (NRC, 1999; Wilhelm, 2000). Survey data have been useful for fleshing out the characteristics of Internet non-users, as well as particular obstacles and concerns that explain IT non-use.

This study assesses the impact of generational and SES differences on IT literacy and political participation. It argues that cohort differences have a direct influence on traditional and electronic forms of political engagement but also suggests that interest in and support for technology are key factors in shaping notions of digital citizenry. In addition, this research evaluates whether e-political participation occurs at the expense of more traditional forms of electoral involvement.

Literature Review

Studies consistently show that age, race, language, and disabilities are significant predictors that shape IT literacy, even when controlling for socioeconomic status (Cooper, 2000; Goslee, 1998; Novak & Hoffman, 1998). Income and education increase the likelihood of access to and use of computers and the Internet (NTIA, 2000, 2002; UCLA, 2000; Wilhelm, 2000) as well as access to broadband (NTIA, 2004). The purchase of a home computer or general access to and availability of computers are considered widely to be dependent on income. Some scholars (Compaine, 2001), however, in situating the rollout of computers and the Internet historically, have concluded that access to computers and connectivity to the Internet, in fact, are diffusing at an unprecedented rate compared to other technologies such as television, radio, and electricity.

In a study of residents of Los Angeles, California, age had no effect on the centrality of the Internet to everyday life; however, older respondents had fewer IT skills than their younger counterparts (Loges & Jung, 2001). Age seems to become a barrier to Internet use among those over 65 years (Lenhart et al., 2000). Concerns about privacy may be an important consideration for elders' use of IT (Den-

nis, 2001; Lenhart et al., 2000). To this end, Loges and Jung (2001) recommend that Internet training puts seniors at ease by addressing these privacy concerns.

Compared to their older counterparts, citizens 30 years of age and younger are more likely to use the Internet as a news source on a weekly basis. Age, sex, education, size of locality, and e-information collection have been shown to be significant predictors of political involvement (Pew Research Center for the People and the Press, 2000). Shah and colleagues (2001) found that reliance on the Internet for information had a positive effect on Generation Xers' civic participation. The Internet may encourage civic and political participation while bolstering both off-line and online communication (Katz et al., 2001) and strengthening community-level participation (Alexander, 1999; Brants, Huizenga & Van Meerten, 1996). Research findings suggest that traditional political participation is reinforced by e-activities (Weber, Loumakis & Bergman, 2003). In turn, the Internet may lead users to expand their political knowledge (Horrigan, Garrett & Resnick, 2004).

Compared to non-users, Internet users are more likely to use other kinds of technology, including cell phones and print and broadcast media (Lenhart et al., 2003); others suggest that use of the Internet and other technologies is mutually reinforcing (Katz et al., 2001). Among Midwesterners, the desire for computing skill promoted positive attitudes toward e-government (Shelley et al., 2004). Attitudes toward IT and a desire to enhance computer skills may compound the impact of sociodemographic constructs, intervening between personal or group characteristics and e-political participation.

Theory

The theoretical structure undergirding our study is based on well-established past research linking generation gaps to political outcomes. Our theoretical approach is predicated on the notion of a younger, with-it, cyber-literate generation living a vastly different political reality than an older generation for which the use of Internet technology is somewhat episodic and for whom the very thought of making serious use of IT is filtered through and sometimes blocked by feelings of technophobia or IT inadequacy. Technological literacy, almost by definition, evokes images of generational differences in political orientations and in levels of political interest and involvement, ranging from simply gathering information passively to voting actively in elections at all levels. The stereotype of college, high school, and even ~~grade school~~ students who can program and Web surf circles around their parents often reflects reality.

Our theoretical base informing this analysis is the extensive literature of political science, political psychology, and political sociology addressing the relationships between generations and politics (Abramson, 1989; Greenstein, 1969; Jennings & Niemi, 1974, 1981). More specifically, our models are informed by and reflect generational differences in voting behavior elucidated by Miller and Shanks' (1996) multistage generational persistence model of societal change

(Kiesler, Morgan & Oppenheimer, 1981; Sears, 1981). Miller and Shanks (1996) postulate:

The voter sentiments involved in a series of taxpayer revolts, the drive for term limits, or the 1994 Republican conception of a revolutionary reduction in the role of the federal government may be only the most recent manifestation of a general rejection of partisan politics by young, newly eligible voters that began in the 1970s. (p. 23)

Generational explanations, broadly speaking, capitalize on the inevitability of actuarial tables, which guarantee the replacement of older political generations by younger ones and the ultimate dominance of the ideas that predominate among the survivors within the electorate. More specifically, Miller and Shanks (1996) argue that reduced participation in U.S. electoral politics was a consequence of post-1964 generations "that were dramatically less engaged by, and less likely to participate in, national politics than were their predecessors at the same stages of their adult lives" (p. 41). Although life-cycle effects lead the electoral participation rates of a given generational cohort to increase, as the cohort ages over time, from the Miller and Shanks (1996) perspective, trends from the 1970s through the early 1990s toward lower voting turnout combined with plunging interest and trust in government and politics are traceable to the replacement of habitual older voters by more heavily non-voting and politically disinterested younger cohorts, particularly since 1972. Period effects also played a leading role in these generational vicissitudes, particularly the rising cynicism regarding government and politics highlighted by war, political assassinations, civil rights, the making of a counterculture, and Watergate-era political crime, coverup, and presidential resignation.

The following three fundamental tenets of the Miller and Shanks (1996) approach are equally relevant to the present investigation:

1. Younger cohorts are particularly vulnerable to influence by historical events in their political environment.
2. Older cohorts may entertain a lifelong openness to change but, in fact, reveal great stability in the persistence of earlier orientations.
3. Even in the face of large historical events, long-term societal change may occur largely as a consequence of generational replacement. (pp. 43-44)

In addition, social connectedness, otherwise expressed as social cooperation, community integration, or social involvement (Knack, 1992; Teixeira, 1987), plays an important role both in Miller and Shanks' (1996) study and in our investigation of generational differences associated with the virtual societal linkages that characterize contemporary IT literacy. However, unlike Miller and Shanks' (1996) reliance on bloc recursive models in which a single equation is enhanced by successive addition of new sets of predictor variables (Agresti & Finlay, 1997), we employ structural equation modeling

(SEM), which is appropriate when causal interpretations are desired measuring both the direct and indirect effects of exogenous (independent) variables (typically, demographic variables) on endogenous (dependent, often behavioral outcomes) variables and the effects of some endogenous variables on other endogenous variables (Bollen, 1989; Bollen & Long, 1993; Jöreskog & Sörbom, 1996a, 1996b). We also conceptualize the role of education differently from Miller and Shanks (1996), who focus on the profound increases in voting participation that are associated with greater educational attainment offsetting overall declines in voter turnout in more recent electoral cohorts.

METHODS

Sample

Data from a 2003 national computer-assisted telephone interview (CATI) random sample survey (n = 478) are reported. The sample consisted of phone numbers appearing in telephone directory listings. Adult respondents living in Colorado, Iowa, and Pennsylvania were eligible for participation.

These data were weighted by gender and age to correspond to those two demographic traits with the 2000 census national adult population. The overall response rate was 31.4%, ranging from 37.4% in Iowa to 26.7% in Pennsylvania.

Response rates are based on the number of completed interviews divided by the number of potentially eligible cases (n = 1521) in the sample (households plus undetermined). Reported sample percentages are statistically valid within ±4.5% at the 95% confidence level over all three states. For individual states, the 95% confidence intervals are ±7.8% for Colorado, ±7.5% for Iowa, and ±8.0% for Pennsylvania.

The distribution among the 478 survey respondents was 32.8% (n = 157) from Colorado, 35.8% (n = 171) from Iowa, and 31.4% (n = 150) from Pennsylvania. Of the three states' combined population age 18 or over, Colorado accounted for 21.7% (3,200,466), Iowa 14.9% (2,192,686), and Pennsylvania 63.4% (9,358,833). Weights were constructed from the ratios of the population proportions to the sample proportions for each state. Final weights were constructed by adjusting the initial weights ~~in order~~ to account for differences in the joint distribution of the sample by age and gender compared to the joint age and gender population distribution.

Respondent demographics generally reflect the characteristics of the sampling frame. Women and men were represented nearly equally (52% and 48%, respectively). Nearly nine in every 10 were White (89%), with other racial/ethnic origins including Black (5%), Hispanic (4%), Native-American/Alaskan Native (1%), and Asian or Pacific Islander (1%). The age breakdown was 18-30 years (23%), 31-50 years (42%), 51-70 years (22%), and 70+ years (13%). On average, respondents were 46 years old. Five percent of respondents reported not completing high school, 24% had achieved a high school degree, 8% a technical or vocational certificate, 24% some college but without degree

Table 1. Factor solution for attitudes toward technology

Item	Factor Loadings	
	IT Advantages	IT Disadvantages
Enjoy using new technology	.65	
Internet is a good source of information	.76	
E-mail is a good way to contact public officials	.72	
Difficult to keep up with technology		.59
Society is too dependent on computers		.71
Personal information stored in computers might not be kept confidential		.73
Information on the Internet is not true		.48

Factor loadings less than .40 are omitted to ease interpretability
Note: (n = 478)

completion, 24% a four-year degree, and 15% a graduate degree. Nearly ~~two-thirds~~ were married or living as married (59%), 23% had never been married, 8% were divorced, 9% widowed, and 1% separated. Nearly a quarter of the respondents lived in a rural area (23%), with another 18% residing in a town of less than 10,000, 22% in a town of 10,000 to 50,000, 11% in a city of 50,000 to 100,000, and 26% in a city of 100,000 or more.

Measures

The following variables were employed in statistical analysis. Response categories for age were 1 = 18-37 years, 2 = 38-50 years, 3 = 51-64 years, and 4 = 65+years. Education was treated as a continuous variable, with response categories of 1 = non-completion of high school, 2 = high school diploma, 3 = trade school, 4 = some college, 5 = undergraduate degree, and 6 = graduate or professional degree. Higher values reflected increased levels of education; the mean was 3.81.

Principal components factor analysis was performed to maximize the shared variation among individual variables, thereby increasing the explanatory power in a theoretically meaningful factor. In this case, seven items measuring attitudes toward technology resulted in two factor-derived scales (Table 1). IT Advantages is a scale comprised of three items (with factor loadings given in parentheses~~,~~ denoting the correlation between each item and the factor with which it is associated): (1) "the Internet is a good source of information about state, national and world news" (.76); (2) "using e-mail would be a good way for people to contact their public officials" (.72); and (3) "I enjoy learning how to use new technological devices" (.65). Since the factor loading for the Internet is closest to 1.00, it does the best job of explaining the concept IT advantages. Higher values of the scale indicate more support for information technology. IT disadvantages is a four-item scale. Concerns about the confidentiality of com-

Table 2. Factor solution for political participation

Item	Factor Loadings	
	Traditional Electoral Participation	E-Political Participation
How often vote in local elections	.91	
How often vote in state/national elections	.90	
Involvement in political process	.64	
E-contact with appointed public officials		.56
Used Internet for political information		.85
E-information about political candidate		.67
Used Internet to get news		.75
Responded to Internet petition		.58

Factor loadings less than .40 are omitted to ease interpretability.
Note: (n = 478)

puter systems (.73) were more indicative of negative attitudes about IT than the veracity of e-information item (.48). Lower values of this scale reflected a distrust of IT.

Two factored scales were extracted from the eight political participation items (Table 2). The Traditional Electoral Participation scale was constructed from three items. Voting in local and state elections had large factor loadings (.91 & .90, respectively), while involvement in the political process was less robust (.64). Higher scale values reflected more involvement in traditional political participation. The E-Political Participation scale was constructed of items that assessed the use of e-information for politics and news. Factor loadings ranged from .56 to .85. Higher scale values indicated more involvement in e-politics. Unless otherwise indicated, missing values were replaced through mean substitution. Replacing missing values with the mean of the non-missing responses did not change the mean value of the indexes constructed from these items; this preserves the desirable statistical property of unbiasedness.

Public IT access was formed as the mean of two items: public computer access and computer training. Higher values of this construct indicate respondents' greater support for public IT access and instruction. The mean was imputed if one item had a legitimate value. The E-elections construct measures interest in having elections held on the Internet. Higher values indicate more desire for e-electoral participation. The variables were transformed to verify that the model assumptions were met.

Research Questions

These variables were used to answer the following research questions:

1. How are demographic traits (age, education) and attitudes regarding tradi-

Table 3. Correlation matrix

	1	2	3	4	5	6	7	8
1. Age	--							
2. Education	-.27**	--						
3. IT advantages (factor score)	-.34**	.28**	--					
4. IT disadvantages (factor score)	-.34**	.17**	-.00	--				
5. Public IT access	-.31**	.24**	.26**	.12**	--			
6. Traditional electoral participation (factor score)	.36**	.15**	-.01	-.14**	-.01	--		
7. E-political participation (factor score)	-.42**	.41**	.40**	.28**	.20**	-.04	--	
8. E-elections	-.15**	.06	.23**	.21**	.19**	-.12*	.18**	--
Mean	2.13	3.81	.00	.00	3.29	.00	1.37	1.75
Standard Deviation	1.11	1.53	1.00	1.00	.53	1.00	.36	.22

** p < .05; ** p < .01.*
Note: (n = 468)

tional political participation, e-political participation, IT advantages, IT disadvantages, public IT access, and e-elections interrelated?

2. To what extent can the outcomes of support for traditional political participation, e-political participation, and e-elections be related causally to age, education, and attitudes regarding IT advantages, IT disadvantages, and public IT access?
3. What is the relative magnitude of direct and indirect components of the causal links among these variables?
4. How well do these results conform to the generational interpretation of differences in levels of use and support for IT?

RESULTS

Correlations

Pearson product-moment correlations among the variables examined in this study, together with descriptive statistics, are presented in Table 3. Correlations describe the strength and direction of the relationship between two variables, ~~which can range~~ from ~~0.0~~ to +1.0. ~~For instance,~~ there is a modest relationship between age and education (r = -.27). That is, older respondents have less education. Younger respondents reported more IT advantages (r = -.34) and fewer technological disadvantages (r = -.34). Younger people also were more likely to suggest that IT should be made available to the public (r = -.31). On the other hand, older people engaged in traditional electoral participation more often than did their younger counterparts

(r = .36) but were less inclined to engage in e-politics (r = -.42) or to support e-elections (r = -.15). Education had a positive relationship with IT advantages (r = .28) and IT disadvantages (r = .17). Education also increased support for public IT access (r = .24) and for both traditional political engagement (r = .15) and e-political participation (r = .41).

Those who saw more advantages to technology had more positive attitudes toward public access to IT (r = .26). Support for IT had a positive association with e-political participation (r = .40) and e-elections (r = .23). The desire for public IT access declined as the disadvantages became more pronounced (r = .12). Those who saw more IT disadvantages were more likely to favor traditional forms of politics (r = -.14). Perceiving fewer IT disadvantages was associated with higher levels of support for e-political participation (r = .28) and e-elections (r = .21). Favoring pubic IT access increased support for e-politics (r = .20) and e-elections (r = .19). As traditional electoral involvement increased, support for e-elections declined (r = -.12). E-politics and e-elections were positively correlated (r = .18).

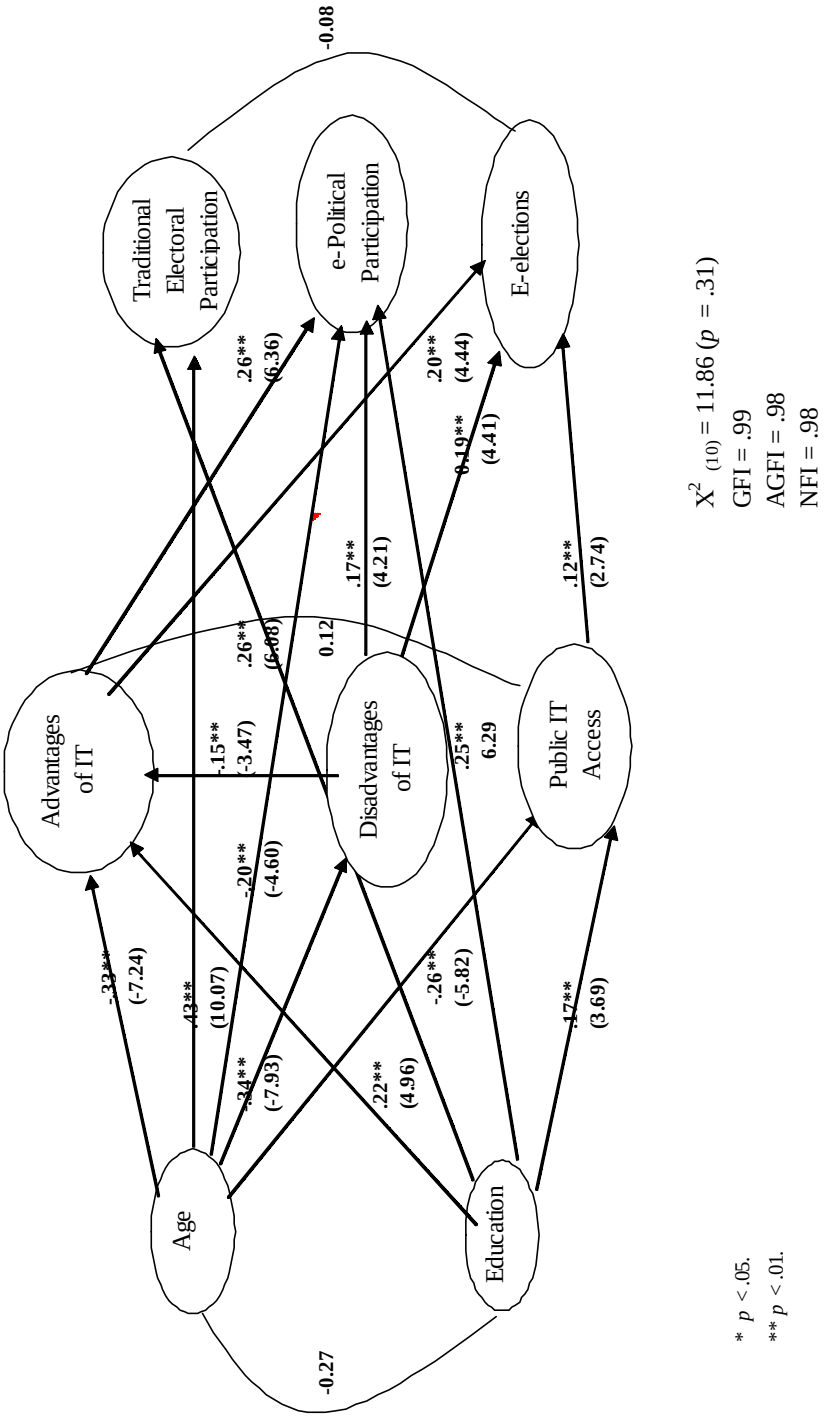
Structural Equation Model

Unlike the correlations discussed previously, structural equation modeling allows researchers to explore simultaneously the relationships between independent and dependent variables. Our model, using the maximum likelihood procedure, fit the data well (Figure 1). The chi-square test was not significant (χ^2 = 11.86; df = 10; p = .31), ~~meaning that the model fit the data well.~~ The Goodness of Fit Index (GFI) was .99, and the Adjusted Goodness of Fit Index (AGFI) was .98, while the Normed Fit Index (NFI) was .98 (Bentler & Bonett, 1980); values of each of these measures closer to 1.00 indicate~~d~~ a better fit of the model to the data. The values of the root mean square error of approximation (RMSEA = .02) and Akaike information criterion (AIC = 63.7) (Akaike, 1987) also confirm that the reduced model accurately reproduces the relationships among the variables contained in the model. With 18 cases per parameter, the estimates meet the usual criteria for being stable and reliable (Bollen, 1989).

Direct effects are displayed in Figure 1 by arrows that go directly from a predictor variable on the left to a dependent variable to its right, without passing through any other variable in between. In contrast, indirect effects are relationships between a left-hand-side predictor variable and a right-hand-side dependent variable that are mediated by passing through one or more other variables in between. Cross-multiplying the regression coefficients for any combination of paths that connect a predictor variable on the left with a dependent variable on the right and then summing these results determines the magnitude of indirect effects. The total effect of a predictor variable on a dependent variable is the sum of its direct and indirect effects.

There are statistically significant direct effects from age and education to dimensions of attitudes toward technology and political interest. As age declined, respondents reported more support for IT

Figure 1. Reduced model



(β = -.33) and fewer technological disadvantages (β = -.34). (The β coefficient ranges from 0.0 to 1.0. For instance, there is a fairly robust relationship between age and positive attitudes toward IT. Since the coefficient is negative, younger individuals valued IT more than their older counterparts di.) Younger persons showed more desire for public IT availability (β = -.26) and e-political participation (β = -.20). However, older-aged respondents had a pronounced preference for traditional electoral involvement (β = .43). Those with higher levels of education held more favorable views toward information technology (β = .22) and positive attitudes toward public IT access (β = .17). In addition, better-educated respondents were more active civically in both traditional (β = .26) and electronic forms of participation (β = .25).

Those who had a positive attitude toward information technology were aware of its less valuable dimensions (β = -.15). Direct effects also were found between the attitudes toward technology factors and citizenship activities. A positive attitude toward technology led to greater involvement in e-political participation (β = .26) and an interest in e-elections (β = .20). Individuals with less concern and fear about IT were more supportive of digital citizenship. They were more involved in e-politics (β = .17) and more likely to be proponents of e-elections (β = .19). Advocates of public IT access were more interested in e-electoral participation (β = .12).

The model displayed in Figure 1 demonstrates how some predictors may have an intervening effect on the outcome measure. Total effects are decomposed into direct and indirect effects in Table 4. Age has an indirect positive effect on IT advantages. Younger persons saw fewer IT disadvantages, while those who held positive views of IT also were capable of seeing its detrimental influences. This indirect effect (.05) accounted for 13% of the total effect. A statistically significant indirect effect (-.13) was found between age and e-political participation, accounting for 39% of the total effect. For the most part, the effect of age on e-politics was mediated through IT advantages. As age increased, IT advantages declined, while IT advantages had a positive impact on e-political participation. The indirect effect that passed through both the negative and positive aspects of IT played a less prominent role. In addition, education also indirectly increased support for e-politics (.06), accounting for 19% of the total effect. Higher levels of education led to stronger support for IT, which, in turn, led to a more positive attitude toward e-politics. Age decreased support for e-elections through several channels (-.16), including IT advantages, IT disadvantages, and public IT access; the effects were strongest through IT advantages and IT disadvantages. Education also had an indirect impact (.06) on e-elections through public IT access and IT advantages, but more so through the latter construct.

CONCLUSION

Generational differences are mirrored in orientations to technology and voting patterns, with younger cohorts favoring cyber involvement, while older citi-

Table 4. Decomposition of total effects for reduced model

Predictor Variable		Dependent Variable	Total Effect	Direct Effect	Indirect Effect	Standard Error	*t*-statistic	Direct Effect as % of Total Effect
Age	⇒	IT advantages	-.38	-.33	.05	.04	-7.24**	87%
Education	⇒	IT advantages	.22	.22		.03	4.96**	100%
Age	⇒	IT disadvantages	-.34	-.34		.04	-7.93**	100%
Age	⇒	Public IT access	-.26	-.26		.02	-5.82**	100%
Education	⇒	Public IT access	.17	.17		.02	3.69**	100%
IT disadvantages	⇒	IT advantages	-.15	-.15		.04	-3.47**	100%
Age	⇒	Electoral participation	.43	.43		.04	10.07**	100%
Education	⇒	Electoral participation	.26	.26		.03	6.08**	100%
Age	⇒	E-politics	-.33	-.20	-.13	.01	-4.60**	61%
Education	⇒	E-politics	.31	.25	.06	.01	6.29**	81%
IT advantages	⇒	E-politics	.26	.26		.01	6.36**	100%
IT advantages	⇒	E-elections	.20	.20		.01	4.44**	100%
IT disadvantages	⇒	E-politics	.21	.17	-.04	.01	4.21**	81%
IT disadvantages	⇒	E-elections	.22	.19	-.03	.01	4.41**	86%
Public IT Access	⇒	E-elections	.12	.12		.02	2.74**	100%
Age	⇒	E-elections	-.16		-.16	.00	-6.34**	0%
Education	⇒	E-elections	.06		.06	.00	4.17**	0%

Total Effect = Direct Effect + Indirect Effect
** $p \leq .05$ (i.e., $|t\text{-value}| \geq 1.96$); ** $p \leq .01$ (i.e., $|t\text{-value}| \geq 2.56$).*

zens prefer more traditional forms of citizenship. Successively, older cohorts are increasingly likely to hold pessimistic attitudes about IT, which short-circuits their participation and interest in e-politics. In addition, older respondents held less favorable attitudes toward IT access than did their younger counterparts. It may be that older respondents see fewer IT benefits in their own lives, and they may speculate, therefore, that other citizens are better off without technology, as well. Opting for digital citizenship decreases respondents' engagements in voting and the political process. There may be a tradeoff as younger people exchange community involvement for e-citizenry and invest less in their communities as a result.

Not surprisingly, education promotes IT literacy and extrinsic efficacy. Greater educational attainment has the ~~net~~ effect of stimulating support for technology and viewing public computer availability and Internet instruction favorably. Citizens' acquisitions of technological skills are consequential for the educated, which, in turn, leads respondents to endorse Internet-based elections. Education has a direct impact on citizens' empowerments and voices in technological and traditional electoral participation and an indirect influence through IT benefits.

Older citizens and the less educated may face unique challenges that influence their desire to become fluent with information technology. The process of becoming a digital citizen is influenced by technological attitudes that may widen the digital gap. By permitting some citizens to conduct their routine business with the government more easily, information technology appears to be widening the gap between the IT literate and those without basic navigational skills. As society becomes increasingly dependent on e-government, social barriers will be compounded if non-electronic voices are marginalized from political participation.

These findings provide evidence supporting the tenets of the Miller and Shanks (1996) thesis regarding age and political activity. The positive direct effect of age on electoral participation denotes that older respondents were more likely to say that they engage in traditional forms of politics and government. This relationship is enhanced by the negative direct effect between age and electronic forms of political participation; younger respondents clearly prefer this more contemporary and innovative mode of engagement vs. the preference among their elders for more traditional patterns of political involvement. Although the effect is entirely indirect, the negative relationship between age and e-elections similarly demonstrates the positive valence for newer electoral cohorts of with-it modes of casting votes that older cohorts may find to be inappropriate, insecure, or simply too new and untested.

It is unknown at this time if Miller and Shanks' (1996) previous findings are replicable. We believe that our extension of the Miller and Shanks (1996) model works better as an explanatory mechanism than as a tool for prediction. The explanatory nature of our findings is inherent both in limitations of the data and in the bounded rationality that is imposed by the lack of specific research-based knowledge about which variables determine outcomes in the rapidly evolving digital divide arena. It is simply too early to have a clear idea about what determines individual or group cyberpolitical outcomes.

This study is limited in that it is cross-sectional, although it does provide evidence of longer-term trends. Care must be taken in drawing conclusions about the processes at work, because the data do not allow clear evaluation of these mechanisms over time. The study's results are based on data collected in three states and ~~likely will not be generalized~~ to all regions in the U.S. Although the model may fit well and be defensible theoretically, it does not imply causality. Nonetheless, this study

suggests that e-government magnifies ~~social~~ divisions, as age dictates IT involvement and empowers younger IT-savvy citizens to shape contemporary and future policy. Future research may do well to investigate whether the evident effect of age on preferences for e-government will continue as generational cohorts age in place within the electorate. Life cycle patterns and the impacts of dramatic events, such as political bombshells or key technological innovations, certainly are expected to be important, and efforts to tease out the differential effects of age, period, and cohort should continue to provide a fertile source of future research as well as exciting opportunities to enhance knowledge in this rapidly evolving aspect of modern governance. Of particular relevance for the future research agenda is whether the digital divide will persist at about its current level, become more severe, or be reduced. It is evident that among the major driving forces influencing the consequences of the digital divide are generational and other societal differences that separate the electorate into technological haves and have-nots.

To the extent that IT literacy affects political participation, it is important to ascertain how meaningful that difference might be. Neither our findings nor other comparable research provides a direct answer yet to whether a higher level of IT literacy increases overall political participation or shifts the forms or quality of participation. In particular, it is crucial to understand to what extent, if at all, IT literacy affects the important dimensions of voting. It is unclear whether IT literacy benefits Republicans, Democrats, third parties, or independent candidates. It also is unclear whether IT literacy raises voting participation overall or in more specific ways (e.g., in national rather than state or local elections, or in elections with high-salience, hot-button issues rather than when only more mundane concerns are at issue).

Ultimately, a number of policy considerations are connected to what we know now and to what we will learn about the societal and political impacts of IT literacy. Whether IT literacy will — or should — be encouraged may depend in part on which political interests are perceived to benefit from expanded technological literacy as well as the limited budgets and the bounded rationality available to policymakers. Even if a clear consensus emerges among political elites to pursue policies that encourage substantially expanded IT literacy, there is no certainty that society will respond quickly, positively, or strongly to such initiatives. Engineering societal change is risky business, all the more so when generational differences in pre-existing levels of IT literacy mean that the targeted audience will be operating from multiple perspectives and with vastly different degrees of receptiveness. It will require a richly textured implementation to make such a policy innovation effective and lasting.

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