Gender and Attitudes toward Technology Use: A Meta-Analysis

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Network: 16. ICT in Education and Training
Format: Paper

Session Information
16 SES 04, Gender Differences and ICT

Paper Session
Time: 2016-08-24
09:00-10:30
Room: OB-H1.49 (ALE 2)
Chair: Fazilat Siddiq

Contribution
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Perspective and Purpose
The stereotyped view that women and girls could have more negative attitudes towards technology and technology use, and they would be less actively engaged in technology-related activities and behaviors, which could have contributed to the so-called “technological gender gap” (Canada & Brusca, 1993). Because over the past two decades after the quantitative synthesis by Liao (1999), the society has witnessed an exponential growth in the technology development and infiltration in all aspects of society, and also new studies have been conducted in this area since the last synthesis, it is time that we revisit this issue and take close look at the research findings after the last synthesis (Liao, 1999) with regard to possible gender differences in the attitudes toward technology and its use.

In the area of research for studying attitudes toward technology use, one critical issue is a lack of conceptual clarity for the construct of “attitude.” Whitley (1997), after their review of the relevant research literature in the area of attitudes related to technology use, suggested that the different ways of operationalizing “attitudes” toward technology use in different studies could be categorized into five different, yet related, aspects: affect, beliefs, self-efficacy, mixed and sex-role stereotype. In our review, we attempted to organize and summarize the research studies based on the type of indicators (affect, belief, and self-efficacy) used in a study.

Collis and Williams (2001) discussed that cultural and regional difference was one critical factor in influencing people’s acceptance and use of Internet-based learning resources. The earlier findings suggested that, in different countries, people might have different perceptions and views about information technology (Lee & Brosnan, 1998; Li & Kirkup, 2007). In
addition, uneven economic development levels across different regions might affect the gender differences in attitudes toward technology use in different populations. Based on the accessibility of technology, people from different regions may have different understanding about technology use, and different views about the usefulness of technology, which, in turn, would influence their intentions, choices, efforts, and decisions. Such factors may lead to differences in terms of how gender groups view technology use in these own cultural contexts.

In summary, the primary purpose of this study was to provide a quantitative synthesis of the relevant empirical studies on the issue of gender differences in attitudes toward technology use. Such a quantitative synthesis of the empirical findings has the potential of providing insights into the relevant issues in the research related to attitudes toward technology use that, otherwise, would not be readily available or obvious from individual studies (Fan & Chen, 2001). Specifically, we focus on the following main research questions:

1. Are there gender group differences in attitudes toward technology use as reported in the previous empirical studies over the last two decades?
2. What are the study features (e.g., different aspects of attitude, regions of sampling, type of population, publication year and publication type) that could partially explain the inconsistencies in the findings concerning the gender group differences in attitudes toward technology use across individual studies in the literature?

**Method**

**Methods**

Source of Meta-analytic Sample. Google Scholar, Eric, Taylor & Francis Online, PsycInfo, SAGE, ScienceDirect data bases were explored for the years 1997 to 2014 using the following key words either singly or in combination: gender, sex, attitudes, computer, internet, e-learning, online learning, web-based learning, technology. The most important inclusion criterion is that a study must have compared gender attitudes towards technology use, and must reports both females’ and males’ means and standard deviations, T-ratio or F-ratio can also be included. In total, 51 studies, 111-independent effect sizes subsequently used in this meta-analysis. And we average the multiple effect sizes to make sure that there are independent effect sizes for every attitude type measure in each study (Hunter & Schmidt, 1990). Finally, these procedures resulted in a sample of 51 studies that provided 92 effect sizes. To understand what might have contributed to the inconsistent gender differences in different studies, we coded four salient study features as moderator variables: (a) population type (four categories); (b) what the area the participants of each study in (four categories); (c) the papers published year; (d) whether a study is a journal article or a dissertation.

Data-Analytic Strategy. In this meta-analysis, we use the Hedges’s standard mean difference between male and female as the effect size measure. The weighting procedure is defined as the inverse of the sampling error variance. So the weighted mean effect size defined as (where is the effect size of study i, is the weight of study i), the statistical significant inference of the mean effect size is based on Wald test. The Hedges’s Q statistic: (Hedges & Olkin, 1985, p. 123) is used to evaluate the null hypothesis of homogeneity of effect sizes versus the alternate hypothesis of heterogeneity of effect sizes. The total heterogeneity can separate into two components, the between-group heterogeneity and the within-group heterogeneity. The key question when evaluating moderators is whether there is greater-than-expectable between-group heterogeneity. When the between-group heterogeneity test proved that the observed variability in effect sizes is greater than expectable due to sampling fluctuation alone, as suggested by Hedges and Verea (1998), we should take both the true deviations in population effect sizes and sampling error into consideration. So in present study the mean effect size estimator and significance testing were obtaining form random-effects model analysis by using the Comprehensive Meta-Analysis (CMA) program.

**Expected Outcomes**

We can overall conclude that male have more positive attitude than female by around 15.9% (g=0.159), statistically significant, it’s smaller than previous meta-analysis results. The differences in their attitudes may have been associated with females’ scarce representation and participation in using technology (Ayalon, 2003). But there is no statistically difference between male and female in affect towards technology use. As technology and the internet have become integrated into the daily lives of people, females are embracing new technical knowledge and skills more than ever before, catching up with males in various fields including technology use. The gap of different gender using technology is now narrowing which might contribute to the findings that there was no difference in their affect level. The findings of this study revealed that females have lower level of cognitive beliefs than males that technology has a positive impact on society. With more scarce representation and participation in using technology, females may hold less positive beliefs and expectancies than males. With a lower perception of technical abilities, as well as a lower utility in scientific and technical fields, this study also revealed that females are intend to have a lower level of self-efficacy towards technology use. However with the rapid development of technology, female also have more opportunities to learn and use technology, they are more confidence in skilling in technology than ever before, the gender gap is narrowing.
Population group stand out to have moderating effect on the differences between male and female in overall attitude, belief, especially strong effect in affect towards technology use. The mean effect size also varies as a function of population area. The correlation coefficient for effect size and article year is statistically non-significant. Dissertation studies and journal articles also revealed inconsistent findings.

References


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