Who Are They and Why Don't They Finish?: Answering Drop-outs

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Abstract

Web-based online surveys are now a well-recognized method of gathering data. Their use allows tracking of a particular kind of non-respondent – the answering dropout, who begins answering questions but drops out before completing the survey. Converting this group into completers may be a relatively easy way to increase response rates. In order to do so, the factors relating to their dropout must be understood. This study examines responses to surveys to determine which survey and respondent factors may be related to dropping out of surveys. Survey responses from ten surveys (eight for instructors and two for students) administered in the Cisco Networking Academy Program were analyzed. For each survey, number of questions, number of pages, median time to complete, number of each type of questions, number of topics covered, and translation were coded. For each respondent survey completion status, country, computer infrastructure, and education level were coded. Visual analysis of graphical patterns suggests rules of thumb to help reduce rates of answering dropouts.

Who Are They and Why Don't They Finish?: Answering Drop-outs

Web-based online surveys are now a well-recognized method of gathering data, holding the promise of gathering data quickly and inexpensively from large samples (Crawford, McCabe, & Pope, 2005). As with other survey methods, the issue of nonresponse is a commonly researched topic (Cook et al, 2000; see also http://www.websm.org). Much of the literature in this area deals with comparisons of response rates for web-based versus telephone and paper and pencil surveys (e.g., Couper, Blair, & Triplett, 1999; Sax, Gilmartin, & Bryant, 2003; Velez, Buletti, & Volz, 2004) and factors leading to low response rates (Cook et al, 2000). Many of these focus on response rate as the percentage of respondents among the target population who complete the survey (Cook et al, 2000; Couper, Blair, & Triplett, 1999). However, web survey responses can be broken down into distinct stages, and several outcome rates defined (Bosnjak & Tutan, 2001; Vehovar, Batagelj, Lozar, & Zaletel, 2002). One of these is the rate of answering drop-outs (also called drop-offs, incompletes, terminations, and partial nonresponse[1]), or the respondents who begin answering questions, but drop out before finishing the survey.

Research on survey dropouts in other surveys modes

Data has long been gathered about face to face interviews, telephone interviews, and paper and pencil surveys, each of which has issues of incompletion to a greater or lesser extent. Face to face interviews are still in use when more appropriate than other means. Researchers at the National Center for Health Statistics conduct the National Health Interview Survey and added a coding system to determine why in-person interviews were terminated (Stussman, Taylor, & Riddick, 2003). The top three reasons were that the interview was too long, the respondent did not have time to complete the interview, and the questions were too personal.

[1] In the literature partial nonresponse sometimes refers to item nonresponse and sometimes means answering dropouts

Given that the interviews are often an hour long, it is not surprising that both of the first two reasons relate to the importance of short surveys in reducing drop-outs. However, in general face to face interviewers are trained in methods to keep respondents from prematurely quitting, which may relate to generally low rates of incompletion in face-to-face interviews (Miller, 2003).

Like face-to-face interviewers, telephone interviewers are trained in methods to keep respondents from prematurely quitting (Miller, 2003). However, one type of telephone survey that is similar in some ways to a web survey is the Telephone Audio Computer-Assisted Self Interview (T-ACASI) or the interactive voice response (IVR survey). In this format, a computer is used to administer the interview, meaning interviewer probing, responses to interviewee questions, feedback and encouragement that might discourage drop-outs are not present (Li, 2006; Link, Johns, & Cooley, 2006). Link et al (2006) indeed found that survey break offs were four times higher in a T-ACASI interview than when there was a person present. An examination of demographic variables indicated that dropoff was more likely among those with less education and lower incomes. Follow-up interviews indicated the most common reason for breaking off was difficulty using the technology. Survey length has also been shown to be related to number of dropouts in this format (Tourangeau, Steiger & Wilson, 2002).

Paper and pencil surveys present different issues with dropout in that there is no record of response if someone decides to stop the survey part of the way through and not mail it in. The only incomplete surveys are from people who decided to mail it in even though it was incomplete (MacElroy, Mikucki, & McDowell, 2002). As would be expected in this case, researchers have found higher rates of drop-out in web-based versus paper and pencil surveys (Velez et al., 2004).

Before looking at research on web survey dropouts specifically, it is worth noting possible differences in what it means to drop out of a web survey versus other survey types. With most other survey types, it is clear that the respondent is "submitting" whatever answers they do give. In mail surveys, the act of mailing in the survey, even if it is not complete, indicates the respondent intended to have the responses they did make be seen. It could be argued that in a telephone survey during which a person is responding to questions from a live person, it is clear that the response they give is being considered by someone. However, in an internet survey, it is not clear whether respondents ever intend their responses to be seen. Some researchers indicate that clicking the button to move to the next page is an act of submitting the page like a survey interview (Paytchev, Couper, McCabe, & Crawford, 2006), but it is not clear that respondents understand clicking the button actually submits their responses, particularly if the button reads, "Next Page" or the equivalent (Crawford et al., 2005).

Issues related to dropouts of web surveys

Identification of drop-outs as a group was made clear with Bosnjak & Tuten (2001), who examined the various types of respondents possible with online surveys. Overall, they classified 7 types of respondents based on their behavior on a one-item/one-screen survey: complete responders, unit nonresponders, answering dropouts, lurkers, lurking dropouts, item nonresponders, and item non-responding drop-outs. The authors conclude in their discussion that the answering drop-out group is most likely to be converted into completers if we can understand the factors that lead to their drop-out. The rates of survey drop-out appear to vary widely. Rates from 281 surveys on a commercial survey site ranged from 0% to 74% (Hamilton, n.d.).

There has been some investigation of the factors that lead to web survey drop-out. Studies of surveys have revealed longer surveys, surveys with sensitive or difficult to answer

questions, and those sent to general populations have higher dropouts (Hamilton, n.d.; Knapp & Heidingsfelder, 2001; Lozar, Manfreda & Vehovar, 2002; Miller, 2003). There appears to be no difference in breakoff rates between a survey administered across many pages versus one page with scrolling (Lozar Manfreda, Batagelj, & Vehovar, 2002; Peytchev et al., 2006).

Incentives appear to lower drop-out rates and may be particularly effective for preventing dropouts in the first minute and a half of a survey (Brazil, Jue, Mullins, & Plunkett, n.d.; Frick, Bachtiger, & Reips, 2001). Interestingly, research suggests most drop-outs occur in the first minutes or first page of a survey (Brazil et al, n.d.; Hamilton, n.d.). However, it is also possible that incented responses give positively biased responses (Brazil et al., n.d.; Miller, 2003).

Heerwegh and Loosveldt (2006) reported that in a sample of students, a personalized invitation led to fewer drop-outs (8.95% in the personalized group versus 14.17% in the nonpersonalized group). They did not find a significant difference in drop-out based on whether there was a progress indicator versus not. Conrad, Couper, Tourangeau, & Peytchev (2003) also reported that progress indicators did not consistently generate significantly better data than no indicator. One author suggests that the indicator does reduce drop-out, but only for surveys with fewer than six pages (Hamilton, n.d.).

Another potential add-in to web-based surveys is advanced graphics. However, Lozar Manfreda et al (2002) report that their use increases survey drop-out among those with the slowest Internet connections. The authors attribute this to respondents terminating due to the amount of time it takes to load the graphics, but it might also be due to technical difficulties such as the connection timing out. The prevalence of technical problems as a reason for dropout has not been frequently addressed in the research.

Crawford, Couper, and Lamias (2001) reported that although including a longer survey length statement in the invitation will decrease initial log-ins, it will also decrease survey drop-outs, leading in the end to comparable response rates to shorter survey length statements. This finding illustrates the importance of looking at all aspects of survey response when determining the effects of various survey characteristics. There does not appear to be a difference in dropouts depending on whether the survey length statement was vague or specific (Heerwegh & Loosveldt, 2006).

There are several issues that have not been examined relating to dropouts. First, is number of questions, number of pages, and/or time to complete the most important length factor in reducing dropouts? What role do technology problems play in dropouts? Are there regional/global differences in dropout rates? Does translation into a respondent's preferred language make a difference in dropout rates? Also, what are average dropout rates that might be used as benchmarks? This paper seeks to address these questions.

Method

Participants

This research was completed in the context of the Cisco Networking Academy Program, a global program in which information technology is taught via a blended program with face-to-face classroom instruction, an online curriculum, and online assessments. Developed by educators and networking professionals, the Networking Academy Program delivers Web-based curriculum, hands-on labs, instructor training and support, and preparation for industry-standard certifications. The curricula are adopted by high schools, community/ technical colleges, and four year colleges/ universities and offered as regular classes at those institutions. Since being

launched in 1997, the program has been taught in more than 10,000 academies in 50 U.S. states and over 145 countries with curricula in nine different languages.

Survey responses from 10 surveys administered to instructors and students in the Cisco Networking Academy Program over a three year period were analyzed. The responses of those who answered at least one question on the survey were analyzed. The eight instructor surveys were begun by 12,756 instructors while the two student surveys were begun by 21,688 respondents. Instructors and students from 146 countries began the surveys. Their representation by region is displayed in Table 1. (This region breakdown is that used by the Networking Academy Program to define geographic areas with similar infrastructures.)

	Instructor	Student
Africa	2.97%	6.34%
Asia Pacific - Emerging	6.94%	7.51%
Asia Pacific - Mature	7.17%	5.55%
Central & Eastern Europe	7.09%	11.99%
Western Europe	21.32%	22.87%
Japan	1.42%	0.12%
Latin America	11.71%	22.66%
Middle East	2.88%	3.63%
Russia & Central Independent States	0.72%	0.37%
US & Canada	37.84%	18.94%

Table 1. Respondent breakdown by geographic region

The students and instructors come primarily from a range of secondary/ high schools, 2-3 year technical/ community colleges, and 4 year colleges/ universities. The breakdown of the education levels of the schools which the students are taking classes and the instructors are teaching is presented in Table 2.

	Instructor	Student
Secondary/ High School	29%	25%
2-3 year Community/ Technical College	41%	26%
4 year College/ University	31%	49%

Table 2. Respondent breakdown by education level of school

Materials

The surveys covered topics ranging from satisfaction with the program to computer infrastructure to opinions about curriculum and exams. The surveys were all multiple pages long, varying from 2 to 10 pages. The number of questions ranged from 14 to 172. The number of questions was not necessarily related to the number of pages; some surveys had many questions on few pages with scrolling while others had only a few questions per page. Surveys contained various types of questions including multiple choice- single answer, multiple choice – multiple answer, fill-in-the-blank, and matrix/ testlet arrangements. Some of the surveys were translated into multiple languages while others were available only in English. Two different survey engines were used: some surveys were offered using an internal engine that resulted in a survey that had the look and feel of the Cisco Networking Academy Program while the other was completed on a commercial survey engine. In both cases survey responses were recorded for each participant each time the respondent clicked to go on to the next page (or clicked submit for the last page).

All survey invitations contained an approximate number of minutes the survey should take, designed to be an estimate on the high side of what it should actually take. Due to legal restrictions, only one email invitation and no reminders were sent for the surveys.

The following variables were coded for each survey:

Total number of questions. This is a count of the maximum number of questions a respondent could see. Given that there were dynamic branching questions on many surveys, in some cases respondents would see one set of questions or another, but not both. For this measure questions were counted as if a respondent selected the option on each branching question that would lead to answering the most questions.

Total number of pages. This is a count of the total number of pages of questions in the survey.

Median time to complete. This is the median time it took those who completed the survey to finish.

Total number and percentage of questions by type. The total number of questions of each type, and the percentage of all questions made up by that type was computed for each survey.

Language of Survey. The languages in which the survey was offered was recorded.

Single vs. Multiple topics. This indicator was a binary measure of whether the survey focused on one topic or covered multiple topics.

The following variables were coded for each respondent:

Response category. The response category was coded as either answering drop-out or completer. Answering drop-outs were those who answered some questions on the survey, but did not ultimately click the submit button. Completers were those who did click the submit button at the end of the survey. This analysis did not include a separation between those who completed and answered all the questions and those who completed but did not answer all the questions, as the focus for the study was on the answering drop-outs.

Role. This variable coded the respondents as instructors or students

Country & Region. This information was obtained either by respondent report or retrieval from the Networking Academy database, depending on the survey. The regions described above to

describe the sample were used in this analysis as an indicator of regional differences in infrastructure as well as geographic area.

Computer Infrastructure. Individual data from each respondent was not available. However, the number of internet hosts per 10,000 people in a country was available from the U.N. This number was used to measure infrastructure, based on the country in which the respondents taught/ took classes.

Education Level. For both instructors and students this variable is the education level of the school at which they are taking or teaching the course.

Data Analysis. Data analysis was accomplished largely through visual graphical analysis. The drop-out rate was graphed with each relevant variable and trends noted. Some bivariate analysis was attempted, however, because there were only 10 surveys, multivariate analysis of survey-level variables was precluded.

Results

Across surveys, rates of answering drop-outs ranged from 2% to 20%. These are in-line with those noted in the literature for surveys sent to a specific population (in this case, those who were involved in a specific educational program).

Respondent Factors

Variables related to the respondent were examined next. Students had a significantly higher percentage of answering drop-outs than the instructors. Across surveys, students averaged 22.1% dropouts while instructors averaged 8.0%. Figure 1 displays the answering drop-out rates by role and education level. Among students, those in high school and community colleges had significantly higher drop-out rates than students 4 year colleges and universities ($\chi^2(2, N = 11015) = 147.14$, $p < .01$). The opposite was true for instructors, with those teaching at high

schools and community colleges significantly less likely to drop-out than those at universities ($\chi^2(2, N = 21688) = 10.93, p < .01$).

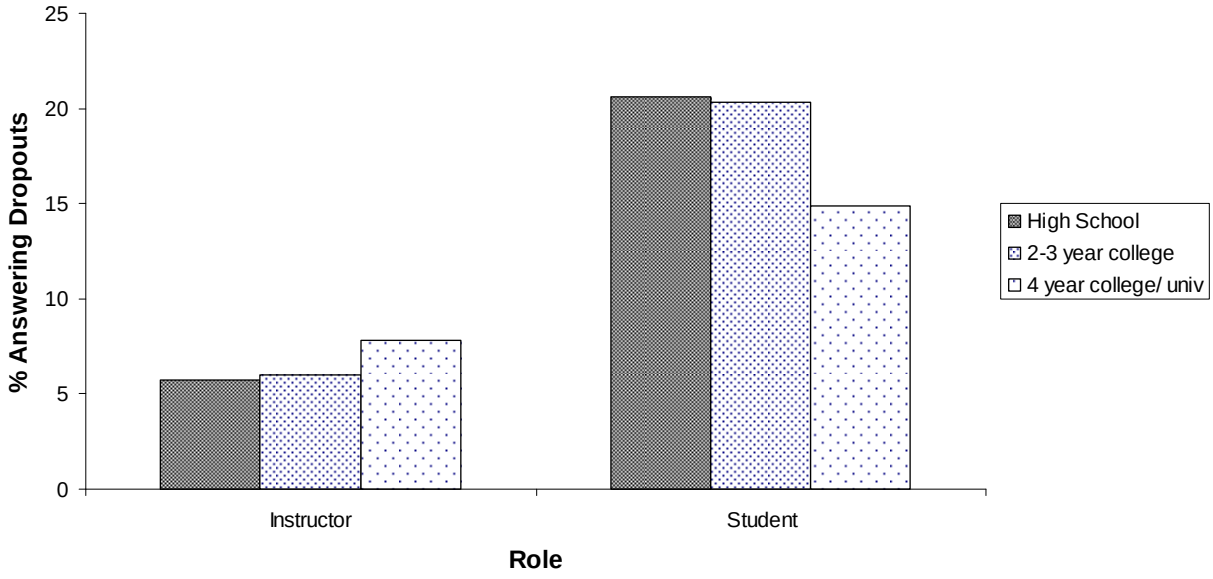

Figure 1. Percent answering drop-outs by role and education level of school

Instructors. Due to the differences between instructors and students, results for other variables were examined separately for each group. Those who were answering drop-outs came from areas with significantly fewer internet hosts per 10,000 people (M = 1330 hosts per 10,000 people; SD = 2316; N = 650) than completers (M = 2438 hosts per 10,000 people; SD = 2891; N = 8674) ($t(9322) = 9.54, p < .01$). This suggests technology issues likely play a role in causing drop outs.

The percent of answering dropouts was next analyzed by region. Figure 2 presents the percent of answering dropouts by region with regions with emerging infrastructure on the left and regions with developed infrastructure on the right. Although there are differences between regions in mature areas and those in emerging areas, there were not significant differences among dropout rates based on region within mature or emerging areas. For example, the

difference between the percent of answering dropouts in Latin America and the Middle East is not significant ($\chi^2(1, N = 1520) = 2.93, p = .06$).

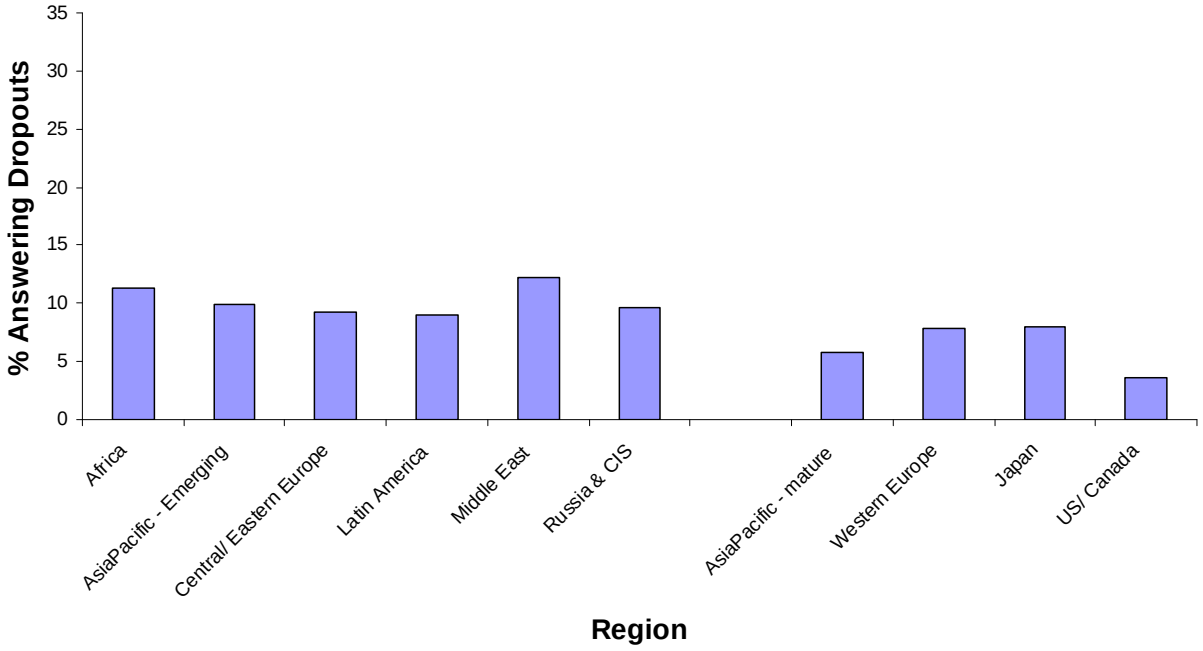

Figure 2. Percent of instructor answering dropouts by region

Students. The infrastructure and region variables were next examined for students. Those who were answering drop-outs came from areas with significantly fewer internet hosts per 10,000 people ($M = 632$ hosts per 10,000 people; $SD = 1566$; $N = 4618$) than completers ($M = 922$ hosts per 10,000 people; $SD = 1973$; $N = 16553$) ($t(9322) = 9.54$, $p < .01$) ($t(21169) = 9.22$, $p < .01$).

Analysis of percent answering drop-outs by region indicates that in emerging markets, respondents from the Middle East are most likely to drop out. In mature regions, respondents from Western Europe are most likely to drop out (see Figure 3).

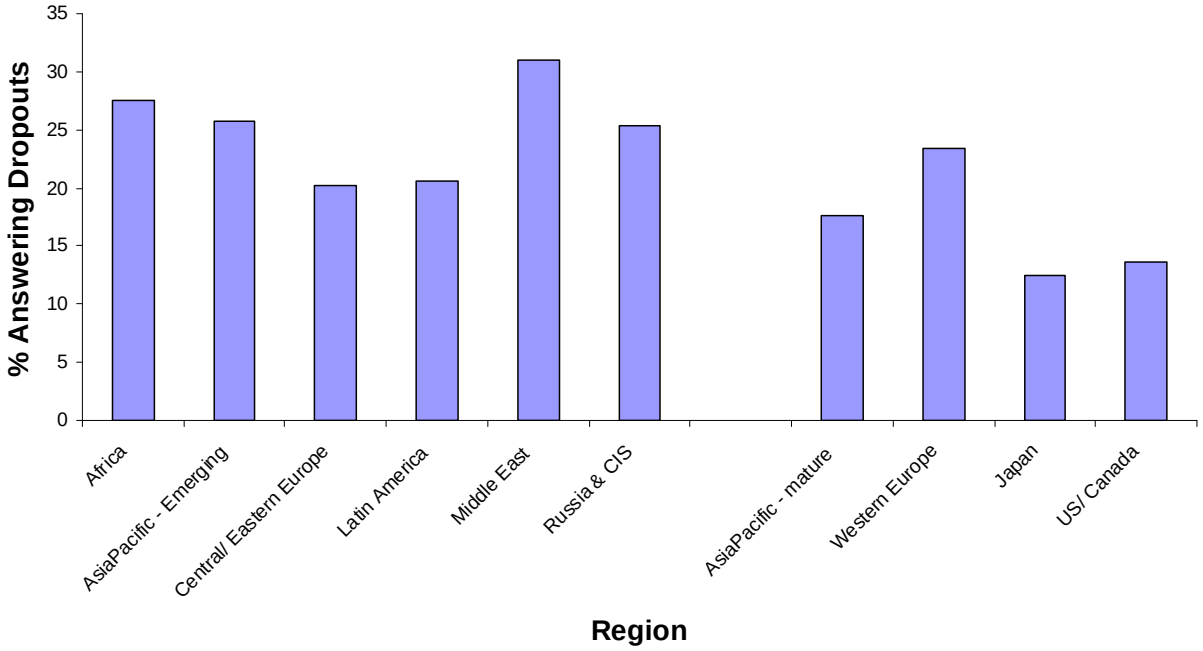

Figure 3. Percent student answering drop-outs by region

The rank of region by percent answering dropouts very closely mirrors the rank of region by internet hosts per 10,000 people (see Table 3). The only exception is that Japan ranks third in internet hosts but has the lowest percentage of answering dropouts. Overall, these results suggest a link between the technology development of an area and the likelihood of respondents dropping out of a survey.

	Rank of Dropouts	Rank of Infrastructure
Africa	5	5
Asia Pacific – Emerging	4	4
Central & Eastern Europe	1	1
Latin America	2	2
Middle East	6	6
Russia & Central Independent States	3	3
Asia Pacific – Mature	3	2
Western Europe	4	4
Japan	1	3
US & Canada	2	1

Note: Infrastructure rank based on number of internet hosts per 10,000 individuals

Table 3. Ranks of regions by answering dropouts and infrastructure.

Survey Factors

Given the differences between the instructor and students in the respondent results, it was determined that their survey factors should be analyzed separately. Due to the fact that only two student surveys were available for analysis, the survey factors section will focus on findings from the instructor surveys.

Length. Survey length can be defined by the number of questions, the number of pages, and/ or the amount of time necessary to complete it. Each of these was investigated. First, the number of questions was examined with each item, including those in testlets counting as one. As expected, the more questions on a survey, the higher the drop-out rate. Figure 4 displays the relationship between total number of questions. It appears that whenever the total number of questions is less than 25, the % of answering dropouts is less than 5%. In addition there appears to be a sharp increase in answering dropouts between 20 and 40 questions. Finally, the percent of answering dropouts appears to plateau at around 12% after approximately 60 total questions.

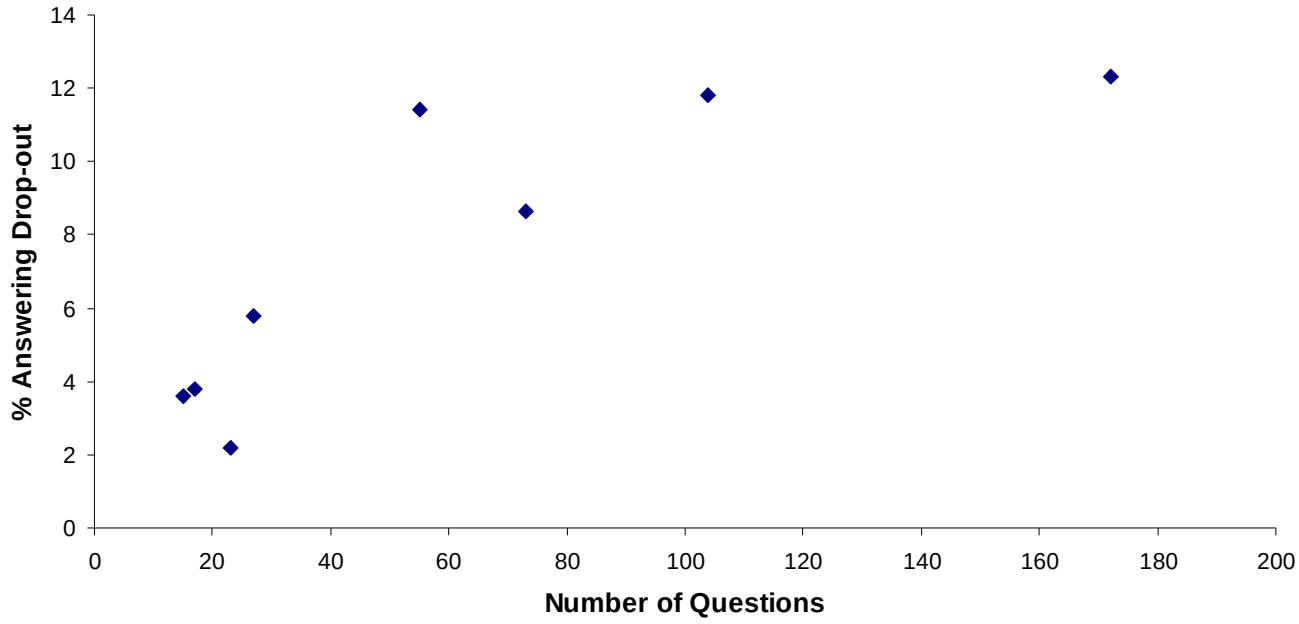

Figure 4. Percent answering dropouts by total number of survey questions

Counting items in testlets is a difficult proposition. It seems as if it takes somewhat less effort to answer five questions in a testlet than five independent MCSA questions because the scale is the same each time. Rather than counting each item in a testlet as one question, one could count a whole testlet as one question. Figure 5 presents the percent of answering dropouts by number of questions with each testlet counting as one question. Looking at the graph, there are two that do not fall along the line (those at 15 and 17 questions). These two surveys were the only two without any testlet questions. This suggests that counting a testlet as one question will work if comparing to other surveys with testlets. However, it does not work if comparing the survey to other surveys without testlets. It also appears that if a survey has testlets, the number of items should be kept under 10 (with a testlet counted as one item) in order to keep the percent of dropouts under 5%.

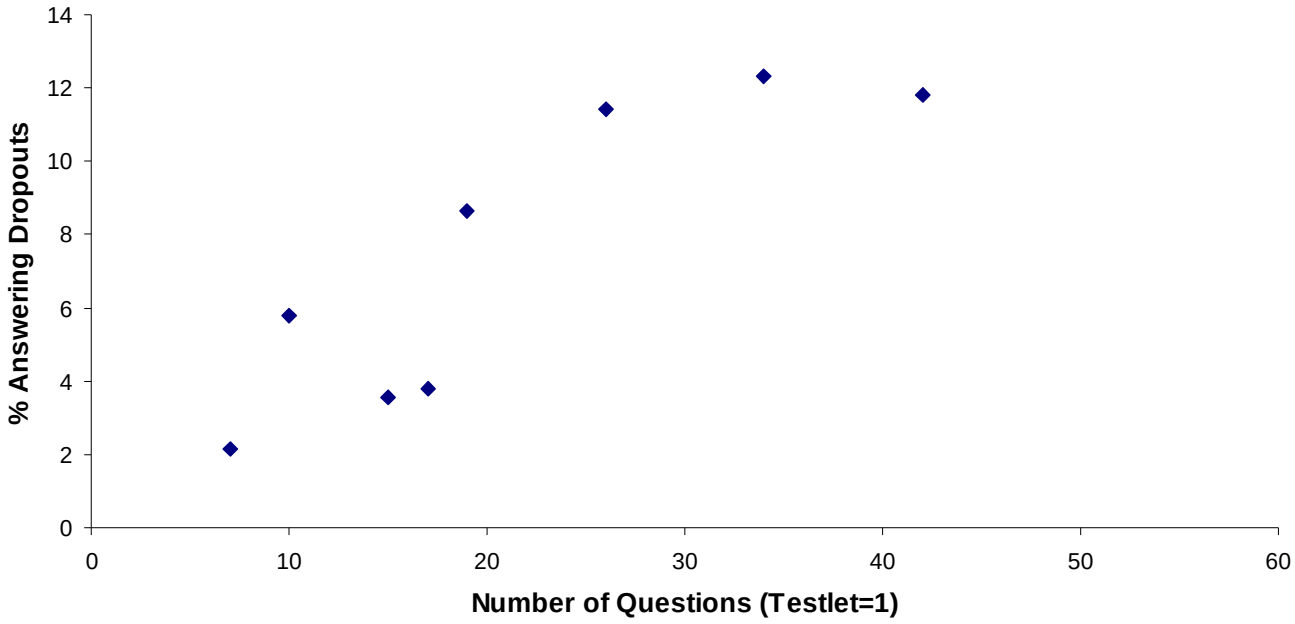

Figure 5. Percent answering dropouts by number of questions (testlet equals one question)

This then raises the question of whether the number of items in a testlet affect dropout. Figure 6 displays the percent of answering dropouts by the average number of items per testlet. There does not appear to be a clear relationship between the two variables. If the total number of questions in the survey is low, there can be numerous items in one testlet without increasing the percent of answering dropouts.

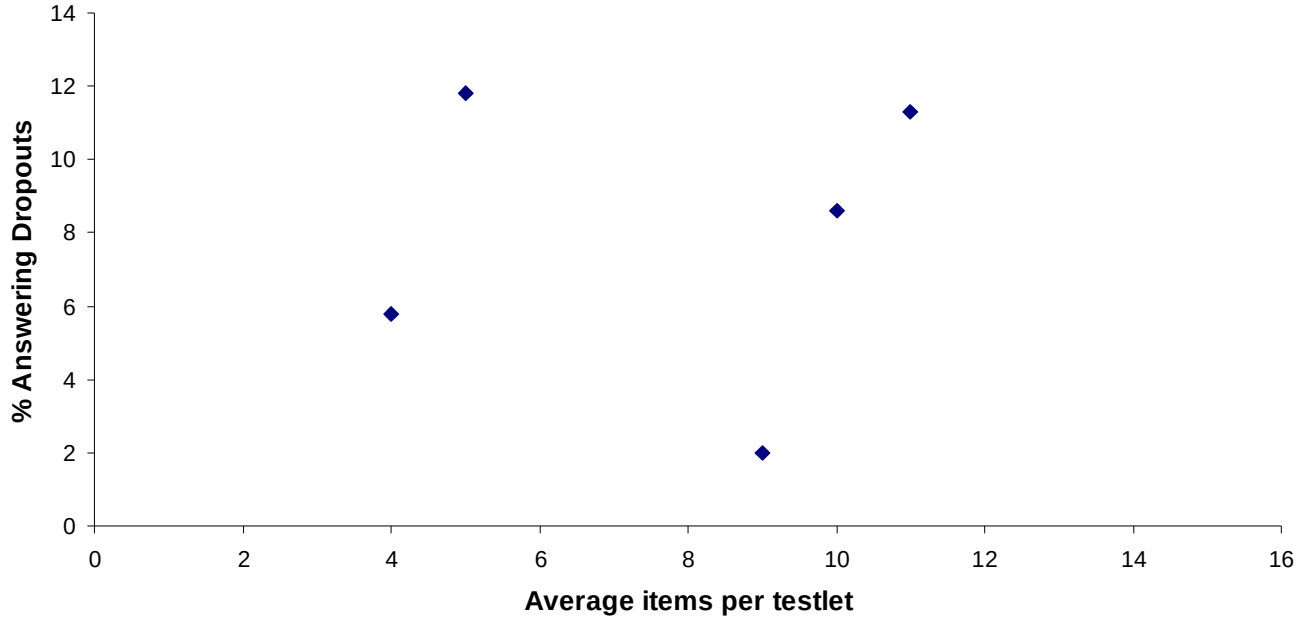

Figure 6. Percent answering dropouts by average number of items per testlet.

Another way of looking at survey length is through the amount of time it takes to complete a survey. Figure 7 presents the relationship between median completion time for the surveys and percent answering drop-outs. Again there is a clear pattern in which surveys with a median completion time of less than 5 minutes have drop out rates of less than 5%. There also appears to be a leveling off of the dropout rate at about 12% after 10 minutes.

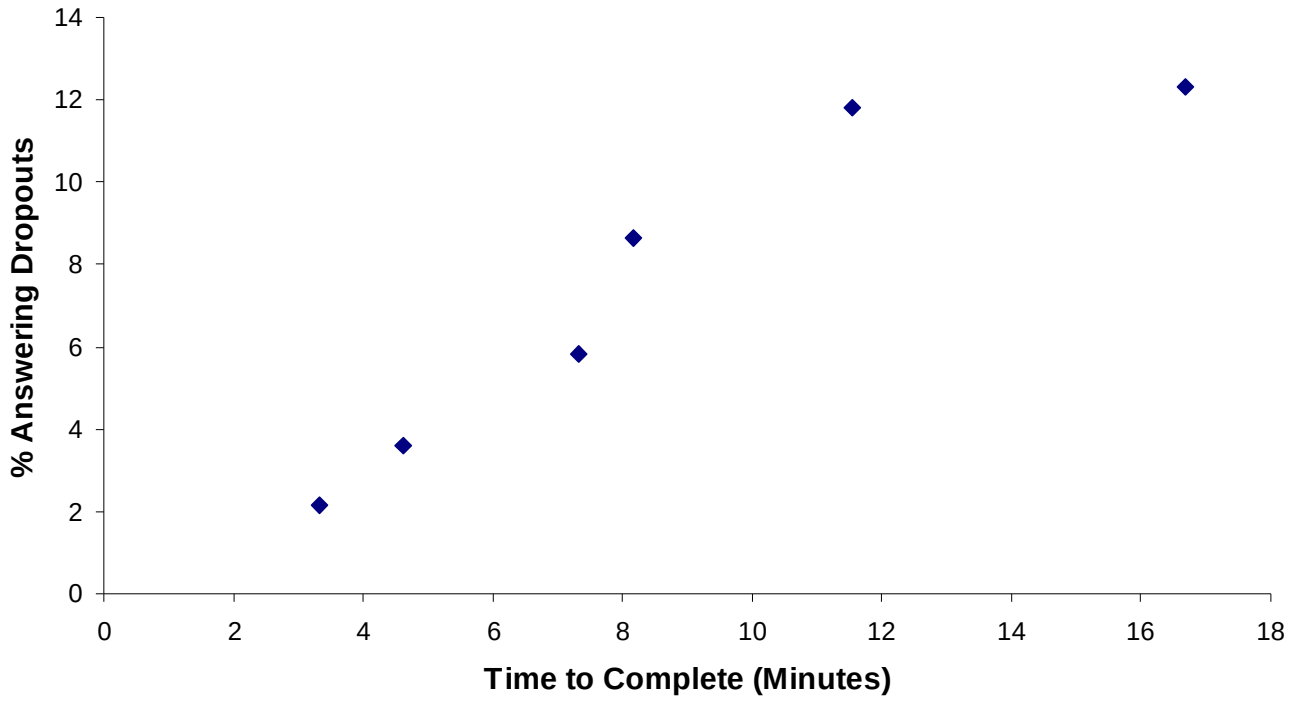

Figure 7. Percent answering dropouts by median survey completion time

A final way to look at survey length is by number of pages in a survey. Figure 8 displays the percent of answering drop-outs by number of pages. There was not a clear pattern by which more pages will necessarily lead to higher rates of dropping out. The survey with 2 pages contained the most questions of any survey (172) and had the highest dropout rate. A survey with many questions on a few pages will likely have a higher drop-out rate than surveys with fewer questions on more pages.

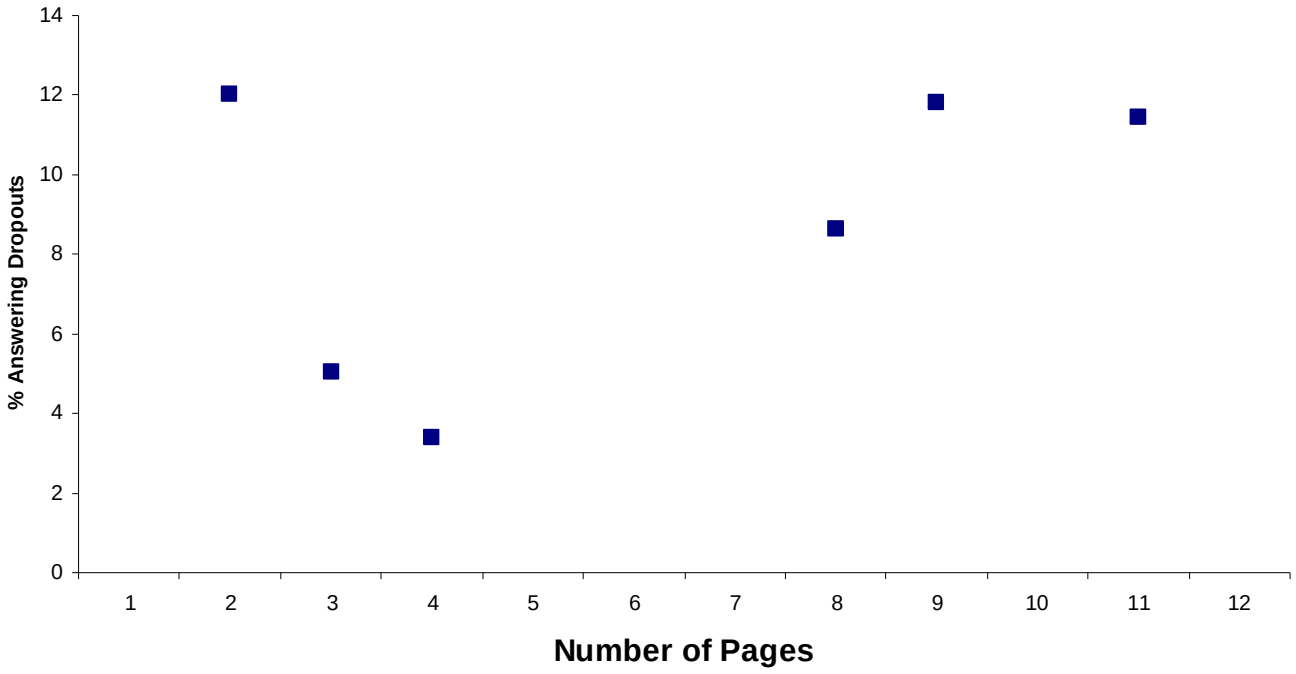

Figure 8. Percent answering dropouts by number of pages

Question Type. The effect of question type was examined by graphing the percent of each question type in the surveys against the percent answering dropouts. Figure 10 displays this graph for fill-in-the-blank questions. On this graph and the graphs for other item types no clear pattern emerges regarding question types and percentage of dropouts.

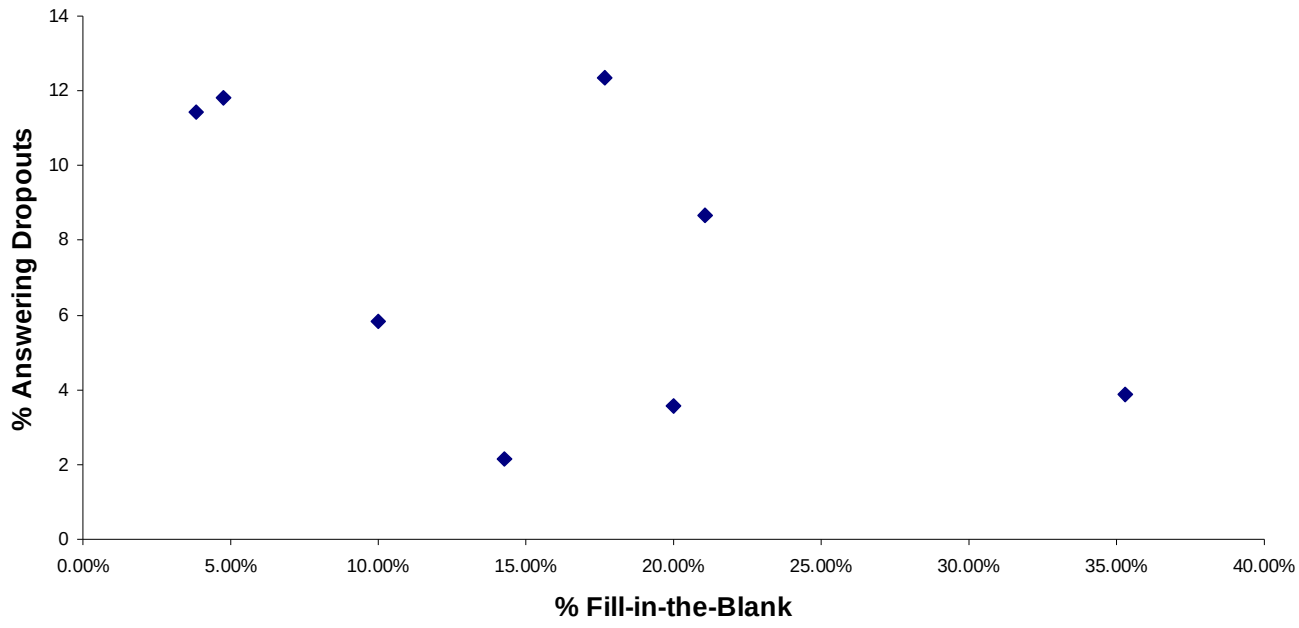

Figure 10. Percent answering dropouts by percent fill-in-the-blank questions.

Translation. We next examined whether translating a survey makes a difference in drop-out rates. In most cases the translated surveys were the longer surveys, so translation analyses would be confounded with length. Therefore, this variable was examined by comparing two surveys of similar length, one of which was translated into 9 languages and the other which was not translated. Based on the languages the survey was translated into, the geographic regions that might show an effect of the translation were Western Europe, the Middle East, and Japan. Respondents in each of these areas had the opportunity to take a survey in their native language when it was offered in a translated form, but only in English when it was not translated. Table 4 presents the rates of answering dropout for the translated and non-translated surveys with similar lengths. There is not a clear pattern of results for translation across all regions. In some cases the translated surveys had slightly lower dropout rates, but these were not significantly different. In Japan the translated survey had a higher dropout rate (but also a higher response rate).

	Translated	Not Translated
Western Europe	3.95% (N=177)	4.48% (N=214)
Middle East	0% (N=26)	5.26% (N=19)
Japan	2.94% (N=34)	0% (N=12)

Table 4. Answering drop-out percentages for a translated and not translated survey.

Branding. There was no difference in drop-out rates between surveys taken on the external survey tool (not branded; 7.9% dropout) versus those on the internal survey engine (branded; 8.0%).

Topic. Examination of the data revealed that the three surveys that covered multiple topics were also the three longest surveys. Therefore, the effect of multiple versus single topics could not be separated from the survey length issue.

Discussion

This research highlights the importance of focusing not just on response rate as the percent of the population that completes, but also in terms of the percent who drop out of the survey. It extends the literature relating to answering drop-outs and begins to identify rules-of-thumb for reducing the number of survey drop-outs. This group may be the first to target when attempting to increase overall response rates and following some guidelines uncovered by this research may help accomplish this.

In summary, instructors are less likely to drop out of surveys than students. Instructors at 4 year colleges and universities are more likely than those at 2 year community colleges or high schools to drop out while students at 4 year colleges and universities are less likely to drop out. Globally, drop out rates seem to be closely tied to infrastructure in a given area. The analyses

make it clear that if one wanted to keep an answering drop-out rate for instructors below 5%, the number of questions should be kept under 20 total questions or fewer than 10 questions if a testlet is counted as one question. The survey should not take longer than 5 minutes to complete. The number of pages is not as important as the time or number of questions. There was no evidence that questions of a specific type influence drop out rates. In addition, it was not clear that translating into a local language will affect drop out (although it may increase initial response rates).

The issue of reducing drop-outs becomes even more important when its impact on data integrity is considered. Miller (2003) examined the effect of drop-outs on results of concept/ product testing and loyalty. He reported that survey completers were significantly more positive about the proposed product than noncompleters. Completers were also more likely to indicate they would use the product than noncompleters. This evidence suggests that longer surveys may produce more positive concept evaluations because of the bias introduced by drop-outs.

Limitations

This research has several limitations. First, it is done in an applied research setting. Each of the surveys examined was deployed with research questions in mind, and answering those took priority over setting controls for analyzing survey behavior. The biggest difficulty that results from this is the interaction of various survey factors. For example, the surveys that cover multiple topics are also the longest surveys. Therefore, the two factors cannot be isolated in this research to determine which is more salient in predicting survey drop-out.

Second, the research did not use a one question per page approach (again because it was conducted in an applied setting). This made it impossible to determine which was the last

question answered by drop outs as question responses were not recorded until the next page button was clicked.

Third, due to a limited number of student surveys, analyses of survey characteristics could not be completed with students. In the Networking Academy Program all students complete a mandatory course feedback form following each class that must be submitted to receive a “pass” for the class. As a result, dropout analysis on that is not meaningful and the students are not surveyed extensively beyond that. However, this limits our ability to understand the factors that influence their survey behavior. Fourth, the research did not take unit (item) nonresponse into account. Decisions about completion or drop-out were made depending on whether the survey was submitted, not whether all questions were answered.

A final limitation is that the surveys conducted in this research are all administered to a group already affiliated and invested in the topics of the surveys. Therefore, these results are probably most generalizable to other surveys sent to groups already involved with the survey content. It may be that these groups are less likely to drop out of a survey because of their investment in the topic.

Suggestions for Future Research

The questions asked in this research are hierarchical questions; there are respondents nested within surveys. Future research (requiring a larger number of surveys) should use multi-level modeling to examine both the survey and individual factors related to survey drop-out. In addition, research more carefully controlling the combinations of variables used in surveys should be conducted to determine the interaction between the variables in influencing dropout rate. Finally it is clear that research on response rates should be breaking down responses by different types of nonresponse as different factors may influence some types and not others.

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