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The Use of Technology in Evaluation Practice

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Background: Evaluation practice is no longer limited to pencil and paper questionnaires, today technological advances allow evaluators to collect data with handheld devices, visualize information in interactive ways, and communicate instantaneously with stakeholders across the globe. These advances have changed how we conduct our practice and they will continue to redefine how we design our evaluations, interact with stakeholders, and communicate our findings. There are few published articles that examine the interface between evaluation and technology and this study represents an initial attempt at examining the technological tools that evaluators use in their practice, the reasons they are adopted, and future technological interest of practicing evaluators.

Purpose: This research on evaluation study attempts to (1) identify the types of technology tools evaluators use in their practice, (2) describe the factors that predict technology adoption, and (3) understand the tools that evaluators are interested in learning more about. This inquiry offers the evaluation community a broader perspective on the technologies that evaluators are implementing in their practice, offers insights on future technological trends within the field, and introduces the evaluation community to tools that can potentially enhance practice.

Setting: Virtual on-line community of evaluation practitioners.

Intervention: This was an exploratory research on evaluation study with no intervention.

Research Design: A panel of experts on technology and evaluation were recruited to brainstorm a comprehensive list of technologies that could be adopted by evaluators as part of their practice. The comprehensive list of technology tools was then embedded within a larger survey instrument that was distributed to a sample of evaluation practitioners from the American Evaluation Association. The survey asked evaluators to select the technology tools they have or currently use in their practice, how often each were used, their satisfaction with each tool, and why they were utilizing each tool in their practice.

Data Collection and Analysis: Data were collected through a web-based survey from members of the American Evaluation Association. The analysis utilized descriptive statics to represent trends in technology use and adoption. Multiple statistical comparisons using ANOVA were also utilized to examine the relationship between technological adoption and use and evaluator background characteristics. Open-ended responses in the survey were also presented as part of the analysis.

Findings: Analyses revealed that technological tools were adopted by evaluators because they helped to produce quality products, increased timeliness, reduced errors, and increased cost efficiencies, and the most adopted tools tended to aid in quantitative data analysis, project management, and productivity. Many evaluators expressed interest in learning more about the use of qualitative analysis tools, web-based data collection tools, and relational database creation and management.

Keywords: *technology adoption; technology use; research on evaluation*

Introduction

Evaluation practice is no longer limited to pencil and paper questionnaires, today technological advances allow evaluators to collect data with handheld devices, visualize information in interactive ways, and communicate instantaneously with stakeholders across the globe. These advances have changed how we conduct our practice and they will continue to redefine how we design our evaluations, interact with stakeholders, and communicate our findings. There are few published articles that examine the interface between evaluation and technology, and the handful of published cases show an increasing role for technology in evaluative inquiry (Galen & Grodzicki, 2011; Mulvey et al., 2005; Duncan et al., 2003), and an increased interest in the use of technology as part of the evaluative process (Love, 2001; Gay et al., 1999a; Bennington,1999).

According to Scriven (1991), technology is primarily focused on developing tools that improve material products or processes. He argues that civilization is possible without science but is not possible without technology (Scriven, 1991), and while certain technological innovations would not be possible without scientific discoveries, all current sciences are dependent on the technology of instruments. Technology, like evaluation, suffers as a discipline with boundaries that are often nebulous, yet it underlies many of the radical changes that transform entire areas of research, science, and evaluation.

Some of these transformations were documented by Gay and Bennington (1999b) editors of a *New Directions for Evaluation* volume dedicated to the "...proliferation of information technologies and computer mediated communication tools" and "the need to understand the use of technology in evaluation inquiry" (p. 1). This volume is largely a conceptual discourse on technology tools that enhance evaluative inquiry, case examples of evaluative approaches that incorporate innovative technologies, techniques to evaluating technologies, and ethical considerations when using technology tools for data collection. Gay and Bennington (1999b) argue that the abilities that technologies bestow change how evaluators design studies, implement methods, and understand and communicate data and information. As a simple illustration one can follow the development of visually-based data analysis software, such as SAS's JMP software, which allows users to interact with raw data at a visual level, offering evaluators and stakeholders the ability detect patterns in data that might otherwise be missed. Similar technologies such as geographic information systems (GIS) provide detailed geographic information that can be paired with program data, and thus allowing the evaluator to see the relationship between the environment in which a program is located and program outcomes. Remote-control data collection systems (i.e., clickers) help evaluators collect data from program participants (regardless of their literacy level) and allow access to a more representative sample. Given the large shifts that technology tools can create within an area, we need to understand what innovations evaluators are implementing in their practice and the factors that lead to their adoption.

Innovation adoption has predominately been measured by either counts of the number of innovations adopted or the amount of time to adopt (Wilson et al., 1999). A more recent approach conducts a preliminary study of a specific industry to identify a nearly exhaustive list of the possible innovations for that industry through the use of experts in the field. Using this customized inventory, a participant sample from that industry is surveyed to identify how many of the listed innovations have been adopted. This approach is labeled Multi-Attribute Measure of Innovation Adoption (MAMIA; Wilson et al., 1999) and it aims to capture two technological attributes, which are radical innovation and relative advantage (Rogers, 2003; Tornatsky & Klien, 1982; Wilson, 1999). Radicalness is the extent to which an innovation represents a departure from what an organization and its members have previously done and requires significant changes in behavior and a degree of new knowledge invested in a technology. Relative advantage is the extent to which an innovation is perceived as being better than the one that it supersedes, which can be expressed in terms of economic profitability, productivity, and reduced labor requirements. The radical innovation and relative advantage constructs provide insights into the motivations to adopt technological tools within the evaluation community and will be used in this study.

With these constructs in mind, this study attempts to (1) identify the types of technology tools evaluators use in their practice, (2) describe the factors that predict technology adoption, and (3) understand the tools that evaluators are interested in learning more about. This inquiry offers the evaluation community a broader perspective on the technologies that evaluators are implementing in their practice, offers insights on future technological trends within the field, and introduces the evaluation community to tools that can potentially enhance practice.

Methods

Using the MAMIA method, a panel of experts on technology and evaluation were recruited to brainstorm a comprehensive list of technologies that could be adopted by evaluators as part of their practice. The expert panel was comprised of seven people: one technology and evaluation scholar, four technology-based evaluation professionals, a Technology in Evaluation American Evaluation Association (AEA) Topical Interest Group (TIG) chair, and one technology consultant. Panel members were contacted via e-mail and asked to brainstorm a comprehensive list of technology tools individually. A preliminary list was formed, was resent to all panel members, and was continually updated until no further types of technology tools could be brainstormed.

Following the brainstorming process, panel members were then given a definition of radicalness and relative advantage and asked to rate each technology tool on the comprehensive list (using a scale ranging from 1 to 7) on each of the two constructs. If panel members were not familiar enough with a technology to provide a rating, they were asked to leave it blank. The scores from all seven panel members were used to calculate a mean score of radicalness and relative advantage for each technology tool. Many technology tools did not have ratings from all seven raters because not every panel member was familiar enough with each technology to rate it. Because the MAMIA calls for a minimum of five panel members, only those technology tools with at least five rating were included in the MAMIA analysis (Wilson et al., 1999).

The comprehensive list of technology tools was then embedded within a larger survey instrument that was distributed to a sample of evaluation practitioners. An e-mail invitation was sent to the e-mail addresses of AEA members with an invitation to take the online survey. Once AEA members received the e-mail inviting them to take part in the survey, they clicked on a link to take the survey online. Survey reminders were also sent several times after the original e-mails to solicit additional responses. The survey asked evaluators to select the technology tools they have or currently use in their practice, how often each were used, their satisfaction with each tool, and why they were utilizing each tool in their practice. They were also asked to indicate their interest in learning more about other technological tools related to evaluation practice, and were asked a battery of background questions such as level of education, evaluator role, and general methodological preferences.

Using data on the technology tools adopted by each evaluator from the survey, and the expert panels' scores of radicalness and relative advantage for each technology tool, a score for radicalness and relative advantage was calculated for each participant by summing the expert panel's mean score for each technology that was adopted by that participant. For example, assuming that Technology A receives a mean expert panel score for radicalness of 4, and a relative advantage score of 5, and Technology B receives a mean expert panel score of 1 for radicalness and 3 for relative advantage. For example, if participant #1 reports to have adopted both technology A and B then they receive a radicalness score of 5 = (4 + 1), and relative advantage Score of 8 = (5 + 3). If another participant (#2) reports to have adopted only Technology A then they receive a radicalness score of 4 and relative advantage Score of 5. Based on these scenarios, it could be argued that participant #1 is more innovative in terms of both radicalness and relative advantage than participant #2. At the end of the analysis individual tests of significance were conducted to assess which evaluator characteristics (e.g., years of evaluation experience, methodological approach, and education level) predict radicalness and relative advantage.

Qualitative Analysis

The survey also included open-ended questions asking evaluators to describe the reasons for adopting their technological tools. An inductive coding schema was used to analyze the qualitative open-ended survey data. In this design, no codes were created a priori but rather codes were constructed from the data to ensure results are grounded in the context. Once data were collected, they were analyzed to generate an initial list of codes. After the code categories were finalized, the data were reanalyzed to assign codes to cases. This approach is context-sensitive and allows the researcher to match observations to appropriate constructs (Glaser & Strauss, 1967; Miles & Huberman, 1994; Richards & Richards, 1995; Strauss, 1987; Thomas, 2006).

Results

Expert Panel

The expert panel brainstormed a total of 182 specific technology tools. The scores from all seven panel members were used to calculate a mean score of radicalness and relative advantage for each technology tool. Technology tools with fewer than five ratings were dropped from the MAMIA analysis. This resulted in 64 specific technologies with at least five ratings on both dimensions (see Table 1).

Table 1
Technology Tool for MAMIA Analysis

Technology Tool
Academic search engines
Google Scholar
ERIC
PsychINFO
LexisNexis
Accounting software
Quicken
Turbo Tax
Blogs/web-logging
PodCasts
Digital data collection devices
Digital still camera
Digital video cameras
Web cam
Digital voice recorder
Digital media players
Windows Media Player
Real Player
QuickTime
Electronic computing devices
Desktop computer
Laptop computer
Personal Digital Assistant/ Pocket PC
Tablet PCs
Electronic forums/groups
Yahoo groups
Google groups
EVALTALK
Email clients
Microsoft Outlook
Gmail
Employment sites
Monster.com
Craigslist.org
Careerbuilder.com
Hotjobs.com
Eval.org
Geo-location solutions
Google Earth
Yahoo Messenger
Geo-location solutions
Google Earth
Yahoo Messenger
Google talk
Mobile phone devices
Cell phone
Blackberry
Online encyclopedias
Wikipedia
Encyclopedia.com
Online media hosting sites
Youtube.com
iTunes.com
Google Video
Online social networking sites
MySpace.com
Personal productivity software
Microsoft Word
Microsoft Excel
Microsoft Power Point
Adobe Acrobat
Microsoft Project
Potable media devices
iPod
Quantitative software
SPSS
Search engines
Google.com
yahoo.com
msn.com
ask.com
Yahoo! Search
Excite
Survey development tools
SurveyMonkey
Google document
Web browsers
Internet Explorer
Netscape Communicator
Mozilla Firefox

Table 1 continued

Technology Tool	
Google talk	*Web development tools*
Web mapping tools	Adobe Flash
Google Maps	
Mapquest	
Yahoo! Maps	

Evaluator Survey

A survey invitation was sent to 4,205 members of the AEA evaluator directory in September of 2009. Of the e-mail invitations sent, 1,757 (42%) bounced back due to bad, or non-current addresses, or spam filters, which resulted in 2,448 potential contacts (58%). Of the 2,448 potential contacts, 783 (32%) opened the e-mail, 723 (30%) clicked on the link, 7 respondents did not qualify to take the survey due to lack of evaluation experience, and 341 only partially completed the survey (14%). This resulted in 375 completes (15% of potential contacts, and 9% of the total sample). It is recognized that this might not be a representative sample due to the relatively small response rate but it does yield some interesting findings on technology adoption and use in the evaluation community. This study is exploratory in nature, and aims to establish a baseline for technology adoption in the evaluation field, with subsequent surveys conducted every four to five years to track changes in technology integration and use. Overall, the sample is gender balanced, older, experienced in evaluation work, and highly educated (see Table 2, columns 1 & 2).

Research Question 1: What technology tools are evaluators using in their practice? Respondents' total number of technology tool adopted as part of their evaluation practice ranged from 0 to 51 (M = 14.7, SD = 9.0, N = 375) (see Table 2, column 3). Individual tests of significance were conducted to assess the relationship between evaluator characteristic variables and technology tools adopted; in doing so alpha was adjusted for multiple comparisons using the Bonferroni correction. Results indicated that evaluator role showed significant differences in the number of technology tools adopted (F (2, 369) = 8.77, p < .01). Tukey post-hoc comparisons showed that those who work as external evaluators adopted significantly more technologies than internal evaluators (p < .001), and mixed role evaluators adopted significantly more technologies than internal evaluators (p = .041) (see Table 2, columns 2 & 3).

Table 2
Background Description of Responding Evaluators and Average Technology Tool Adoption

	1 *N*	2 Percent of Total	*3* *M*	*4* *SD*
Overall	375	100	14.7	9.0
Gender				
Male	153	40.8	14.2[a]	9.4
Female	222	59.2	15.1[a]	8.7
Years of Evaluation Experience				
Up to 5 Years	67	17.9	13.9[a]	8.8
6 to 10 Years	96	25.6	14.8[a]	8.4
11 to 15	59	15.7	13.2[a]	8.1
More than 15 Years	153	40.8	15.6[a]	9.7
Employed in Education Sector				
Yes	235	62.7	15.7[a]	9.6
No	140	37.3	13.2[a]	7.6

Table 2 continued

	1	2	3	4
	N	Percent of Total	*M*	*SD*
Employed in Social Service Sector				
Yes	226	60.3	15.4[a]	8.8
No	149	39.7	13.8[a]	9.2
Employed in Healthcare Sector				
Yes	123	32.8	15.4[a]	9.1
No	252	67.2	14.4[a]	8.9
Employed in Private Sector				
Yes	45	12.0	17.1[a]	10.9
No	330	88.0	14.4[a]	8.7
Highest Obtained Degree				
Bachelors	14	3.7	12.1[a]	6.8
Masters	134	35.7	15.0[a]	8.0
Doctorate	226	60.3	14.7[a]	9.6
Evaluator Role				
Internal Evaluator	77	20.5	11.2[a]	6.6
External Evaluator	202	53.9	16.2[b]	9.2
Mixed Internal/External	94	25.1	14.5[b]	9.4
General Methodological Approach				
Quantitative	58	15.5	14.7[a]	8.0
Qualitative	29	7.7	13.9[a]	10.0
Mixed Methods	288	76.8	14.8[a]	9.1

Note. $n = 375$; ANOVA and Tukey post-hoc comparisons. *a* & *b*: Groups under the same sub-heading that do not share super-scripts differ at familywise $p < .05$; alpha adjusted for multiple comparisons using the Bonferroni correction.

Technology Adoption

Adoption rates by types of technology tools show that quantitative software and personal productivity software are the most prevalent types of technologies that evaluators adopt as part of their practice, each with 86% adoption rates (see Figure 1). These are followed by electronic computing devices (75%), e-mail clients (70%), internet search engines (68%), survey development tools (67%), web browsers (66%), academic search engines (65%), relational database management systems (58%), and digital data collection tools (51%).

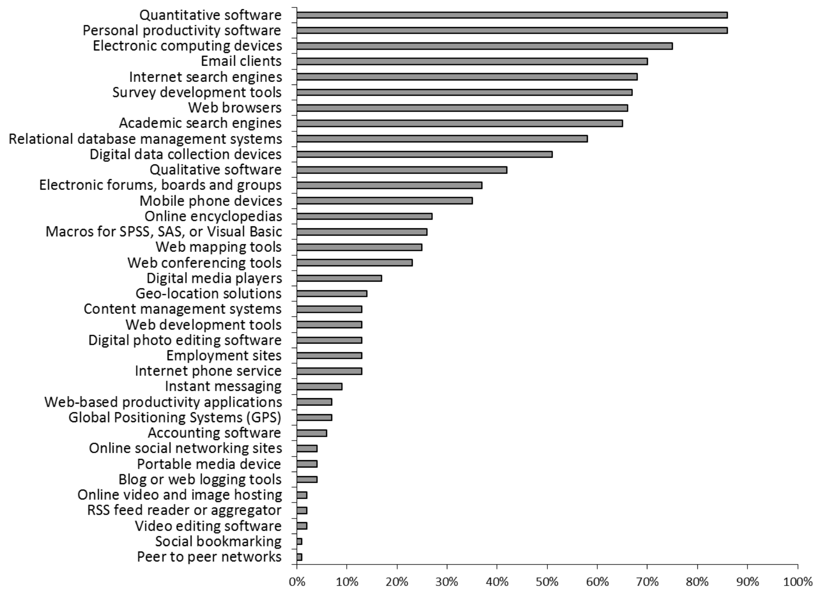

Figure 1. Adoption Rates of Major Types of Technologies

More specifically, adoption rates for specific technology tools range from 83% to 0%. Those used by at least 10% of the respondents are shown in Figure 2. The statistical analysis package SPSS had the highest adoption rate among evaluators (83%), followed by Microsoft Word (82%), Excel (81%), PowerPoint (70%), Adobe Acrobat (57%), Google.com (49%), and Microsoft Outlook (49%).

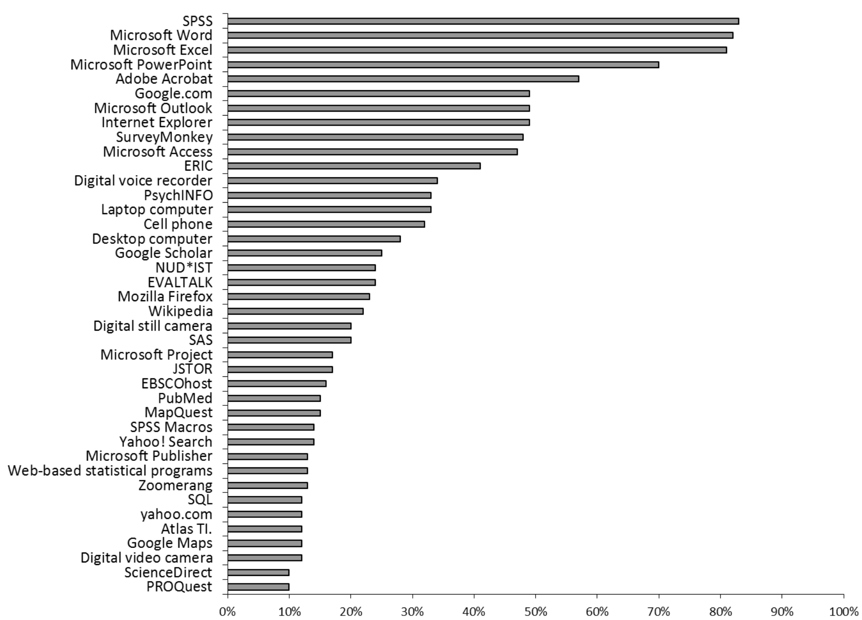

Figure 2. Adoption Rates of Specific Technology Tools

Technology tools with adoption rates greater than 10% were investigated by employment sector to understand if adoption of certain technologies varied across these sectors. Cross tabulations were tested with Pearson's Chi-Square (with Bonferroni correction to control for inflated alpha error in doing multiple comparisons) to understand if the adoption of specific technology tools (Yes/No) was independent whether the evaluator is employed in each specific sector (Yes/No) (see Table 3). Evaluators employed in education were more likely to use ERIC and less likely to use PubMed compared to those who do not work in education. Evaluators employed in social service adopted Access more than those who were not employed in the social service sector. Evaluators employed in healthcare adopted PubMed more than those who are not employed in the healthcare sector. No significant differences were observed on adoption of tools by those employed in the private sector. These findings show how evaluators in different sectors employ technologies specific to their sector to meet their evaluation needs. These patterns may occur because evaluators within certain sectors in evaluation are adopting technologies that are more specific to that particular sub-field or discipline. For example, one would expect to see those in education adopting ERIC more readily than those not employed in education, and one would expect to see evaluators employed in healthcare more likely using PubMed than evaluators not employed in healthcare.

Table 3
Percentage of Evaluators Who Use Mainstream Technology Tools by Employment Sector

	Technology Tool	Employed in Education		Employed in Social Service		Employed in Healthcare	
		Yes (*N* = 125)	No (*N* = 140)	Yes (*N* = 226)	No (*N* = 149)	Yes (*N* = 123)	No (*N* = 252)
Basic communication tools for evaluators							
	Laptop computer	.36	.27	.32	.33	.28	.35
	Cell phone	.35	.25	.32	.31	.25	.35
	Desktop computer	.31	.23	.28	.28	.26	.29
	EVALTALK	.28	.16	.27	.17	.24	.23
Analytical tools for evaluators							
	PsychINFO	.34	.31	.36	.28	.37	.31
	JSTOR	.17	.15	.18	.15	.16	.17
	Google Scholar	.27	.21	.22	.29	.25	.25
	EBSCOhost	.17	.16	.16	.16	.20	.15
	ScienceDirect	.07	.16	.12	.09	.15	.08
	PubMed	.09*	.25*	.16	.14	.28*	.09*
	PROQuest	.11	.09	.09	.11	.09	.11
	ERIC	.50*	.25*	.47	.32	.40	.41
	Atlas TI.	.11	.13	.12	.12	.12	.12
	SPSS	.86	.75	.86	.76	.85	.81
	SAS	.18	.24	.21	.19	.24	.18
	Web-based statistical programs	.15	.09	.12	.13	.17	.11
	Zoomerang	.13	.12	.12	.13	.11	.14
Productivity tools for evaluators							
	Microsoft Word	.82	.81	.83	.80	.82	.81
	Microsoft Excel	.81	.78	.79	.81	.81	.79
	Microsoft PowerPoint	.68	.72	.74	.63	.74	.63
	Adobe Acrobat	.59	.54	.59	.53	.62	.54
	Internet Explorer	.46	.53	.54	.42	.46	.50
	Microsoft Outlook	.47	.51	.50	.47	.50	.48
	Microsoft Access	.43	.53	.54*	.36*	.52	.44
	Google.com	.51	.45	.52	.44	.52	.47
Data collection tools for evaluators							
	Digital still camera	.23	.16	.22	.18	.24	.19
	Digital video camera	.15	.06	.12	.11	.11	.12
	Digital voice recorder	.39	.26	.32	.37	.33	.35
	yahoo.com	.13	.11	.13	.10	.11	.12
	Yahoo! Search	.16	.10	.16	.11	.16	.13
	Wikipedia	.23	.19	.23	.18	.27	.19

Table 3 continued

Technology Tool	Employed in Education		Employed in Social Service		Employed in Healthcare	
	Yes (*N* = 125)	No (*N* = 140)	Yes (*N* = 226)	No (*N* = 149)	Yes (*N* = 123)	No (*N* = 252)
Microsoft Project	.18	.14	.20	.12	.20	.15
Google Maps	.14	.06	.11	.13	.09	.13
SQL	.12	.12	.15	.09	.11	.13
MapQuest	.18	.09	.16	.13	.11	.17
Microsoft Publisher	.14	.11	.16	.08	.19	.10
NUD*IST	.23	.26	.24	.24	.24	.24
Mozilla Firefox	.24	.21	.25	.20	.19	.25
SurveyMonkey	.47	.48	.48	.46	.45	.49
SPSS macros	.16	.10	.15	.13	.17	.12

A total score for radicalness and relative advantage was calculated for each evaluator by summing the panel's mean rating for each technology that was adopted by that evaluator. Respondents' scores for radicalness ranged from 0 to 122.6 (M = 39.0, SD = 23.4, N = 375). Respondents' scores for relative advantage ranged from 0 to 190.2 (M = 61.7, SD = 36.3, N = 375). Evaluators' scores for radicalness and relative advantage are very strongly correlated (r = .99, p < .001, N = 375); this essentially indicates that each measure is measuring the same construct. Evaluator's scores for radicalness and number of technologies adopted are also very strongly correlated (r = .95, p < .001, N = 375), in addition to evaluator's scores for relative advantage and number of technologies adopted (r = .95, p < .001, N = 375). Evaluator scores for radicalness and relative advantage are confounded by the number of technologies that each evaluator adopted, because these scores were summed across each technology that was adopted. Therefore, instead of using the total radicalness and relative advantage scores that the MAMIA calls for, the average radicalness and relative advantage scores will be investigated.

The average score for radicalness and relative advantage was calculated for each evaluator by averaging the panel's mean rating for each technology that was adopted by that evaluator. Respondents' scores for mean radicalness ranged from 0 to 4.17 (M = 2.65, SD = .66, N = 375). Respondents' scores for mean relative advantage ranged from 0 to 6.33 (M = 4.23, SD = 1.04, N = 375). Both of these distributions were negatively skewed due to six low values which were Widsorized; after this procedure respondents' scores for mean radicalness ranged from .83 to 4.17 (M = 2.66, SD = .61, N = 375), and respondents' scores for mean relative advantage ranged from 1.27 to 6.33 (M = 4.25, SD = .97, N = 375). The average radicalness and relative advantage scores were also strongly correlated (r = .98, p < .001, N = 375). As was observed for summed scores, the average radicalness and relative advantage scores are so highly correlated that they are essentially measuring the same thing. Individual tests of significance were conducted to assess the relationship between each of the predictor variables and average radicalness and average relative advantage scores; like the previous set of significance tests alpha was adjusted for multiple comparisons using the Bonferroni correction (see Table 4). The analysis revealed that those employed in healthcare had significantly lower average radicalness scores (F (1, 370) = 12.83, p < .001, d = .40), and lower mean relative advantage scores (F (1, 370) = 10.93, p = .001, d = .37) than those evaluators who did not work in healthcare.

Table 4
Mean Radicalness and Relative Advantage Scores by Evaluator Characteristics

	Radicalness Score			*Relative Advantage Score*		
	M	*SD*	*N*	*M*	*SD*	*N*
Overall	2.66	.61	375	4.24	0.97	375
Years of Evaluation Experience						
0 to 5 Years	2.75[a]	.69	66	4.35[a]	1.07	66
6 to 10 Years	2.70[a]	.58	95	4.29[a]	0.89	95
11 to 15 Years	2.58[a]	.69	59	4.10[a]	1.13	59
More than 15 Years	2.64[a]	.56	152	4.23[a]	0.90	152
Gender						
Male	2.60[a]	.69	152	4.16[a]	1.11	152
Female	2.70[a]	.55	220	4.31[a]	0.86	220
Employed in Education						
Yes	2.71[a]	.61	232	4.31[a]	0.97	232
No	2.59[a]	.60	140	4.14[a]	0.96	140
Employed in Social Service						
Yes	2.64[a]	.59	224	4.22[a]	0.93	224
No	2.69[a]	.65	148	4.29[a]	1.02	148
Employed in Healthcare						
Yes	2.50[a]	.62	123	4.01[a]	0.99	123
No	2.74[b]	.59	249	4.36[b]	0.94	249
Employed in Private Sector						
Yes	2.56[a]	.58	43	4.08[a]	0.91	43
No	2.68[a]	.62	329	4.27[a]	0.98	329
Highest Obtained Degree						
Bachelors	2.72[a]	.48	14	4.38[a]	0.75	14
Masters	2.73[a]	.59	133	4.36[a]	0.93	133
Doctorate	2.61[a]	.63	225	4.18[a]	1.00	225
Evaluator Role						
Internal evaluator	2.64[a]	.66	76	4.22[a]	1.06	76
External evaluator	2.72[a]	.57	202	4.33[a]	0.91	202
Mixed Internal External	2.56[a]	.65	94	4.10[a]	1.02	94
General Methodological Approach						
Quantitative	2.46[a]	.65	58	3.92[a]	1.05	58
Qualitative	2.73[a]	.59	29	4.40[a]	0.92	29
Mixed Methods	2.70[a]	.60	285	4.30[a]	0.95	285

Note. a & *b*: Groups under the same sub-heading that do not share super-scripts differ at familywise $p < .05$; alpha adjusted for multiple comparisons using Bonferroni correction. Radicalness and Relative Advantage scales are 1 to 7, where 1=least radical/relatively advantageous, and 7=most radical/relatively advantageous.

Research Question 2: What factors explain technology tool adoption in evaluation practice? Exploratory factor analysis was used to identify factors that explain patterns of interest in technology tools. Evaluators were asked to rate their level of interest in learning about different technology tools using a five-point scale for 36 types of technology tools. All 36 types of technology tools were included in the factor analysis. Principal axis factoring was chosen as the type of factor extraction and oblimin factor rotation was used. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was .97, indicating a factor analysis could be useful with the data. Initially, all 36 variables were entered into the factor analysis and the most suitable numbers of factors was determined by investigating eigenvalues and the scree plot. Four factors had eigenvalues greater than one; however, based on the scree plot and interpretability a three-factor solution was chosen as most appropriate. The first three factors accounted for 49.1%, 6.6%, and 3.9% of the variance in the 36 variables, respectively, and the fourth factor accounted for only 3.1% more variance. The scree plot showed a strong general factor and a flattening after the third factor. In the initial extraction, three factors explained 59.6% of the total variance.

After the oblique rotation the three factors accounted for 43.8%, 19.4%, and 30.8% of the variance in the 36 variables, respectively. Note that the proportions cannot be added because the factors are not orthogonal. The variables that loaded highest on Factor One were social bookmarking, blogging, online media hosting, portable media devices, video editing software, peer-to-peer networks, online social networking, and RSS feeds. The tools that load high on Factor One all involve some facet of web applications; therefore, the proposed name for factor one is web applications for evaluators. The technology tools that load highest on Factor Two are personal productivity software, search engines, web browsers, and e-mail clients; therefore Factor Two was named productivity tools for evaluators. Finally, the variables that load heaviest on Factor Three are relational database management systems, qualitative software, macros for SPSS and SAS, academic search engines, and survey development tools. Factor Three was labeled analytical tools for evaluators. Therefore three factors account for evaluators' interest in learning about types of technology tools for their practice: web applications, productivity tools, and analytical tools for evaluators. Factor One and Three (web-based applications and analytical tools) are the most strongly correlated (r = .61). The factor analysis was used to categorize each tool and to organize the results of subsequent analysis.

For each technology tool that evaluators reported using as part of their evaluation practice, respondents were asked to describe the primary reason why they incorporated the technology into their evaluation practice; this survey item was open-ended. These qualitative data were coded and analyzed; one code was applied to each response to capture the primary reason. Seven codes (or reasons for adoption) emerged from the qualitative analysis, which included: relevance, quality, time, communication, prevent error or misuse, required by someone other than the evaluator, and cost.

Table 5 shows the relationships between the various qualitative reasons for technology adoption and the actual technological tools as categorized by the factor analysis. The four technology tools that showed the highest frequencies for each reason were investigated. Microsoft Word, Excel, PROQuest and SAS were the tools most often employed because of relevance. SAS, EVALTALK, Microsoft Publisher, and EBSCOhost were tools most often cited for being used because of quality. Yahoo! Search, MapQuest, Google.com and Wikipedia were the tools most often cited for time efficiency. Cell phone, Microsoft Outlook, PowerPoint, and the digital still camera were most often employed for communication. The digital voice recorder, MapQuest, Adobe Acrobat, and Google Maps were the technologies most often cited for being used to prevent error or misuse. Microsoft PowerPoint, SQL , Microsoft Project, and the desktop computer were most often used because it was required by someone else or someone other than the evaluator. Finally, SurveyMonkey, Zoomerang, Web-based statistical programs, and yahoo.com were most often cited as being used because they were cost efficient solutions. Identifying the reasons why evaluators employ specific technologies can improve our understanding of the roles that technology plays in evaluation practice.

Table 5
Percentage of Evaluators Who Use Mainstream Technology Tools by Reason for Adoption

Technology Tool	Relevance	Quality	Time	Communication	Prevent Error/ Misuse	Required by someone other than evaluator	Cost
Factor One: Basic computing for evaluators							
Laptop computer	.32	.16	.30	.13	.02	.05	.01
Cell phone	.04	.00	.12	.81	.01	.00	.02
Desktop computer	.29	.17	.20	.11	.03	.18	.03
EVALTALK	.11	.46	.12	.28	.02	.01	.00

Table 5 continued

Technology Tool	Relevance	Quality	Time	Communication	Prevent Error/ Misuse	Required by someone other than evaluator	Cost
Factor Two: Analytical tools for evaluators							
PsychINFO	.29	.40	.21	.02	.03	.03	.01
JSTOR	.29	.32	.32	.00	.05	.00	.02
Google Scholar	.24	.33	.37	.01	.01	.01	.02
EBSCOhost	.31	.42	.20	.03	.00	.03	.00
ScienceDirect	.29	.34	.29	.03	.00	.05	.00
PubMed	.28	.35	.28	.02	.02	.06	.00
PROQuest	.34	.31	.31	.00	.00	.03	.00
ERIC	.32	.37	.22	.01	.02	.05	.02
Atlas TI.	.24	.40	.17	.07	.07	.05	.00
SPSS	.26	.27	.16	.02	.17	.11	.01
SAS	.33	.50	.13	.03	.09	.17	.00
Web-based statistical programs	.10	.30	.38	.03	.08	.08	.05
Zoomerang	.23	.16	.34	.09	.02	.05	.11
Factor Three: Productivity tools for evaluators							
Microsoft Word	.40	.06	.09	.33	.00	.11	.01
Microsoft Excel	.35	.12	.18	.17	.10	.06	.02
Microsoft PowerPoint	.14	.05	.03	.72	.00	.40	.01
Adobe Acrobat	.21	.11	.02	.34	.27	.05	.00
Internet Explorer	.29	.15	.22	.20	.01	.11	.02
Microsoft Outlook	.12	.01	.08	.73	.01	.04	.01
Microsoft Access	.27	.23	.15	.04	.12	.16	.02
Google.com	.31	.15	.45	.03	.02	.01	.02
Factor Four: Data collection tools for evaluators							
Digital still camera	.11	.40	.03	.36	.01	.08	.00
Digital video camera	.10	.38	.00	.28	.08	.18	.00
Digital voice recorder	.06	.28	.06	.08	.46	.06	.00
yahoo.com	.25	.13	.38	.15	.05	.00	.05
Yahoo! Search	.26	.19	.51	.00	.05	.00	.00
Wikipedia	.29	.16	.45	.08	.00	.01	.01
Microsoft Project	.14	.00	.11	.23	.11	.19	.00
Google Maps	.20	.13	.38	.10	.20	.00	.00
SQL	.31	.26	.12	.05	.02	.24	.00
MapQuest	.13	.02	.48	.06	.28	.00	.04
Microsoft Publisher	.10	.46	.05	.34	.00	.05	.00
NUD*IST	.24	.36	.17	.07	.07	.10	.00
Mozilla Firefox	.31	.21	.20	.18	.06	.01	.03
SurveyMonkey	.15	.07	.34	.14	.03	.06	.21
SPSS macros	.29	.29	.18	.02	.16	.04	.02
Mean	.23	.23	.22	.16	.07	.06	.12

Research Question 3: What technology tools have potential for the future? Individual tests of significance were conducted to assess the relationship between each of the predictor variables and mean interest in an evaluation-specific online database that could be used to search for academic journals, scholarly articles, and reports related to evaluation. No significant differences on evaluator characteristics were found (after adjusting alpha for multiple comparisons using the Bonferroni correction). Although no evaluator differences were observed, still over half of practicing evaluators report being definitely interested in using an evaluation-specific online database. Of those expressing at least some interest in learning more about technology tools (N = 351), 25% are definitely interested in learning about survey development tools, 21% for relational database management systems, and qualitative software. Two in ten are definitely interested in learning more about quantitative software, 16% academic search engines, 14% Macros and web conferencing tools, 13% geo-location solution such as GIS, 11% in electronic forums, 10% in content management systems, and 10% in blogging tools (see Figure 3).

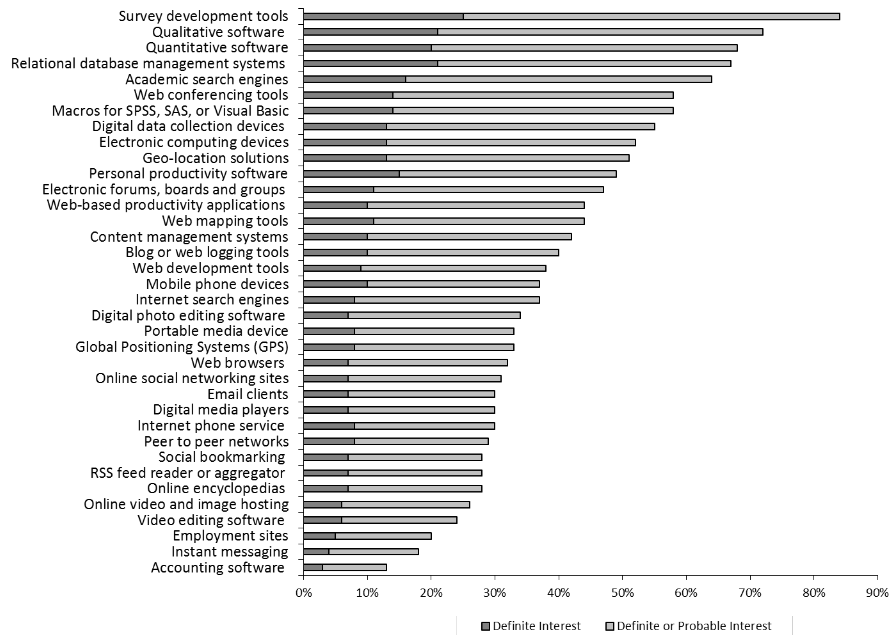

Figure 3. Percentage of Evaluators Expressing Interest in Types of Technology Tools (*N* = 351)

Discussion

Technological developments are constantly changing how we conduct our practice. This study sought to attain a snapshot of the technological tools that evaluators have adopted in their practice and the overall utility of current tools and interest in new tools. Findings from this study suggested that technology was considered useful if it produced quality products, enhanced communication, was quick/timely, and reduced costs. Analytical tools that helped evaluators collect, manage, and analyze data efficiently (e.g., survey development tools, and relational databases) were often cited as the most useful. For example, on-line surveys help evaluators gain more accurate data (i.e., quality), in a quick manner (i.e., timely) at a relatively low cost (expense reduction). According to Ritter and Sue, editors of a *New Directions for Evaluation* volume on using online surveys in evaluation, "It is now feasible for researchers to conceive an evaluation, create a questionnaire, field an online survey, and analyze and present data all in a matter of days. The ease and speed with which online survey data can be collected and processed has untold implications for all aspects of evaluation" (2007, p. 1). As such, evaluators' interest is highest for learning more about online survey development tools like SurveyMonkey, Zoomerang, and Questionpro. This is an area evaluators should expect to see growth in their development and adoption rates.

Relational databases were also frequently cited tools of interest. These databases allow evaluators to quickly attain needed data through on-line access (i.e., ease), help organizations store and use data (i.e., communication), and reduce redundancy (i.e., time) by connecting databases together. Such database systems, when established, dramatically enhance the efficiency of the evaluation process and provide information to quickly meet stakeholder needs.

Evaluators were also interested in learning more about qualitative software and how it can be used in their work. There was a noteworthy gap between qualitative software adoption rates (42%) and qualitative software interest rates (68%) which implies that there is interest but not as much use of this software. Many factors could help explain this gap, for example the qualitative software packages are expensive and require a significant learning curve. It may also be the case that those using qualitative data may prefer to utilize non-software based analysis techniques to interpret the qualitative data. This strong interest in qualitative software should be addressed with workshops or demonstrations to increase evaluators' understanding of the strengths and limitations of such analysis tools.

Most evaluators (80%) were also interested in an evaluation-specific resource database that contains evaluation information on methods, tools, instruments, research, and theories. At the time this survey was administered such a database did not exist, however in 2010 AEA created an evaluation library containing many of the requested resources. The development of this tool provides a central space for all evaluation-related materials to be accessed, offers a gateway for the development of future tools of this type, and appears to fill a need for the evaluation community.

Many of the technological tools that were actually adopted by evaluators focused on quantitative data analysis (e.g., SPSS, SAS), and personal productivity tools (i.e., Excel, Word). These tools appear to be the most commonly utilized tools in the field along with internet based communication tools such as outlook e-mail software. However, few of these technologies would be considered evaluation-specific tools. Largely, the technology tools identified in this study are tools that were developed for and by other fields and adapted for use in evaluation practice. This trend will continue into the future, and as new innovations develop in different areas they will begin to filter into the evaluation community. For example, the development of paper-thin displays may one day change how data is collected from stakeholders by passing out electronic papers for them to complete surveys or to write or even draw figures representing different constructs. The ongoing development of data visualization and interaction could transform how we "delve" into data and communicate with stakeholders. These concepts may become common practice in the evaluation field and again transform how we conduct our practice.

This study, or a study of its type could be replicated and the findings analyzed across multiple time points to learn more about how technology adoption changes as a function of time, as the field evolves, grows, and as new technologies emerge. Future research should track technologies that this study identified as low-adoption tools and identify which technologies make the largest gains and largest drops in the future. Future research could also investigate the relationship between sector of employment and technology adoption, specifically addressing whether those evaluators in non-profit, social service, and governmental sectors show significant differences in perceptions and adoption of technology compared to their private sector counterparts. Future research could examine technology adoption within evaluation from a qualitative framework to identify barriers and motivators for adoption within particular contexts. A qualitative approach would provide insight to why evaluators choose to employ various technologies in their practice, as well as identify factors underlying evaluators' decision-making related to technology use.

Fetterman concluded, "the irony in sharing information about current web-based tools is that they remain current for about a nanosecond and thus the reason why discussions about technology tools or webs of meaning must be revisited" (2002, p. 36). For example, when this study was conducted Facebook (a social networking site) and Twitter (a micro-blogging site) were just emerging. These sites may have a large impact on the evaluation community because of their widespread adoption. It may help evaluators keep track of program clients (for longitudinal surveys), it may provide valuable qualitative information about participants and how they have changed due to a particular program intervention, or it may be used to understand how collations are developing or evolving. These are potential uses that are unknown at this point and additional work is needed to track such trends within the evaluation community. This study could be viewed as an initial baseline measure that aims to capture a snapshot of what technological tools evaluators are using in the field, and use this information to track how new developments have impact the field. Constant vigilance about emerging technological trends is needed to understand their implications for evaluation practice. The field needs to be aware of which technological elements remain at the core of evaluation practice, which technological tools improve the quality of work, and which technological innovations will completely change the field. These are the questions that can only be answered by examining our field's technological trends longitudinally, and this study represents the first data point on that continuum.

Limitations

The MIAMA method was used because it was purported to be a multi-dimensional measure of technology adoption, not just a unidimensional measure like the total number of technologies that one might adopt. However, when the scores for radicalness and relative advantage were calculated according to the MAMIA, both dimensions were heavily confounded by the number of technology tools that evaluators adopted. So although the

MAMIA set out to operationalize innovation as multi-dimensional construct, it was not a successful multi-dimensional measure when applied to the field of Evaluation. Not only was the MAMIA not a multi-dimensional measure of innovation, but the two attributes thought to represent innovativeness were each measuring the same thing. In an effort to adhere to the MAMIA, both the radicalness and relative advantage dimensions have been presented in this paper; however, because both dimensions were measuring the same thing and relative advantage could have been dropped from subsequent analysis.

The online survey methodology used to collect data for this study may have precluded non-technology engagers. Future research should cast a larger net of practicing evaluators, including those that may not have e-mail access. Of the 4,205 e-mail messages in the sample, 1,757 (42%) were non-deliverable because the addresses were no longer current, evaluators had left their position, or the messages were unable to get through some organizations' spam filters.

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