Customer Education in the Digital Age: Intended and Unintended Effects

Benjamin von Walter
Eastern Switzerland University of Applied Sciences
Bruno Jäger
OST - Eastern Switzerland University of Applied Sciences
Christian Heumann
Eastern Switzerland University of Applied Sciences
Dietmar Kremmel
FHS St.Gallen University of Applied Sciences

Customer Education in the Digital Age: Intended and Unintended Effects

Abstract

Many companies implement customer education to improve their customers' abilities to interact with digital service technologies. In this research, we investigate how customers respond to different forms of customer education. A study of customer data of a financial service provider and an experiment show that customer education has a positive effect on acceptance of service technologies. However, we also demonstrate that customers may not always respond positively to customer education. Whereas customers who receive education adaptive to their individual abilities react favorably, customers who receive non-adaptive education feel negatively about the service technology that has been the subject of customer education. In sum, these findings emphasize the potential of customer education to increase technology acceptance and point to the importance of making customer education more adaptive.

Keywords: customer education, customer learning, technology acceptance

Conference Track: Services Marketing

1. Introduction

Scholars have emphasized that effective customer participation is essential to service value creation in a digital world (e.g., Chen & Wang, 2016; Dong, Sivakumar, Evans, & Zou, 2014). Whether a customer is using a fitness app, making a scan payment, or monitoring his/her blood pressure with a digital device, none of these services would be possible without customers' expertise to interact with digital service technologies. To impart such knowledge, service firms offer their customers a variety of customer education measures, that is, activities and information to foster the skills and abilities needed to use their services (Hibbert, Winklhofer, & Temerak, 2012). Common measures range from seminars and in-store advice to online resources such as explainer videos, interactive walkthroughs, or tooltips.

However, even though customer education is a widespread phenomenon in the digital marketplace, research about its impact is scarce. Specifically, research has not clearly established the link between customer education and technology acceptance. That is, previous studies have examined the effect of expertise, self-efficacy, and other learning outcomes (e.g., Bell et al., 2017; Zhao, Mattila, & Tao, 2008) but have barely addressed how customer education affects actual adoption behavior. Importantly, existing studies have viewed customer education as an inherently positive experience for customers. This view contrasts with anecdotal evidence suggesting that customer education may sometimes be irritating for customers (e.g., Agrawal, 2022). So far, it is unclear when customer education leads to favorable and unfavorable customer reactions.

Against this background, the current research investigates intended and unintended effects of customer education. First, we examine the impact of customer education on technology acceptance. In this regard, an analysis of data of a financial service provider based on propensity score matching shows that customers who have participated in customer education use a service technology more often than customers who have not received customer education. Second, we conducted an experiment to examine when customers respond more and less favorably to customer education. In this respect, our findings suggest that customer education may backfire if it is not adaptive to the abilities of individual customers. In doing so, our research extends existing work on customer learning and helps companies to leverage customer education's potential for technology acceptance.

2. Conceptual development and hypotheses

2.1 The impact of customer education on technology acceptance

According to the literature, customer education is the process of proactively explaining and demonstrating a service to customers (Bell et al., 2017; Eisingerich & Bell, 2008). In recent years, traditional forms of customer education such as frontline employee advice and workshops have been complemented by online education (Hollebeek, Srivastava, & Chen, 2019). For example, many firms offer their customers so-called "learning nuggets", that is, short learning activities such as explainer videos, slideshows, and tooltips.

Previous research has not clearly linked customer education to technology acceptance. Whereas customer education research has focused on the impact of learning outcomes such as expertise and self-efficacy (e.g., Bell et al., 2017; Zhao et al., 2008), research on technology acceptance has examined the role of individual differences and technology characteristics to explain technology adoption (Blut, Wang, & Schoefer, 2016). We propose that the provision of customer education is an additional, important factor to enhance acceptance of service technologies. First, as mentioned above, customer education explains the concept of a service technology to customers. This may lead to a greater awareness of its functionalities, an important prerequisite for technology adoption (Rogers, 1995). A bank customer, for example, who knows about new features of her online banking tool may use it more often. Second, customer education may provide knowledge on how to use a specific technology-based service, for example, by demonstrating the steps of a service interaction (Zhao et al., 2008). This may increase customers' self-efficacy, that is, customers' beliefs in their ability to use the service (Bandura, 1997). Studies have linked self-efficacy to adoption of service technologies (e.g., van Beuningen, de Ruyter, Wetzels, & Streukens, 2009). Summarizing,

H1: Customer education will have a positive impact on the use of service technologies.

2.2 The role of adaptivity

Importantly, customers may not always view customer education positively. One factor which may influence customers' reactions to educational measures is adaptivity. In general, adaptivity is regarded as the variation of the extent and content of education based on a learner's prior knowledge and abilities or other characteristics (Aleven, McLaughlin, Glenn, & Koedinger, 2017). An example would be a company which shows video popups and tooltips during a service interaction only to customers who do not have sufficient expertise to participate in the service effectively.

In the following, we propose that adaptivity plays a crucial role in ensuring a positive customer response to educational interventions. That is, customers who experience that customer education is adaptive to their individual abilities may respond more favorably to a

service technology than customers who do not experience a match between customer education and their abilities. According to the literature, customer learning is a self-directed, volitional process depending not only on the provision of learning resources but also on situational interest (Hibbert et al., 2012; Hollebeek et al., 2019). Customer education which is adaptive to individual abilities may spark greater situational interest as it is of higher personal relevance (Hidi & Renninger, 2006). For example, one may imagine a customer who has little knowledge about a specific feature of a service technology and therefore finds it difficult to use the service. This customer may welcome an instruction as it increases his/her knowledge about the service technology and, subsequently, his/her perception of self-efficacy (Hidi & Ainley, 2008). Accordingly, he or she may accept the service technology more strongly. In contrast, non-adaptive customer education may be of less personal relevance as people may believe that they already have the abilities needed to use a service technology. Accordingly, they may be less interested in receiving customer education. In fact, offering such education may lead to negative feelings as it may signal to customers that a company questions their ability to use a service or a specific feature of it. In this respect, scholars have argued that unsolicited offerings of help can pose a threat to one's feelings of self-esteem (e.g., Bolger & Amarel, 2007; Nadler & Fisher, 1986). Hence, one may argue that non-adaptive customer education may be viewed negatively. As a result, customers may be less satisfied with a service technology. Thus,

> *H2:* Adaptivity will determine customers' response to customer education. That is, customer will (a) respond positively to *adaptive* customer education compared to a control condition without customer education but (b) negatively to *non-adaptive* customer education compared to a control condition without customer education.

3. Study 1

3.1 Data and method

To test H1, we analyzed data of a financial service provider which specializes in investment advice. The provider offers all customers a robo-advice feature which allows them to develop, review, and adapt investment strategies based on financial algorithms. However, only some customers activate the feature and use it. Hence, the company regularly invites customers to workshops in one of their branches which educate them on this topic. In the following, we view participation in an educational workshop as a "treatment" and investigate the effect of this "treatment" on adoption behavior. The data set consists of a random sample of 26,659 investment customers of the bank, including 247 customers who attended a

4

workshop within the last nine month. A dichotomous choice variable served as dependent variable (0=no activation of robo-advice feature, 1=activation of robo-advice feature). The dataset also includes control variables which may explain participation in customer education and may influence acceptance of new technologies, namely age, duration of business relationship, income, and use of general internet banking.

We used a propensity score matching (PSM) procedure, which is a well-known approach in the field of causal inference on observational data (Rosenbaum & Rubin, 1984). More precisely, our objective was to identify the average treatment effect on the treated (ATT) of customer education by artificially creating a control group in which each participant of the workshop ("treated") was matched to a similar non-participant ("non-treated") according to a propensity score. To obtain parameter estimates for the propensity scores, we first fitted a logistic regression on customer education using all variables (see Table 1). Next, participants (i.e., "treated" customers) were one-to-one matched to non-participants (i.e., "non-treated" customers) based on their propensity scores via the nearest neighbor matching algorithm (for a similar approach see von Wangenheim & Bayón, 2007). Thus, post matching, the dataset consisted of 494 observations, including 247 "treated" and 247 "non-treated" customers. Finally, we ran a logistic regression on our binary dependent variable including customer education as well as all controls using the matched dataset.

	Dataset Before Matching (n = 26,659) DV: customer education			Matched Dataset (n = 247) DV: activation of robo-advice		
Independent Variables	B	Wald	p	B	Wald	p
Constant	-5.21	-12.49	<0.001	-1.66	-1.87	0.06
Customer education	-	-	-	1.56	5.04	<0.001
Age	0.01	1.24	0.22	-0.02	-1.73	0.08
Duration of business relationship	-0.15	-6.54	<0.001	-0.11	-2.27	0.02
Income	<0.001	-1.62	0.11	<0.001	0.37	0.71
Use of internet banking	1.35	8.68	<0.001	0.65	1.80	0.07

DV=dependent variable

Table 1. Results of Logistic Regression Analyses

3.2 Results

The analysis of the matched dataset shows that customer education has a significant positive effect on use of robo advice (B = 1.56, Wald = 5.04, 1 d.f., $p < .001$). More specifically, 23.4 percent of customers participating in customer education activated the robo-advice feature compared to only 6.1 percent of non-participating customers. These findings provide support for H1.

However, although we used propensity matching to achieve a comparability of treatment groups, respondents were not assigned randomly to the customer education and the control

5

condition. That is, participants decided for themselves whether they wanted to receive customer education or not. This setting is typical for conventional customer education but not for online customer education. That is, online education is often displayed automatically during a service encounter (e.g., tooltips, videos). To address this issue, the following study relies on an experimental approach and investigates customer education in an online context.

4. Study 2

4.1 Design, participants, and procedure

The purpose of study 2 was to test H2a and H2b. We investigated a different form of customer education, namely a slideshow which was shown to customers when using a service technology. One-hundred-and-sixty-four participants were recruited on the campus of a university under the pretext of testing a digital banking feature of a local bank and were run individually in a separated room. At the beginning of the study, participants were asked to fill in a questionnaire to assess several control measures. Next, they were introduced to the target feature, which was a bill scanning tool installed on a smartphone prepared for the study. Respondents received a paper invoice and were asked to pay the invoice by scanning it within 90 seconds (time was pretested and ensured that all participants with some experience in internet banking could easily master the task). After scanning the bill, half of the participants were asked to click through a slideshow which appeared on an additional screen and provided a step-by-step instruction of how to scan a bill. Next, they were asked to pay the same bill once more within 90 seconds. Finally, they responded to the dependent measures and were debriefed. All participants received a voucher for a free drink at the university's cafeteria.

In total, 40 participants failed to complete they first payment (65% female, average age: 29.7 years). As they did not know sufficiently how to scan a bill, we reckoned that customer education was adaptive to their abilities in that it showed them how to use the service technology. Hence, this subsample was used to test H2a. In contrast, 124 participants scanned and paid the first bill successfully (57% female, average age: 29.2 years). In this case, customer education was non-adaptive. That it, participants received an educational intervention although they had the ability to use the scanning tool. Consequently, this subsample of customers was used to test H2b.

4.2 Measures

To assess participants' service technology acceptance, we measured their satisfaction with the scanning tool using a three-item scale from Mende and Bolton (2011) (I am

satisfied/content/happy with the payment scanner, $\alpha_{\text{sample\_adaptive\_vs\_control}} = .98$; $\alpha_{\text{sample\_non-adaptive\_vs\_control}} = .92$). Moreover, we measured participants' negative affect with six items adapted from the PANAS scales (Watson, Clark, & Tellegen, 1988) (How do you feel about this service? unhappy, disappointed, depressed, bad, unfavorable, dissatisfied; $\alpha_{\text{sample\_adaptive\_vs\_control}} = .91$; $\alpha_{\text{sample\_non-adaptive\_vs\_control}} = .89$). If not stated otherwise, all items used seven-point scales. We also included controls such as if participants were customers of the bank, how often they had scanned bills before (ordinal scale with nine categories), and how they perceived their general expertise in internet banking (five items adpated from Chiou and Droge (2006); $\alpha_{\text{sample\_adaptive\_vs\_control}} = .93$; $\alpha_{\text{sample\_non-adaptive\_vs\_control}} = .96$). In addition, we used the results of the second scan payment (-1=not completed, 1=completed) as a control variable. Arguably, people may react differently to a service technology if they succeed in using it or not.

4.3 Result

Control variables. In both subsamples, successful completion of the second payment emerged as a significant covariate and was included in the analyses. All other control variables did not exert a significant impact in most instances and were thus excluded from the analyses.

Hypotheses testing. We first analyzed the sample of respondents who failed to scan the first bill. An ANOVA revealed a (marginally) significant impact of customer education on satisfaction ($F(1,37) = 3.78$, $p = .06$) and negative affect ($F(1,37) = 6.26$, $p = .02$). Specifically, participants who received customer education were more satisfied with the service technology than participants who did not receive customer education ($M_{\text{cust\_edu}} = 5.03$, $M_{\text{control}} = 3.88$) and felt less negatively about it ($M_{\text{cust\_edu}} = 2.03$, $M_{\text{control}} = 3.23$). These findings support H2a. Next, we analyzed participants who succeeded in scanning the first bill. As expected, there was negative effect of customer education on satisfaction ($F(1,121) = 6.19$, $p = .01$) and a positive effect on negative affect ($F(1,120) = 5.17$, $p = .03$). That is, participants were less satisfied with the service technology ($M_{\text{cust\_edu}} = 5.60$, $M_{\text{control}} = 6.16$) and demonstrated more negative emotions than participants in the control group ($M_{\text{cust\_edu}} = 1.47$, $M_{\text{control}} = 1.18$). These results support H2b.

5. Discussion

The purpose of this research was to better understand the impact of customer education on technology acceptance. In this respect, Study 1 shows that customer education can increase

actual adoption behavior. However, as Study 2 demonstrates, customers may not always react favorably to customer education. That is, only educational interventions which are adaptive to customers' abilities lead to favorable responses. In contrast, non-adaptive customer education may backfire and reduce acceptance of a service technology.

These findings contribute to existing research. Thus far, behavioral effects of customer education on adoption of service technologies have barely been analyzed empirically. For example, Blut et al.'s (2016) meta-analysis on technology acceptance does not include customer education as a determinant of technology acceptance. Similarly, research on customer learning has neglected downstream behavioral consequences of educational interventions (e.g., Bell et al., 2017; Zhao et al., 2008). Using data from a large financial service provider, we shed light on this issue and show that customer education has the potential to substantially increase acceptance of service technologies. This indicates that service technology providers should leverage the power of customer education more strongly.

Importantly, our study addresses how service providers must design customer education measures. In this respect, our findings suggest that customers appreciate educational interventions which are adaptive to their abilities but respond negatively to non-adaptive interventions. These results are important as the service literature has viewed customer education as an inherently positive experience and has not considered the backfiring effect of non-adaptive customer education (e.g., Eisingerich & Bell, 2008; Sun, Eisingerich, Foscht, Cui, & Schloffer, 2022). To avoid this pitfall, managers should refrain from "one-size-fits-all solutions" and should use adaptive customer education only. While this seems relatively easy to achieve when it comes to instructions provided by employees on a one-to-one basis, it requires the development of sophisticated algorithms in an online education context. That is, firms need to assign the right learning activities and information to the right customers at the right time based on the right data.

Our studies also have some limitations that call for future research. For example, we investigated different educational contexts to increase the validity of our research. That is, in the first study, we examined customer education detached from a specific service interaction, a context in which customers could decide for themselves if they wanted to receive customer education or not. In contrast, in the second study, we focused on customer education during an ongoing service interaction, a context in which it is common to display customer education automatically (e.g., tool tips, educational popups). Future research may want to investigate the impact of these contexts more closely. Another interesting avenue may be to test different operationalizations of adaptivity. In our research, customer education was adaptive to

customers' abilities. However, research on adaptive learning has discussed many other learner characteristics educational systems can be adaptive to such as different learning styles or metacognition (Aleven et al., 2017). It seems necessary to investigate these issues to fully understand the impact of customer education in the digital age.

Literature

Agrawal, P. (2022). Why tooltips are terrible and how to better design them. Retrieved from https://www.chameleon.io/blog/why-tooltips-are-terrible-and-why-you-should-use-them. (Last accessed: October 20, 2002).

Aleven, V., McLaughlin, E. A., Glenn, R. A., & Koedinger, K. R. (2017). Instruction based on adaptive learning technologies. In R. E. Mayer & P. A. Alexander (eds.), *Handbook of research on learning and instruction* (2nd ed., pp. 522-560). New York, Routledge.

Bandura, A. (1997). *Self-efficacy. The exercise of control*. New York: W. H. Freeman.

Bell, S. J., Auh, S., & Eisingerich, A. B. (2017). Unraveling the customer education paradox. *Journal of Service Research, 20*(3), 306-321.

Blut, M., Wang, C., & Schoefer, K. (2016). Factors influencing the acceptance of self-service technologies: A meta-analysis. *Journal of Service Research, 19*(4), 396-416.

Bolger, N., & Amarel, D. (2007). Effects of social support visibility on adjustment to stress: Experimental evidence. *Journal of Personality and Social Psychology, 92*(3), 458-475.

Chen, C.-F., & Wang, J.-P. (2016). Customer participation, value co-creation and customer loyalty – a case of airline online check-in system. *Computers in Human Behavior, 62*, 346-352.

Chiou, J.-S., & Droge, C. (2006). Service quality, trust, specific asset investment, and expertise: Direct and indirect effects in a satisfaction-loyalty framework. *Journal of the Academy of Marketing Science, 34*(4), 613.

Dong, B., Sivakumar, K., Evans, K. R., & Zou, S. (2014). Effect of customer participation on service outcomes: The moderating role of participation readiness. *Journal of Service Research, 18*(2), 160-176.

Eisingerich, A. B., & Bell, S. J. (2008). Perceived service quality and customer trust: Does enhancing customers' service knowledge matter? *Journal of Service Research, 10*(3), 256-268.

Hibbert, S., Winklhofer, H., & Temerak, M. S. (2012). Customers as resource integrators: Toward a model of customer learning. *Journal of Service Research, 15*(3), 247-261.

Hidi, S., & Ainley, M. (2008). Interest and self-regulation: Relationships between two variables that influence learning. In *Motivation and self-regulated learning: Theory, research, and applications* (pp. 77-109). Mahwah, NJ, Lawrence Erlbaum Associates Publishers.

Hidi, S., & Renninger, K. A. (2006). The four-phase model of interest development. *Educational Psychologist, 41*(2), 111-127.

Hollebeek, L. D., Srivastava, R. K., & Chen, T. (2019). S-D logic–informed customer engagement: Integrative framework, revised fundamental propositions, and application to CRM. *Journal of the Academy of Marketing Science, 47*(1), 161-185.

Mende, M., & Bolton, R. N. (2011). Why attachment security matters: How customers' attachment styles influence their relationships with service firms and service employees. *Journal of Service Research, 14*(3), 285-301.

Nadler, A., & Fisher, J. (1986). The role of threat to self-esteem and perceived control in recipient reaction to help: Theory development and empirical validation. *Advances in Experimental Social Psychology, 19*, 81-94.

Rogers, E. M. (1995). *Diffusion of innovations* (4th ed.). New York: The Free Press.

Rosenbaum, P. R., & Rubin, D. B. (1984). Reducing bias in observational studies using subclassification on the propensity score. *Journal of the American Statistical Association, 79*(387), 516-524.

Sun, X., Eisingerich, A. B., Foscht, T., Cui, X., & Schloffer, J. (2022). Why do customers want to learn? Antecedents and outcomes of customer learning. *European Journal of Marketing, 56*(3), 677-703.

van Beuningen, J., de Ruyter, K., Wetzels, M., & Streukens, S. (2009). Customer self-efficacy in technology-based self-service: Assessing between- and within-person differences. *Journal of Service Research, 11*(4), 407-428.

von Wangenheim, F., & Bayón, T. (2007). Behavioral consequences of overbooking service capacity. *Journal of Marketing, 71*(4), 36-47.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect - the PANAS scales. *Journal of Personality and Social Psychology, 54*(6), 1063-1070.

Zhao, X., Mattila, A. S., & Tao, L. S. E. (2008). The role of post-training self-efficacy in customers' use of self service technologies. *International Journal of Service Industry Management, 19*(4), 492-505.