Improving Completion Rate of Digital Skill Self-assessment Survey: an Empirical Study

Xiao Peng, Ran Zhang, Tamara Marantika, Machil Deinum, Jet van der Touw, Xander Lub, Koen van Turnhout

University of Applied Sciences Utrecht, Utrecht, Netherland
xiao.peng@hu.nl, ran.zhang@hu.nl, tamara.marantika@hu.nl, machil.deinum@hu.nl, jet.vandertouw@hu.nl, xander.lub@hu.nl, koen.vanturnhout@hu.nl

This study examines completion rate for a self-assessment survey designed to assess employees' digital skills levels in the workplace. The aim is to improve data quality by investigating completion of the survey. The study reviews the theoretical background related to self-assessment surveys and completion rate, and explores the influence of survey length and format in survey design on completion rate. The research design and data analysis are described in detail, with a focus on identifying factors that may influence completion rate. Results suggest that survey designers should consider using Likert scales to optimize completion rate and completion time. However, this study did not find a significant increase in completion rate as a result of motivation, which was claimed from the literature. The study concludes with implications for the design and implementation of self-assessment surveys in the workplace, including the importance of reducing length and complexity of survey items and questions.

Keywords:
self-assessment surveys, likert scale survey, slider survey, two-option survey, completion rate

University of Maribor Press

DOI https://doi.org/10.18690/um.fov.6.2023.29
ISBN 978-961-286-804-8

1 Introduction

The use of self-assessment surveys has become increasingly popular in recent years as a means of evaluating an individual's skills, knowledge, and abilities (Andrade, 2019; Benraghda et al., 2022; Noorka & Sarwar, 2020). These surveys have proven to be particularly useful in the workplace, where they can help identify areas where employees may require additional training or support. Although self-assessment surveys have the potential to offer numerous benefits, gathering accurate data can be challenging due to low response rates, low completion rate and early drop outs, particularly when the self-assessment survey results reflect one's own skills level that he/she sees private.

This study aims to investigate the factors that influence participants' fatigue and completion rate for a self-assessment survey designed to test employees' digital skills levels. The goal is to identify factors that can be used to increase participation and completion in the survey, thereby improving the quality of the data collected. Specifically, this research will explore the use of various perspectives in the survey design as a potential means of increasing completion rate.

The digital skills survey has been chosen for testing in this study due to two principal reasons. Firstly, this assessment tool was conceptualized and developed by the authors themselves, who possess an excellent grasp of its underlying theoretical constructs. Consequently, the authors are better equipped to effectively scrutinize and decipher the results yielded by this current study. Secondly, during the preliminary testing phase, the authors noted inconsistent completion rates, which served as a catalyst for devising the current study, which aims to delve deeper into the determinants of completion rates in self-assessment surveys employing diverse types of response scales.

The study will begin with a review of the theoretical background related to self-assessment surveys and completion rate. This will be followed by a detailed description of the research design, data analysis and results with a focus on identifying factors that may be influencing completion rate. Finally, conclusions will be drawn along with a discussion of their implications for the design and implementation of self-assessment surveys in the workplace.

2 Research background

Self-assessment survey for monitoring skills costs less resources to administer than other methods and requires less time than a testing (Allen & van der Velden, 2005), and web-based survey as a survey instrument is developed as an easy and economical method of collecting data (Parsons, 2007). An advantage of web-based survey is that it's possible to track the respondent behavior, namely "complete responders (respond to the entire survey), unit non-responders or refusals (do not respond to the survey at all), and item non-responders (respond to only some of the questions)" (Parsons, 2007). This study primarily focuses on the impact of length and formats/types of a survey on the respondent behavior by examining the completion rate of the survey, as these factors are often discussed as significant determinants (Beebe et al., 2010a; Buskirk et al., 2015; Dobronte, 2015; Galesic & Bosnjak, 2009; Hoerger, 2010; Nestler et al., 2015; Revilla & Ochoa, 2017; Roster et al., 2015).

Even though no significant relationship was found between survey length and quality (Beebe et al., 2010b), longer the survey, more fatigue and burden of the participants, especially web-paged surveys (Galesic, 2006; Savage & Waldman, 2008). Both Deutskens et al. (2004) and Marcus et al. (2007) found that participants were willing to complete the survey if it lasted shorter (15-30 minutes and 10-20 minutes), compared to those longer than 30 minutes. Galesic and Bosnjak (2009) tested survey length with 10/20/30 minutes, and found that more respondents started and completed the survey with 10 minutes than the rest. Brace (2013) suggested the length of an online survey as 15 mins and around 40-45 questions. Moreover, Revilla & Ochoa (2017) tested and concluded that ideal survey length is a median of 10 minutes and that the maximum survey length is 20 minutes.

Roster et al. (2015) compared traditional radio-button Likert scale and slider bar formats for five-point Likert scale questions and argued that "a more interactive experience may reduce survey fatigue and nonresponse, and potentially, lead to higher quality data". Stanley & Jenkins (2007) claimed that the "fun factor" of slider scales can engage respondents, especially for young respondents. Buskirk et al. (2015) found from experiment that even though slider starting position could lead to different responses, slider is more preferred than radio buttoned and more from Pc than smart phone users. However, systematic studies by academic researchers

have investigated data quality in multiple ways with mixed empirical results (Roster et al., 2015).

Besides the design of the survey namely length and format, motivation of participants is an intrinsic factor in determining the completion rate of a survey, particularly when it comes to self-assessments of skills by employees. If employees do not see the value in it for their own job or career development, they are not willing to spend effort to help achieving the goal and need of the organization (Govender & Parumasur, 2010). They may not be motivated to fill out the survey and they may and may not take it seriously. This can lead to incomplete or inaccurate responses, which can in turn affect the usefulness of the data collected.

3 Method

The current study employs a design used by Galesic (2006) and Nestler et al. (2015), which involved dividing the survey into blocks of questions and soliciting participant evaluation of the previous blocks. However, this method was adapted with several modifications. Specifically, a button with the option to stop the survey was included at approximately one-third and two-thirds of the survey length. When clicking on the "stop" button, a message box appears showing how much of the survey was finished but that they could stop or continue if they wished. This button feature was used instead of immediate message box to prevent overt intervention of participants into ending the survey early. This feature aimed to measure the rate of survey dropouts and provide immediate feedback of the questionnaire. The feedback questions assessed the motivation level of the participants filling in the survey adopted from motivation questionnaire developed by Fiorella et al. (2021). Specifically three feedback questions were asked with five-point Likert scale: how interesting the questions are, how well you have answered the previous questions, are the questions relevant for your career; and one open question of why you (may) choose to stop the survey. In addition to the feedback opportunity provided if the participants choose to stop at designed places, the participants are also presented with the same feedback questions at the end of the survey if they complete the whole survey.

This study employs three survey formats: two-option choices, a slider bar with five scales, and a five-point Likert scale radio-button survey. The latter two formats have been discussed and compared in the literature. The reason why the two-option choices format is incorporated into this study is that, from the perspective of user experience, presenting participants with scenarios, particularly those related to topic of technology, which may be unfamiliar and complex, can be difficult to answer. The survey is divided into three blocks of questions based on three themes: Resilience (attitude toward technology), Analytical (information handling skills), and Technology (technology skills). Participants receive a random survey form and a random sequence of the three themes. For example, one participant may receive a slider form of survey starting with questions from the Analytical theme. Each type of survey takes approximately 15 minutes, with 32 questions for the two-option choice survey and 35 questions for both the slider and five-point Likert scale surveys. The reason for this difference is to account for the fact that the two-option survey included more text and involved more reading. An example of the three formats of surveys and three themes of questions is provided in Figure 1.

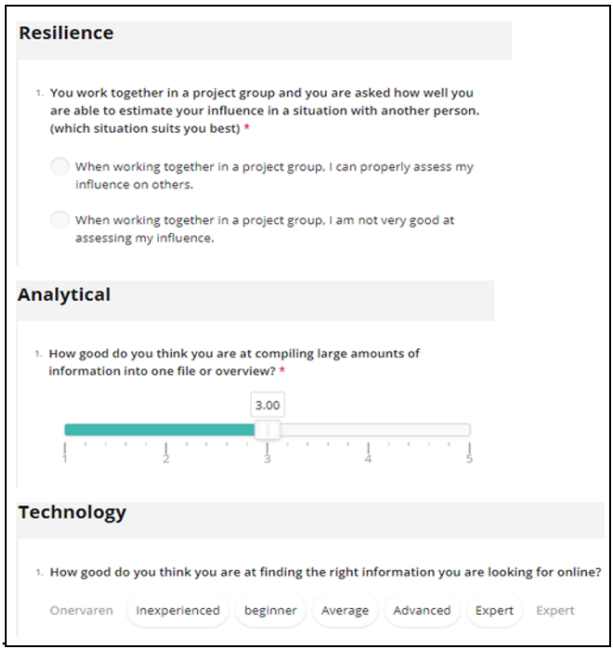

Figure 1: Example of survey formats

As an incentive for collecting more data (Nestler et al., 2015), participants are offered a chance to win a €40 gift card, and they are required to leave an email address at the end of the survey for registration in the lottery. To ensure compliance with GDPR regulations that prohibit the misuse of participant data, a privacy statement is presented at the start of the survey assuring participants that their email address will only be used for registration purposes, and all collected information will be used for research purposes only.

4 Analysis and results

After removing non-valued and duplicated data, the survey yielded a total of 121 responses out of the initial 161 data collected. Descriptions of respondents' age and gender are shown in Table 1. Morover, completetion rates for 1/3, 2/3 or the whole surevy are reported in the table. Specifically, among the 121 respondents, 20 individuals or 17% of the sample completed less than 1/3 of all questions, 10 individuals or 8% of the sample completed between 1/3 and 2/3 or all questions, while the majority (75%) of respondents completed more than 2/3 of all survey questions. This entails that most respondents complete the survey with length of around 15 mins.

Table 1: Sample profile

	Number of respondents	**%**
Gender		
Male	42	34.71%
Female	50	41.32%
Other genders	4	3.31%
Missing	25	20.66%
Age		
Younger than 20	25	20.66%
Between 20 and 22	33	27.27%
Between 23 and 25	21	17.36%
Older than 25	16	13.22%
Missing	26	21.49%
Survey completion		
Less than 1/3	20	16.53%
Between 1/3 and 2/3	10	8.26%
More than 2/3	91	75.21%

Note: N = 121, age (M = 23.41, SD = 7.61).

Completion rate[1] (calculated by dividing number of answered questions by total number of questions), completion time (calculated as sum of seconds used per question), and average time per answered question (calculated by completion time divided by number of questions answered) were compared among the three different survey formats (Likert scale, slider, and two options). ANOVAs show significant differences for all three variables (see Table 2). Likert-scale surveys were completed more (94%) than slider surveys (70%) and two-option surveys (72%). In terms of completion time, two-option surveys took the longest time (480 seconds), followed by Likert-scale surveys (366 seconds), and then slider surveys (225 seconds). Average time per answered question was the longest for two-option surveys (23 seconds per answered question), followed by Likert scale (11 seconds per answered question), and then slider (10 seconds per answered question).

Table 2: Analysis of variance on survey completion among three survey formats[2]

	Response type	N	M	SD	F
Completion rate	Likert scale	35	93.88%	11.68%	7.13**
	Slider	51	70.42%	37.70%	
	Two options	35	72.06%	30.52%	
Completion time	Likert scale	35	365.74	161.51	12.77**
	Slider	51	225.39	153.40	
	Two options	35	480.06	356.17	
Average time per answered question	Likert scale	35	11.29	4.91	22.14**
	Slider	51	10.14	6.11	
	Two options	35	23.37	15.51	

Note: Completion time and average time per answered question measured in seconds; ** $p < .01$

Moreover, the differences identified in completion rate and average time per answered question are visualized in Figures 2 and 3. Also noteworthy is that two options and slider items show similar completion rates, but two option items took much longer to complete. This can be indicative that two option items, although

[1] Completion rate is chosen instead of response rate in this study as it represents a meaningful indicator of the data quality. Given the research design of using a student sample, response rates were high across all surveys sent.

[2] Further Bonferroni post-hoc analyses reveal that for completion rate: Likert scale is significantly higher than both slider and two-option; for average time per answered question: two-option is significantly longer than both Likert scale and slider; and for overall completion time: two-option is significantly longer than slider but not Likert scale while Likert scale is significantly longer than slider. It is also noted that overall completion time should be viewed in the context of the other two variables as completion time itself is contingent upon the number of questions each respondent chose to answer.

time-consuming, are associated with less survey fatigue compared to the slider format. Taken together, the findings shown in the Figures as well as Table 2 indicate that for the administered survey among this sample, Likert-scale items led to the highest level of completion as respondents who were assigned this version of the survey answered the most questions and used relatively little time per answered question. For completion time, Likert scale response type lies in the middle. For both completion rate and average time per answered question, Likert scale is also associated with the lowest standard deviation (see Table 2), indicating a more consistent level of performance among respondents who were assigned surveys of this response type.

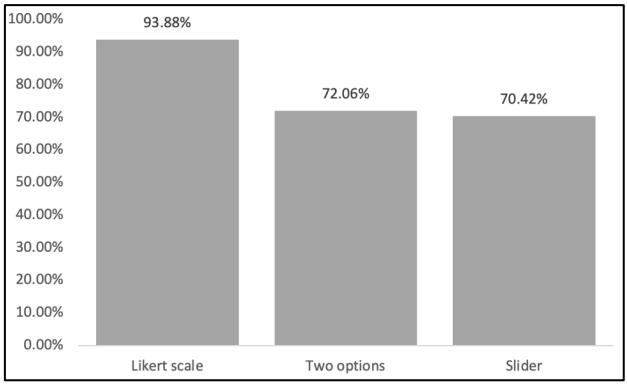

Figure 2: Completion rates among surveys of three survey formats

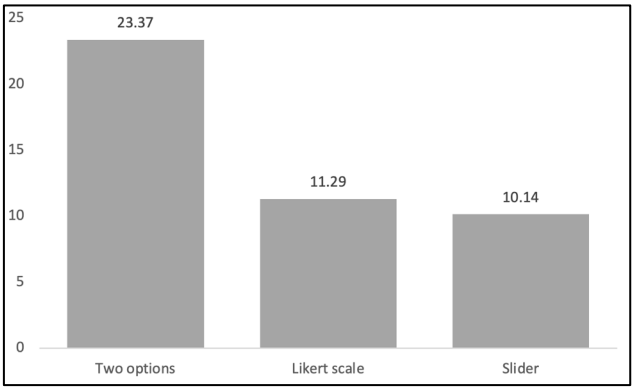

Figure 3: Average time in seconds per answered question among surveys of three survey formats

Additionally, average time per answered question and completion rate are significantly and negatively correlated (r = -.29, p < .01), indicating those respondents who completed more questions used relatively less time per question; another interpretation of this correlational finding is that those who were able to spend less time per question tended to complete the survey more fully.

Motivation of the participants is checked, especially because this survey is about employees' digital skills self-assessment, it is difficult to get response or honest response, may due to the reason that employees are not motivated. This is why the feedback questions regarding motivation were asked, the aim is to understand the relation between motivation of the participants and response, therefore motivate participation. Correlation from these three feedback questions with significant results are presented. First, the three feedback questions (questions being interesting, previous questions well answered, and questions being relevant for future career) are significantly and positively correlated among each other (see Table 3). This confirmed that the items chosen for measuring motivation level are reliable factors.

Table 3: Correlations

	1	**2**	**3**
1 Questions interesting			
2 Previous questions well answered	.61**		
3 Questions relevant for career	.41**	.37**	

Note: ** p < .01

A regression analysis is performed, using the three theoretical questions as predictors and completion rate as the dependent variable. It should be noted that not all respondents chose to answer the three theoretical control questions. Among the 121 respondents in this sample, 64 responded to these three questions. The outcome of this regression analysis shows no significant relationship between motivation questions and completion of the survey among participants in this study (see Table 4).

Despite the inclusion of an open-ended question inquiring about the reasons for survey discontinuation, only a limited number of respondents, specifically 22 out of 121, provided a response. This lack of responses can be attributed to the fact that most respondents did complete the survey to a large extent. Of those who did respond, the most commonly given reasons for discontinuation included: (1)

perceived irrelevance of the questions, (2) excessive number of questions, and (3) complexity and length of the survey items, which posed difficulties in reading and comprehending the survey content. These findings highlight the significance of designing surveys that are concise, relevant, and easy to navigate, to ensure optimal participation and minimize attrition.

Table 4: Regression analysis with completion rate as dependent variable

Predictor	***B***	***SE***	***Beta***	***t***	***p***
Intercept (constant)	.82	.06		14.23	.00
Questions interesting	.02	.02	.15	.92	.36
Previous questions well answered	.02	.02	.09	.55	.58
Questions relevant for career	-.01	.01	-.11	-.81	.42

Note: $R = .20$, $R^2 = .04$, $F = .81$ (*ns*).

5 Conclusions and implications

The results indicate that more than 75% participants complete the survey with the estimated length of 15 mins, this confirms the literature that the average length of 15 mins is appropriate supporting high completion rate. However, the incentive given in this study may contribute to the high completion rate as well. In the real self-assessment survey, a relevant reward could be considered for improving completion rate. For example, the employees would receive free career consult and training for self-development.

This study also shows that the formats of surveys significantly impact completion rates and completion time. Specifically, Likert scale surveys are completed more than two-option surveys and slider surveys. In terms of completion time per answered question, Likert-scale surveys involve less time than two-option surveys and only marginally more time than slider surveys. Likert scale is also associated with the lowest standard deviation among the three survey formats, indicating a more consistent level of performance among respondents who were assigned surveys of this response type both in the amount of time needed to complete the survey and the extent to which they completed the survey. This suggests that survey designers should consider using Likert scale to optimize completion rates and completion time. However, this conclusion is only based on the completion rates of this 121-student sample, it does not refer to any other factors. One concern that some

participants tend to skip the later part of the survey by choosing middle (Likert scale) or 4 (in slider), whether they are not engaged in the survey, influenced by the incentive or it has to do with less relevance because they are students rather than employees, should be investigated further in future study.

In addition, given the longer time per answered question for two-option surveys, survey designers ought to consider using this survey format only when it is required (e.g.: complex reasoning is involved or when respondents must give a dichotomy answer). Even then, it is important to note that two-option format may still result in lower completion rates and longer overall completion time.

Moreover, the negative correlation between completion rate and average time per answered question suggests that reducing the time spent per question can increase completion rates. To improve completion rates, survey designers may consider simplifying survey items and questions, thereby reducing their length and complexity.

However, this study does not offer conclusive evidence of a relationship between motivation and completion rate. To increase motivation among employees, it can be helpful to clearly communicate the purpose and benefits of the survey, such as how the data will be used to improve employee development programs or support career growth. It can also be useful to emphasize the confidentiality and anonymity of responses to encourage employees to provide honest feedback. Additionally, offering incentives such as a free career consult and training can provide additional motivation for employees to participate. Overall, by emphasizing the importance and benefits of the survey, employers can help increase employee motivation and participation, resulting in more useful data and better outcomes for all involved.

Finally, the findings and conclusions of this study should be viewed in light of two potential limitations. The first limitation concerns the sample group and sample size. While the sample of students provides insightful findings, it may only partially reflect the behaviors of employees. Therefore, future research utilizing a larger employee sample is recommended to validate the generalizability of the present study's findings. Moreover, with a sample size of only 121, divided into three response type groups, the current study's sample size is limited, which further emphasizes the need for larger samples in future research. However, it is worth noting that the current

study still produced statistically significant results, which mitigates some of the concerns associated with the sample size limitation. The second limitation pertains to the potential presence of common method bias. As all variables used in the correlation and regression analyses are self-reported by the sample, there exists a possibility of common method bias. To combat this issue, future studies could incorporate research designs that utilize multiple data sources. It is essential to note, though, that the correlation and regression analyses served primarily as supplementary analysis, and the key conclusions of this study are based primarily on the ANOVA results.

Despite the above mentioned two potential limitations, this study provides valuable insights into completion rates of self-assessment surveys. The findings indicate that survey designers should give careful consideration to survey length and format to optimize completion rates and completion time, with the use of Likert scales showing promise in enhancing survey completion. While the study did not find evidence of a significant relationship between motivation and completion rates, the results underscore the importance of reducing survey complexity and length to promote engagement and participation. These findings have implications for the design and implementation of self-assessment surveys in the workplace, highlighting the need to prioritize user experience and streamline survey design to maximize data quality and promote workforce development. Overall, this study contributes to the growing body of literature on survey design and completion rates, offering practical insights for HR managers and researchers seeking to improve the use of self-assessment surveys as a tool for evaluating digital skills in the workplace.

References

Allen, J., & van der Velden, R. (2005). The Role of Self-Assessment in Measuring Skills. http://www.reflexproject.org.2

Andrade, H. L. (2019). A Critical Review of Research on Student Self-Assessment. Frontiers in Education, 4, 87. https://doi.org/10.3389/FEDUC.2019.00087/BIBTEX

Beebe, T. J., Rey, E., Ziegenfuss, J. Y., Jenkins, S., Lackore, K., Talley, N. J., & Locke III, R. G. (2010a). Shortening a survey and using alternative forms of prenotification: Impact on response rate and quality. In BMC Medical Research Methodology (Vol. 10). http://www.biomedcentral.com/1471-2288/10/50

Beebe, T. J., Rey, E., Ziegenfuss, J. Y., Jenkins, S., Lackore, K., Talley, N. J., & Locke III, R. G. (2010b). Shortening a survey and using alternative forms of prenotification: Impact on response rate and quality. In BMC Medical Research Methodology (Vol. 10). http://www.biomedcentral.com/1471-2288/10/50

Benraghda, A., Mohd Radzuan, N. R., & Lardhi, F. A. S. (2022). Self-assessment as a self-regulated learning approach in English oral presentations: College students' choices and perceptions. Http://Www.Editorialmanager.Com/Cogentedu, 9(1). https://doi.org/10.1080/2331186X.2022.2123472

Brace, I. (2013). Questionnaire design : how to plan, structure and write survey material for effective market research.

Buskirk, T. D., Saunders, T., & Michaud, J. (2015). Are Sliders Too Slick for Surveys? An Experiment Comparing Slider and Radio Button Scales for Smartphone, Tablet and Computer Based Surveys. Methods, Data, Analyses, 9(2), 32. https://doi.org/10.12758/mda.2015.013

Deutskens, E., De, K. O., Nl, R. K. D. U., Oosterveld, P., & Nl, P. O. (2004). Response Rate and Response Quality of Internet-Based Surveys: An Experimental Study. In Marketing Letters (Vol. 15, Issue 1).

Dobronte, A. (2015, June 27). Likert scales vs. slider Scales in commercial market research.

Fiorella, L., Yoon, S. Y., Atit, K., Power, J. R., Panther, G., Sorby, S., Uttal, D. H., & Veurink, N. (2021). Validation of the Mathematics Motivation Questionnaire (MMQ) for secondary school students. International Journal of STEM Education, 8(52). https://doi.org/10.1186/s40594-021-00307-x

Galesic, M. (2006). Dropouts on the Web: Effects of Interest and Burden Experienced During an Online Survey. Journal of Official Statistics, 22, 313–328.

Galesic, M., & Bosnjak, M. (2009). Effects of questionnaire length on participation and indicators of response quality in a web survey. Public Opinion Quarterly, 73(2), 349–360. https://doi.org/10.1093/poq/nfp031

Govender, S., & Parumasur, S. (2010). The Relationship between Employee Motivation and Job Involvement. SAJEMS NS, 13(3), 237–253.

Hoerger, M. (2010). Participant Dropout as a Function of Survey Length in Internet-Mediated University Studies: Implications for Study Design and Voluntary Participation in Psychological Research. Cyberpsychology, Behavior, and Social Networking, 13(6), 697–700.

Marcus, B., Bosnjak, M., Lindner, S., Pilischenko, S., & Schütz, A. (2007). Compensating for Low Topic Interest and Long Surveys A Field Experiment on Nonresponse in Web Surveys. Social Science Computer Review, 25, 372–383. https://doi.org/10.1177/0894439307297606

Nestler, S., Thielsch, M., Vasilev, E., & Back, M. D. (2015). Will They Stay or Will They Go? Personality Predictors of Dropout in an Online Study. International Journal of Internet Science, 10(1), 37–48.

Noorka, I. R., & Sarwar, M. (2020). Self-Assessment for Students. 760–769. https://doi.org/10.1007/978-3-319-95870-5_90

Parsons, C. (2007). Web-Based surveys: Best practices based on the research literature. Visitor Studies, 10(1), 13–33. https://doi.org/10.1080/10645570701263404

Revilla, M., & Ochoa, C. (2017). FORUM Ideal and maximum length for a web survey. International Journal of Market Research, 59, 557. https://doi.org/10.2501/IJMR-2017-039

Roster, C. A., Lucianetti, L., & Albaum, G. (2015). Exploring Slider vs. Categorical Response Formats in Web-Based Surveys. Journal of Research Practice, 11(1), 1–19. http://jrp.icaap.org/index.php/jrp/article/view/509/413

Savage, S. J., & Waldman, D. M. (2008). Learning and fatigue during choice experiments: A comparison of online and mail survey modes. Journal of Applied Econometrics, 23(3), 351–371. https://doi.org/10.1002/jae.984

Stanley, N., & Jenkins, S. (2007). Watch What I Do! Using Graphic Input Controls in Web Surveys. Fifth International Conference of the Association for Survey Computing. http://www.asc.org.uk