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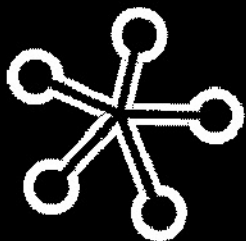UNIVERSITY OF AMSTERDAM

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Can creative web survey questionnaire design improve the response quality?

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Abstract

The main goal of this experimental research is to explore the opportunities and challenges when taking a creative approach to web survey questionnaire design in order to improve the response rate and quality of responses. Two versions of a questionnaire related to attitudes toward academic procrastination are created; a conventional one and a questionnaire with a popup text message at the end describing the levels of procrastination of each student depending on the scores of the answers and grades of each student. Each student of a total population of 3030 receives randomly an e-mail invitation with a link to one of the two web survey questionnaires. A comparison on response rate and quality of responses between these two questionnaires is conducted. Even though no significant statistical increase of response rate appears to be in the second questionnaire, quality of responses in terms of dropouts is significant lower.

Keywords: web survey; questionnaire design; non-response; dropouts; quality of responses.

1. Introduction

Living in the digital era where the advances of technology and accessibility of internet are becoming almost synonymous of communication, inevitable many opportunities and challenges are offered to researchers. The advantages of reduced time, lowered cost, ease of data entry, flexibility in format, and ability to capture additional response-set information that are universal to internet-based data collection, have contributed to the transformation of conventional survey to e-survey.

The benefits of web surveys are recognized a decade before internet takes the place that currently holds (Schmidt, 1997). At the beginning of this century researchers report a great benefit of web surveys: the requirement of less effort by respondents to complete and return than traditional mail surveys (Couper, 2000; Fricker & Schonlau, 2002; Lyons et al. 2005; Deutskens, de Ruyter & Wetzelset, 2006; Couper & Miller, 2008; Malhotra, 2008; Dillman, Smyth, & Christian, 2009; Vicente & Reis, 2010). Other studies claim that with the increased trend of people becoming "digital natives" web surveys result in higher response rates. (Jones & Pitt, 1999; Cook, Heath, & Thompson, 2000; Couper, 2000; Couper, Traugott, & Lamias, 2001; Fricker & Schonlau, 2002; Kaplowitz, Hadlock, & Levine, 2004; van Selm & Jankowski, 2006; Lusk et al. 2007; Converse, Wolfe, Huang, & Oswald, 2008; Couper, 2008; Couper & Miller, 2008; Shih & Fan, 2008). The vast majority of survey researchers' were expecting that due to the advantages of internet, the appropriateness and response rates of web surveys would increase in the future. Some even claimed that the novelty of the new medium would enhance response rates (Parker, 1992; Zhang, 2000). Unfortunately expectations have not met since response rate in online surveys is found to be even lower than in other modes (Lozar Manfreda et al. 2008; Shih & Fan, 2008). Actually, the increasing rate of non-response in surveys as a problem for researchers and especially the increasing refusal component of non-response are noticed since 90's (Groves, 1989; Davey, 1996). Brick & Williams (2013) mention this as a growing problem in survey research in general. For this reason, cutting edge methods and tailor-made questionnaires need to be implemented in order to pursue invitees to complete web survey questionnaires.

How can researchers implement the expanded opportunities offered by web survey tools in order to solve important methodological issues of concern? How can we make the surveys more attractive to the respondents? This experimental study aims to investigate whether creative design of web questionnaires can improve response rate and quality of responses. We address this challenge by implementing an experiment on university students. A short version of Tuckman's (1991) offline questionnaire is transformed into two versions of web survey questionnaire; a conventional one and a quiz-type questionnaire with popup text message at the end of the survey. A conditional text message which is based on the scores of the answers and grades of students popups after each student finishes the survey describing the level of his/hers procrastination.

Assuming that the effects of administering the web survey questionnaire with popup text message at the end are the same as the one without, two hypotheses are stated:

Hypothesis 1: The response rate is significantly higher for the "popup" student group.

Hypothesis 2: The dropout rate is significantly lower for the "popup" student group.

This article is organized as follows: Section 2 includes current challenges on non-response and Section 3 provides the experimental design and data collection. Results and analysis are discussed in Section 4 and Section 5 concludes the paper. Statistical analysis of the results is conducted using two independent samples z-test. The findings of this study can be important to both practitioners and academic researchers.

2. Challenges on non-response

Since internet is the major medium for delivering self-administered surveys, it is easily observable and cannot be denied that the focus of researchers should not be on whether to choose between traditional and web survey, but on how to resolve important methodological issues such as how to increase the participation of the individuals, to convince people to answer questionnaires online, and to provide accurate information within the opportunities offered by advanced technology. There is a growing body of studies which investigates the phenomenon of nonresponse and ways to increase response rates in web surveys (Brick & Williams, 2013; Conrad, Couper, Tourangeau, & Galesic, 2005; Converse et al., 2008; Cook, Heath, & Thompson, 2000; Edwards, Roberts, Clarke, DiGuiseppi, Pratap, Wentz, & Kwan, 2002; Kaplowitz et. al, 2004; Lozar Manfreda, Bosnjak, Berzelak, Haas, & Vehovar, 2008).

The relatively scarce evidence on factors affecting nonresponse in web-based data collection methods appear to be less conclusive. A meta-analysis by Sheehan (2001) quantitatively summarizes data on factors influencing response rates in internet-based surveys. The meta-analysis of 31 studies on e-mail surveys finds, among other effects, small positive bivariate relationships between response rates and both topic salience and survey length. The effects of four factors (a) high versus low topic salience, (b) short versus long survey, (c) lottery incentive versus no incentive, and (d) no feedback and general feedback (study results) versus personal feedback (individual profile of results) along with selected interactions, presume to affect response rates in web surveys. As expected, highly salient topics and shorter surveys yield considerably higher unit-response rates (Marcus, Bosnjak, Lindner, & Schütz, 2007).

Couper (2008) stresses that design matters and should be considered as an integral part of developing process and deploying a web survey. Good design can improve the quality of responses obtained from web surveys and enhance the overall experience of respondents. There are many challenges and opportunities for web survey designers. For most authors (Stewart & Pavlou, 2002), the particularity that differentiates internet from other traditional media is its "potential for interactivity". Interaction is considered as one of the most relevant opportunities of the web based interviews (Conrad et al. 2005). For Best and Krueger (2004) and Conrad et al. (2005), researchers try several interactive options for promoting more accurate survey data or optimizing the quality of responses, such as progress indicators, missing data messages, answer feedbacks, continuation procedures or even social presence. The most frequently studied internal design feature in web surveys is the progress indicator (Crawford et al., 2001; Couper et al., 2001; Conrad et al., 2005; Heerwegh & Loosveldt, 2006; Matzat et al., 2009). The progress indicator is unique because it provides respondents with live feedback on how far they have progressed through the survey instrument. In experimental studies, the progress indicator has yielded mixed results for minimizing dropouts. For example, Couper et al. (2001) find a positive, though, non-significant, effect on dropouts when a progress indicator is presented to respondents. In contrast, Crawford et al. (2001) find a negative effect, which they attribute it to the progress indicators inability to accurately estimate the duration of the survey when open-ended questions are included in the questionnaire. Ganassali (2008) propose a conceptual framework of the effects of on-line questionnaire design on the quality

of collected responses, and present the results of an experiment where different protocols are tested and compared in a randomized design using the basis of several quality indexes. Thus, finding alternative design features that consistently encourage and motivate respondents to complete a survey questionnaire continues to be an ongoing and meritorious task.

Certain techniques, when applied well, deliver good results: they protect against respondent satisfying behaviors (Krosnick, 1991), reduce dropout rates and straight-lining, increase the amount of time spent considering questions and increase the length and richness of open ended responses. Sleep and Puleston (2008) examined the reasons for dropouts in online surveys, and identified respondent boredom as a key factor. Gamification defined by Zichermann and Cunningham (2011) as the use of game thinking and game mechanics to engage users and solve problems is a new factor used by researchers to attract and even more to retain the invited respondent to fulfill the questionnaire. Completion of trivial online quizzes, polls and tests emerge as a social pastime for many internet users, particularly those in teen and young adult demographics (Fricker & Schonlau, 2002). They argue the need for a 'makeover' on how online surveys are designed, a 'paradigm shift of thinking' about the design and development of online questionnaires and question types to enhance their fluidity and interactivity. These so-called 'gaming techniques', aimed at making question formats more varied, engaging and more visual, show positive effects both on response quality, dropout rates and respondent satisfaction. In this way surveys are more lively and entertaining, as other online experiences, through the use of basic elements of game mechanic-a back story, a game-like aesthetic, rules for play and advancement, a challenge, and rewards (Downes-Le Guin et al., 2012). Yet, according to the same study, no benefits of gamification for engagement and data quality emerge and the need to focus on aspects such as survey length, topic salience, and cognitive burden are emphasized. Sakshaug and Crawford (2010) propose a method that displays textual messages of encouragement intermittently to web survey respondents to reduce the number of dropouts.

The literature review show somewhat mixed findings as to the benefits of used techniques in web surveys on response and engagement of respondents. Based on this, the need for new research on exploring the optimal ways of improving respondents' enjoyment of the survey-taking experience, as well as tackling the problem of engagement via more fundamental components of survey designs is inevitable.

This experimental research will add to the literature with a new, yet unexplored, web survey technique: conditional text message popup at the end of the survey. The success of tailor-made methods is usually reported in the context of maximizing response rate. This research is even more focused on positive effect on respondents' willingness to complete a questionnaire once they begin.

3. Experimental design and data collection

The questionnaire development begins by conducting literature review to identify and select relevant and attractive topic for students (Church, 1993; Edwards et al., 2002; and Yammarino et al., 1991). Students' lives are characterized by frequent deadlines in the world of education. Academic procrastination tends to be normal for the majority of students and as a tendency is mostly met in higher education. By reviewing literature that focuses on procrastination among students, we choose to use Tuckman Procrastination Scale (TPS).

The scale is developed specifically to detect whether students tend to procrastinate at starting and completing the college requirements. We implement the shorter version of TPS questionnaire (Edwards et al. 2002) that is consisted of 16 items taken from 35 items (Tuckman, 1991). This version concerning academic behavior implements a Likert-type 4 point scale as follows: 1=that is me for sure, 4= that is not me for sure.

The structure of the two questionnaires for both groups is identical. Each questionnaire is consisted of 22 variables and is divided in two parts. The first part includes 6 socio-demographic questions. The questions of the first part are categorical; three of them ordinal (group age, year of study, grade group) and three of them nominal (sex, marital status, and area of study). The second part of the questionnaire is consisted of the 16 TPS questions. As the vast majority of the students at Frederick University are Greek-speaking, Greek language is used in the questionnaire. The original questionnaire is double translated and pilot tested among colleagues at the university. Questions are expanded in two pages. At the end of each question there is a force answering (FA) feature, otherwise called hard reminder, forcing students to either answer each question and move on to the next one, or stop the web survey completely. Forced answering promises the reduction of one form of non-response error: the item non-response, which is a major component of data quality. At the same time though, using forced answering might cause respondents to entirely dropout early in the survey, something that increases non-response error.

The length of the survey is first mentioned to the e-mail sent, in the form of time (Crawford et al. 2001). In addition, students can also see the length via page number indicator on each screen of the questionnaire. Even though the two questionnaires are identical, because of the popup text message and the time taken from the respondent to read the outcome, the duration of the two web surveys slightly differs. After the questionnaire is designed, extensive testing is conducted using various types of computers and possible respond scenaria.

The software used for the development of the questionnaire is 1KA. 1KA is an ideal tool for this study as it enables and combines components that is of our interest. The software supports the developing, creation and design of online questionnaire, can generate various reports, collects paradata and monitor data collection. Even though the 1KA can also perform statistical analysis of the data the authors use SPSS IBM (version 19th) for the analysis of data.

Both questionnaires are implemented with the same features i.e., progress indicator, and hard reminder on each question. The only difference is that the second questionnaire is created as a quiz and respondents after they finish with answering get feedback that is conditionally connected with the scores of answers and their grades. The first questionnaire is without any interaction or feedback. Scores of the answers are divided in two parts: below or equal to 34 and above 34, and grades on 3 levels. According to these 6 possible combinations, 6 text popup text messages are created. Consulting literature review, the text in the popup message describes the level of procrastination of each student, according to answers and grades reported by each one (Hewitt et al., 1991; Burka & Yuen, 2008; Klibert et al., 2005; Milgram, 1991 and 1998; Haycock et al., 1998; Ellis & Knaus, 1977; Ferrari, 1991; Ferrari, Johnson & McCown, 1995).

In particular, web surveys for data collections are as appropriate and ideal as surveys if addressed to college students and members of professional associations (Baatard, 2012). Frederick University has currently 3030 enrolled students in two campuses. The fact that every student at the university has an e-mail account and free access to the web makes the use of the web for surveying students attractive (Couper et al. 2001). The population is divided in two independent groups of 1515 size each. The authors officially informed about the experiment the Studies and Student Welfare Service of Frederick University and after having permission the Computing and Information Systems Service provide them with the students' e-mail addresses. As the e-mail address of each student is directly associated with the time of first enrolment the selection was random to avoid any kind of bias. The e-mails are sent from the author's academic account. On the 22nd of April 2013 each student receives an e-mail with identical introduction. The sender identifies herself as member of the university faculty and asking students to click on the link given to them at the end of the e-mail. The only difference between the e-mails' content is that students of group 2 (questionnaire with popup text message) are informed that at the end of the web survey they receive a popup text message describing their attitudes towards procrastination. This is emphasised to students in a way to present the web survey as a game. In addition, it is stated that the duration of the web survey takes only 2-3 minutes. On the 9th of May, two weeks later, a second e-mail is sent to the students thanking those who responded and reminding those that did not response to do so. This single follow-up which is sent right after the majority of respondents reacted to the initial e-mailing, help boosting the response rate even more (Dillman et al., 2009). On the 22th of May the web survey is closed. No real incentives are used but within the text of the e-mail, it is insisted that this survey is part of an important educational and research project. Here, it is worth mentioning that this is the first time the author invites electronically these students to complete a web survey questionnaire.

4. Analysis and results

Among all the criteria that are studied as indexes of quality, the response rate is the most frequent. As a principle, a survey must provide a clear definition of the term response rate. For this study as response rate we consider the Standard Definition proposed by AAPOR (2011, p.44), RR2. According to this definition, the response rate is defined as the number of complete plus the partial questionnaires answered, divided by the invitees.

Two weeks after launching the survey, we had received 442 answers from the group of students with popup text message and 449 from the group of students without the text message, representing a global response rate of 29.4%. As mentioned above a single follow-up is sent after the end of the second week to boost the response (Dillman, 2000). By the end of the survey we receive in total 1189 answers representing total response rate of 39.2%. The response rate for the group with the popup text message is 39.7% or 601 respondents out of 1515 and 38.8% or 588 out of 1515 for the respondents without the text message. Table 1 clearly shows that there is no statistical significant difference between the response rate of the two groups (p-value=0.63122) and therefore Hypothesis 1: The response rate is significantly higher for the "popup" student group than for the "without popup" group, cannot be supported.

Table 1   Response Rates and Dropouts

	Without popup text message n (%)	With popup text message n (%)	p-value
Total units responded	588 (38.8)	601 (39.7)	0.63122
Total Population	1515 (100)	1515 (100)	
Completed	363 (61.7)	418 (69.6)	0.00452***
Dropouts	225 (38.3)	183 (30.4)	0.00452***
Total units	588 (100)	601 (100)	
Total eligible	415 (70.6)	460 (76.5)	0.0198**
Lurkers (answered at most the first page/demographics)	173 (29.4)	141 (23.5)	0.0198**
Total units	588 (100)	601 (100)	

Note : * p-value <0.10, ** p-value<0.05, *** p-value<0.001

Yet, the opportunity that the web survey software offers by tracking the log files on the server and measuring the dropout rates, provide additional results. Respondents that for various reasons, fail to ever complete the questionnaire are referred as abandonments, breakoffs, drop-outs, or partials (AAPOR, 2011, p.34). Dropouts are calculated as the difference between the number of participants that respond and the participants who fully complete the questionnaire. According to report files registered on the server, dropout rate of 30.4% or 183 dropouts' respondents do not finished the survey in the group with popup text message. Respectively for the other group the dropout rate is 38.3% or 225 dropouts. Statistical analysis shows significant difference in these dropout rates (p-value=0.00452) that strongly support the second research hypothesis; Hypothesis 2: The dropout rate will be significantly lower for the "popup" student group than for the "without popup" group. In addition, statistically significant difference exist between the two group of students whose questionnaires are eligible for analysis (p-value=0.0198). Figure 1 shows the time lines for the number of dropouts of the two groups. It is clear that at the majority of the time the number of dropouts is higher for the group without the popup text message. The graph also indicates the boost in the responses when the first reminder is sent.

Figure 1: Time series for the number of dropouts for the two groups
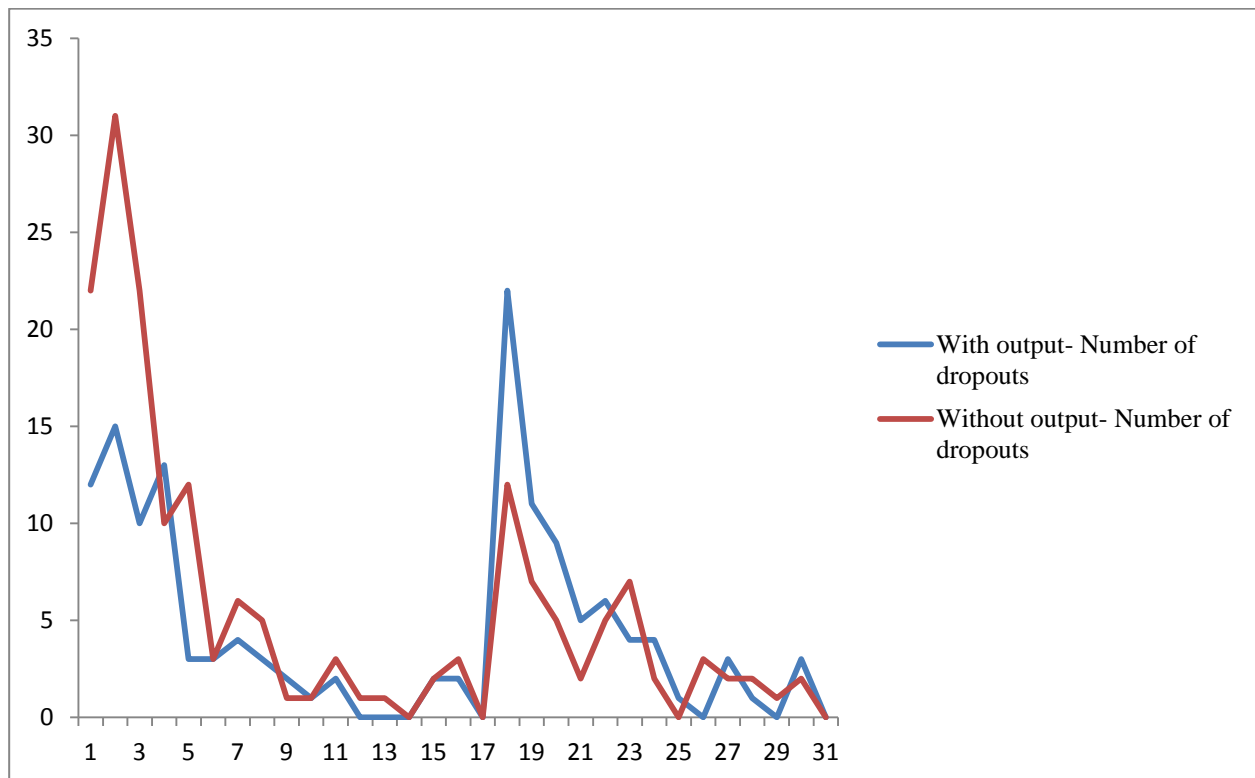
Partially empty questionnaires we consider those whose respondents dropped out the web survey without responding to a single item or answered at most the first page/demographics, i.e., the lurkers. The number of lurkers in the first group is 173 out of 588 (29.4%) while in the second 141 out of 601 (23.5%). Table 1 evidently shows that there is statistically significant difference between the lurkers of the two groups. As a matter of fact, the lurkers in the "popup" group are significantly lower than in the other group (p-value=0.0198) adding value to the second hypothesis. The difference between the dropout respondents and the lurkers are also considered eligible for statistical analysis. Actually, in both groups dropouts occur after completing the first page, in other words after answering the demographics on first page. This shows that the usage of the feature of forced answering, i.e. the obligatory completion of each question does not seem to affect the initial decision of the respondent to finish or not the questionnaire.

As mentioned before, measurement of quality of responses in this web survey is done through dropout rate. We consider dropout rate to be more suitable than item non response, because of the implementation of forced answering. Inevitable, quality of responses for the group with the popup text message is higher than the group without and this is thanks to the creative text message at the end of one of the questionnaires.

5. Conclusion

The purpose of this study is through an experiment to test a new method for increasing response rate and decrease dropouts rate in online surveys. A new method is implemented in this research: conditional popup with text message describing the level of procrastination of the student depending on the scores of answers and declared grades. Web survey questionnaire is fielded on population of university students to test whether displaying popup text will motivate participation and the engagement of more students.

The results of the experiment are the expected ones and coincide with international findings. The increased participation formulated in the first hypothesis is not supported, or response rate was not significantly higher in the group with the popup questionnaire. A concern is the high probability that invitees may only have seen the email, have read the content, clicked the link and it is a question if they have read the introduction of the questionnaire at all. Further investigation is needed on how to be creative in order to attract and engage invitees. The second hypothesis which claims that the questionnaire with the popup will engage more students it is supported and the dropouts are statistically significant lower in the experiment with this group. Sakshaug and Crawford (2010), stress that text messages can be even more successful if additional material is presented at the end of the survey as description or in the form of a randomly chosen picture. In this study, the difference between the two groups is the implementation of the popup text message in the web design of the second questionnaire. It can be concluded that students may have been curious to read the popup text message and therefore creative design of the questionnaire improved the response quality.

The experiment could be even more successful if during the survey some text messages appear during the survey to remind students that there is a popup text message at the end. These messages need to be motivating, and encouraging with ultimate purpose the engagement of student until the end of the survey. Some examples are: "See what kind of student you are", "Are you a perfect student or are you a perfect procrastinator?"

One of the biggest concerns when someone is conducting a survey is to improve the engagement of respondent and the quality of responses. The implementation of creativeness in the questionnaire that nowadays is easily achieved with web survey tools can be an alternative to ease these concerns. It is just a matter of ideas of the researchers and their innovation to attract the invitees to respond and to retain. This study contributes to the body of literature on improving the design and effectiveness of the web based survey process.

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