



How Self-Efficacy and Gender Issues Affect Software Adoption and Use

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Today's computer software packages have potential to change how business is conducted, but only if organizations recognize their usefulness and ease of use. For an organization to benefit fully from its investments, training initiatives geared toward creating "buy-in" are needed to ensure the successful adoption of software packages [10]. This article presents research findings on how one such initiative, a simple tutorial, affected user confidence in mastering software, and subsequently the likelihood of successful use and adoption of the package. Women and men were found to relate to the tutorial differently, which suggests that gender should be taken into consideration when creating marketing and training strategies [4].

The study participants were eighty MBA students, 52 men and the 28 women, enrolled at a U.S. university. They completed questionnaires measuring their computer experience and their self-efficacy beliefs concerning their ability to use Microsoft's FrontPage 98 to create and maintain a Web site. The self-efficacy questionnaire is shown in Table 1. Self-efficacy is the measure of one's confidence in mastering a new challenge. When self-efficacy is high, one believes a high probability exists that one will be successful, while low self-efficacy suggests a limited belief one will accomplish an objective. It can be assessed at a holistic level, where one judges one's ability to accomplish objectives in general, or at a task level. Bolstering self-efficacy is important because it affects one's willingness to invest effort into purchasing, learning, and using software.

The participants had no previous experience with FrontPage 98. Each completed a hands-on tutorial designed to provide a brief, controlled exposure to the software. The Web sites built by the participants while completing the tutorial were graded to ensure the tutorial had been completed correctly. Afterwards, participants completed another set of questionnaires measuring their perceptions of the software package's ease of use, usefulness, and their self-efficacy beliefs about their ability to use Microsoft's FrontPage 98 to build and maintain a Web site after completing the tutorial. Following are highlights of our main findings:

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Self-Efficacy: The following questions ask you to indicate whether you could use Microsoft FrontPage®98 under a variety of conditions. For each of the conditions, please indicate how confident you are that you would be able to complete the job using the software. 1 indicates “Not at all confident,” 4 indicates “Moderately confident,” and 7 indicates “Totally confident”	
Item 1	if there was no one around to tell me what to do as I go.
Item 2	if I had never used a package like it before.
Item 3	if I had only the software manuals for reference.
Item 4	if I had seen someone else using it before trying it myself.
Item 5	if I could call someone for help if I got stuck.
Item 6	if someone else had helped me get started.
Item 7	if I had a lot of time to complete the job for which the software was provided.
Item 8	if I had just the built-in help facility for assistance.
Item 9	if someone showed me how to do it first.
Item 10	if I had used similar packages before this one to do the same job.
Adapted from Compeau & Higgins (1995)	

Table 1. The self-efficacy questionnaire.

Previous experience predicted higher comfort levels. Those with more experience using computer-based technologies had higher task-specific self-efficacy levels than those with less experience. Other studies have demonstrated that prior experience completing a specific task increases a person’s self-efficacy when confronted with a new but similar task [7]. Such self-efficacy from previous experience is important—studies on technology adoption [5] and software training [11] have shown a relationship between self-efficacy beliefs concerning computer use and the motivation to use those technologies. These studies argued that a person’s level of general computer self-efficacy is instrumental in influencing attitudes towards a new software package prior to its use.

Updated self-efficacy beliefs resulting from prior exposure to similar software packages continued to affect self-efficacy levels in subsequent training sessions; that is, an earlier positive experience positively influenced self-efficacy in later sessions. This observation is in line with previous study findings that self-efficacy has a cumulative nature and experiences build on each other [1]. It should be noted, however, that temporal and sequential issues may also affect the impact of positive training experiences of self-efficacy: more recent experiences are most salient.

Also in accordance with other research, we noted that having a general sense of self-efficacy helped influence attitudes toward the new software prior to use, but after use, the experience itself is more influential in forming self-efficacy beliefs [5, 11]. In the current study, pre-tutorial self-efficacy beliefs were at a holistic or general computer level. Post-tutorial self-efficacy beliefs were no longer general, because the exposure to the software package affected task-specific self-efficacy beliefs.

Tutorial boosted self-efficacy, especially for women. After completing the tutorial, the participants’ self-efficacy beliefs concerning FrontPage 98 improved significantly. Self-efficacy was measured on a 7-point scale. The pre/post-tutorial scores are shown in Figure 1. After this brief, positive, hands-on exposure to the software, study participants were more confident that buying and using FrontPage 98 would benefit an

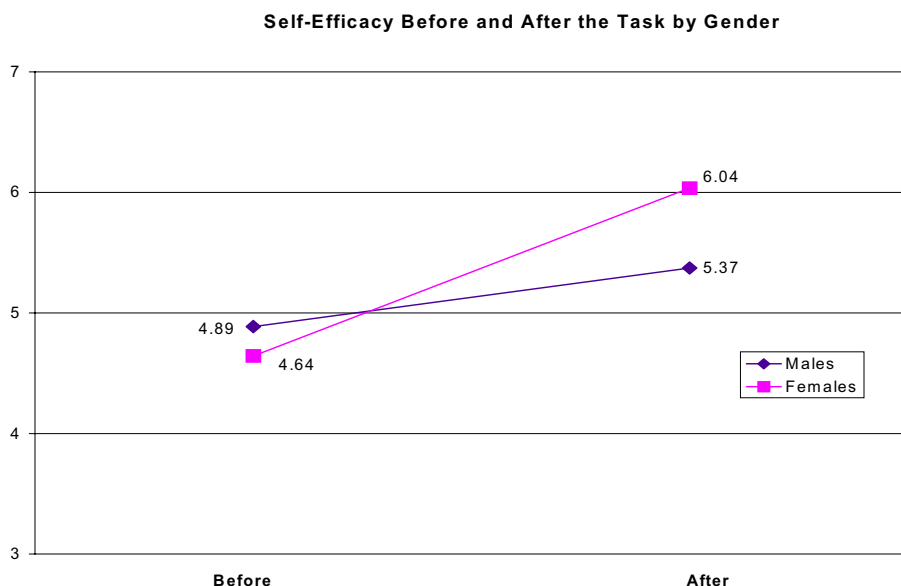


Figure 1. The pre/post-tutorial scores. Self-efficacy was measured on a 7-point scale.

organization with a Web presence. More importantly, they believed they could successfully be involved in the adoption and use of the software package.

The percentage change between pretutorial and post-tutorial self-efficacy scores was significantly greater for women. The tutorial raised women's confidence in their Frontpage abilities more than it did men's. In other words, male and female study participants were similar. All entered the tutorial with similar computer experience and computer-related self-efficacy. Also, no significant performance differences existed between men and women: the quality of their Web sites was equivalent, as was their time required to complete the tutorial.

Making Sense of the Findings

One explanation for the greater change in women's self-efficacy levels after the tutorial may relate to male-female biases in estimating ability. Gender-based differences in self-efficacy are recognized across many disciplines. One study measuring holistic self-efficacy in 14 cultures found males' self-reported general self-efficacy level was higher than females' in each cultural group [9]. It is possible the women under-reported their self-efficacy before the tutorial, but the tutorial served as a reality check, giving the women a truer sense of their ability to use the software. Researchers have noted that by high school, boys tend to overestimate their mathematical ability and girls underestimate theirs. In another study, self-efficacy was a key variable in examining why women and minorities are underrepresented in science and engineering [6]. On average, women were more likely than men to lack confidence in science and math. Thus, in general, women's lower sense of self-efficacy reduces their likelihood of selecting a science or mathematics field such as computer science.

Another explanation for the greater change in women's self-efficacy may involve gender differences in the propensity to apply general experiences to a specific task. The men and women had similar experience with computer-based technologies, but

not with FrontPage 98 or its applications: Web site design and maintenance. That higher levels of general self-efficacy are reported by men than women across cultures suggests men are more confident than women, and such confidence may encourage men to apply general knowledge to task-specific demands. The female study participants may have been less likely to feel confident if they did not have task-specific experience, and more likely to report a sense of self-efficacy after completing the tutorial.

Conclusion

While these findings make sense intuitively, self-efficacy's impact on user comfort is often overlooked in business strategies for selling, implementing, or deploying software. Those wishing to encourage software adoption need to manipulate the target's level of self-efficacy, since essentially, the user or decision-maker needs to believe the proposed benefits of using the software package are achievable. Also, in accordance with the finding that self-efficacy is cumulative, trainers should design training programs to ensure early successes that build the trainees' self-efficacy levels [1]. Also, when training involves multiple sessions, packages, or features, the sequence of the material presented is important.

Given that self-efficacy tends to be higher in men, under certain circumstances gender should be taken into consideration when creating marketing and training strategies [4]. Women may initially appear more resistant to marketing or implementation initiatives. Without task-specific experience, they may be more hesitant than men. Employing earlier and more exposures to the software package may assist the tentative female decision-maker. Incorporating a hands-on introduction to a software package may take a higher priority when approaching a reluctant user-base, especially when a strong female presence exists.

It is also important that experience with a software package be positive. In this study, the participants volunteered to participate in the study because they felt the experience would improve their educational experience. Each participant completed the tutorial without difficulty, found the technology performed reliably, and gained a basic understanding about how to use a software package. They had a positive experience, and as expected, their confidence using FrontPage to build a workplace Web site increased. But if their experience had been negative, if they'd felt confused or frustrated, for example, their self-efficacy levels may have dropped, and they would have been more likely to reject the software package.

When pre-sale, implementation, and training initiatives for software packages increase the prospective customer's or user's self-efficacy beliefs, the likelihood the individual will commit to using the software package is likely to increase. Thus, efforts to enhance self-efficacy and create "buy-in" will result in a higher rate of successful software deployment and use.

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