

The Moderating Effect of Self-Efficacy on Perceived Service Quality in E-learning: A China Case Study

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Abstract— this study sought to determine the extent to which students' self-efficacy and their social environment influence their perceptions of the e-learning platform as provided by the institution. Based on literature the Perceived Service Quality model (PSQ) is modified using self-efficacy as a moderating effect. Although multiple studies also indicate a moderating effect for social influence, no significance was found to confirm this. A case study at the East China Normal University was performed in validating the conceptual model.

Index Terms—E-learning, Self-efficacy, Social influence, Perceived Service Quality

I. INTRODUCTION

In their paper on e-learning in China Blair, Riezebos, De Vries, De Vries & Zhiting [4] propose a model for measuring the perceived service quality of e-learning. Perceived Service Quality (PSQ) is determined by the dimensions Reliability, Responsiveness, Assurance, Validation of learning resources and Empathy. In the future research section Blair et al. propose further exploration of other variables that (co)determine PSQ. Suggestions are being made for investigating the role of social influence and self-efficacy as moderating effects on the five dimensions of PSQ. This paper explores these possible effects and suggests modifications on the PSQ model.

Research on the moderating effects of social influence and self-efficacy is not new. In 2002 the Theory of Planned Behavior by Ajzen [1] already states that subjective norms and self-efficacy are important predictors of behavioral intention. In this case the subjective norm refers to the perception that someone has that significant others want them to accommodate a certain behavior. In practice, this theorizes that the opinion of other individuals and self-efficacy are important predictors of someone's attitude and behavior. Towards technology Lee, Kim and Chung [15], showed in their research on the usage of mobile Internet services that social influence and self-efficacy significantly affect the perceived usefulness and perceived ease of use. This paper explores the extent to which social influence and self-efficacy will count as the moderating factors on the

perception of the service quality regarding the e-learning platform at the ECNU.

Research Question: to what extent do social influence and self-efficacy moderate the five dimensions of PSQ?

A. Social Influence

Subjective norms and related external variables have been identified as influencers of attitude and behavior. Both in the Theory of Reasoned Action [3] and the Technology Acceptance Model [6] elements of external (social) influences can be found. Social influence can be described as a change in someone's thoughts, feelings, attitudes or behavior that results from interaction with another individual or group [19]. Salancik and Pfeffer [20] state in their Social Information Processing Model (SIPM) that individuals may be influenced by cues from others about how to react, value and evaluate certain phenomena. When using technology, the same influence cues can be found. Especially in online learning systems, where there is an extensive group interaction, social influence can be an important moderating factor [14]. When reviewing social influence in this way, exposure to social information can lead to change, both in a positive or negative way. Social influence is the process by which individuals make real changes to their feelings and behaviors as a result of interaction with others who are perceived to be similar, desirable, or expert. These changes can be stimulated in three ways. First of all, people adjust their beliefs with respect to others to whom they feel similar in accordance with psychological principles such as balance. Secondly, individuals are influenced by the majority. When the referent social group holds a particular attitude, it is likely that the individual will adopt it as well. Finally an individual may change an opinion under the influence of another who is perceived to be an expert in the matter at hand [19]. Exposure to social information can therefore lead to a positive change in the perception of the technology, or it can lead to resistance in the use of a system, which is a negative change in perception. Lee et al. [13] revealed that influences from communication partners changed the attitudes of students on electronic systems significantly.

Although the moderating effect of social influence in overall behavioral change has been verified, Venkatesh & Morris [25] found in their research that social influence is an underexposed factor often even omitted from research in technology acceptance. Although their study only converged a component of social influence, they note an underestimation of the overall role of social influence.

Research in the usage of technology shows a vital role for social influence. Individuals had a higher intention to use technology when more persons in general used the technology. The same can be said for the social influence of work groups. Individual group members would use the technology when more people in the work group used the technology [12]. Another research confirms this; they found that work group based social influence explained a unique variance in individual attitudes and behaviors [7]. Fulk [7] also suggests the viability of future research on the social shaping of attitudes and behaviors related to the usage of communication technology. Therefore, social influence as a moderating effect on perceived quality of an e-learning system will count as a prominent moderating effect in this research.

B. Self-Efficacy

In addition to the moderating effect of social influence, Lee, Kim and Chung [15] also describe the moderating effect of self efficacy on the perceived usefulness of mobile technology. Bandura [2] defines self-efficacy as people’s judgments of their capabilities to organize and execute courses of action required to attain designated types of performance. According to Bandura [2] it is not about the skills a person has, but his or her perception of how they can use them effectively. Bandura [3] also mentions the self-efficacy theory which states that behavior is cognitively mediated by the strengths of a person’s self-efficacy beliefs. Shin [23] confirms this and finds self-efficacy to have a significant effect on both extrinsic and intrinsic motivation. Otieno and Wasonga [18] approach this from another point of view and identify self-efficacy as a resiliency characteristic that has an impact on achievement.

Towards learning self-efficacy counts as a predictor of a student’s motivation and learning behavior [16]; [21]; [22]; [26]. Self-efficacy also influences computer usage. Lower levels of computer self-efficacy are related to lower learning outcomes [27]. In their study on computer self-efficacy in predicting continuance usage of e-learning systems, Hayashi, Chen, Ryan & Wu [8] also mention several studies that found strong evidence of a relation between self-efficacy and computer behavior at universities.

Hsu and Chiu [9] found in their research on self-efficacy that there is a relation between self-efficacy and the acceptance of electronic service. They make a distinction between general computer self-efficacy and task specific computer self-efficacy. Multiple studies [28]; Chau et al., [5] found empirical evidence that supports that there is a significant effect between computer self-efficacy and the perceived usefulness of a

system. A high self-efficacy can also be viewed as an important indicator of trust in the usage of an online system [10].

Joo, Bong and Choi [11] show that students’ perceived capability for effectively regulating their learning processes is an important variable in computer-mediated learning. Lee and Lee [14] confirm the role of self-efficacy in the usage of online educational systems and research the connection between self-efficacy and quality factors and the overall satisfaction of the e-learning environment. In their research the learners’ self-efficacy refers to the learners’ self-regulatory efficacy. Because student motivation and computer usage is crucial in e-learning, self-efficacy functions as a moderator on PSQ.

II MODEL DEVELOPMENT

Prior to conducting the research a conceptual model was developed. Based on literature the model measures the possible moderating effects of social influence and self-efficacy on the five dimensions of PSQ. In addition the direct effects of both moderators on PSQ are also determined.

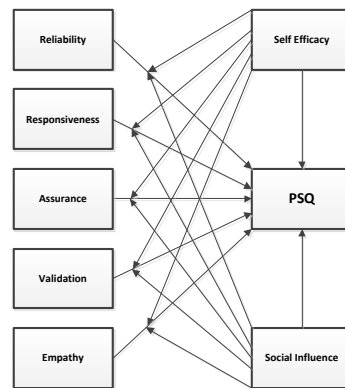


Figure 1 Conceptual model PSQ including moderating effects.

Figure 1 displays the modified PSQ model. Considering the conceptual model the following hypothesis is formulated:

Hypothesis 1 (H1) Social Influence and Social Efficacy moderate the five dimensions and PSQ

III MEASUREMENT

A. Data Collection

A survey technique was used to collect data. The population sample was selected from the non-degree students participating at the East China Normal University. After measuring for twenty-one days 234 questionnaires were obtained.

B. Measurement

To progress the investigation of PSQ by quantitative research an appropriate measure of the underlying constructs is required. The additional constructs social influence and self-efficacy were included in the original

instrument. To maximize the response ratio the questionnaire was translated from English to Mandarin Chinese. In monitoring the quality a backward translation system was used. Each question was translated by one person, and then translated back by another, without the second translator seeing the original question. The backward translation was compared to the original version to see whether the questions were interchangeable. This process was repeated until the most accurate translation was developed. Finally the results of this process were carefully discussed by a team consisting of several Dutch and Chinese academics in finalizing the questionnaire.

To rule out translation issues in analyzing the data, for example the loss of meaning in the answers, the respondents had to answer the questions by means of a 5-point Likert scale. The response options ranged from completely agree to completely disagree.

IV RESULTS

A. General outcomes

Prior to the general outcomes of the research the reliability of the instrument was measured by means of the internal consistency. Using Cronbach’s Alpha, each construct scored an Alpha of >.8 verifying reliability.

A total of 212 completely filled in, usable questionnaires were returned. Of these 212 questionnaires, 48 respondents are male and 164 are female. Respondents were also asked to inform on their age. This construct was divided into six groups. Most of the respondents are under the age of 30. The results show that the majority of respondents are in the age categories 20 – 25 (86 respondents) and 25 – 30 (62 respondents).

A factor analysis was used for data reduction. The Kaiser-Meyer-Olkin measures a sampling adequacy of 0.9, which indicates the partial correlations among the variables are small and legitimize the proceeding of the factor analysis. The communalities show factor loadings above 0.77 for all dimensions which further explain the non-observed factor. Table I provides insights in the amount of variance determined by the individual independent variables. Reliability counts for 86 % of the variance. The Eigenvalues of Responsiveness, Assurance, Validation and Empathy generate such low scores, far below the needed 1, that according to the Kaiser Criterion they add less variance than they deliver. Therefore they are grouped into one primary factor named Reliability (figure 3).

TABLE I
Factor variance

| | Total | % of variance |
|----------------|-------|---------------|
| Reliability | 4.288 | 85.765 |
| Responsiveness | .310 | 6.195 |
| Assurance | .195 | 3.894 |
| Validation | .115 | 2.298 |
| Empathy | .092 | 1.848 |

TABLE II

Factor variance

| Model Summary | ANOVA | |
|-------------------|--------|-------|
| Adjusted R Square | F | Sig. |
| .516 | 75,962 | 0.000 |

B. Moderating effects

A multiple regression \ correlation analysis was used to determine the variance and interaction effects. Reliability and self-efficacy significantly determine PSQ. Interaction between both independent variables is also significant. Social influence does not seem to determine or influence PSQ, nor does it moderate any relations. Finally no significant interaction was found involving self-efficacy and social influence.

TABLE III
Coefficients interaction effects

| PSQ | Beta | F | Sig. |
|------------------------------|-------|--------|------|
| Mean Reliability | .526 | 9.440 | .000 |
| Mean Self Efficacy | .323 | 5.548 | .000 |
| Mean Social Influence | .043 | .872 | .384 |
| Interaction Reliability / SE | .130 | 2.516 | .013 |
| Interaction Reliability / SI | .067 | 1.287 | .200 |
| Interaction SE / SI | -.037 | -1,328 | .186 |

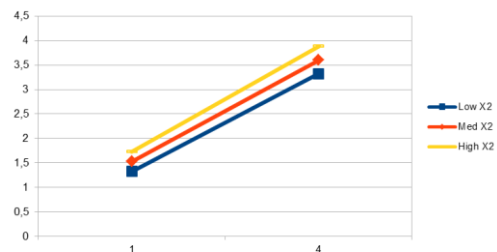


Figure 2 Simple slope graph interaction effect reliability and self-efficacy

As figure 2 illustrates the simple slopes analysis suggests a positive interaction. The t-scores, above 1.96, and significant p-values, table IV, validate the simple slope method. The interaction effect slightly increases, which indicates a reducing effect with progress, although this minor deviation can statistically be rejected.

TABLE IV

Simple slopes analysis

| SE Label | SE value | Slope between Reliability and PSQ at this value | Slope standard error | T statistic | df | p-value |
|----------|----------|---|----------------------|-------------|-----|-----------|
| Low SE | 1,91 | 0,6636 | 0,08153 | 8,13874 | 208 | 3,612E-14 |
| Med SE | 2,34 | 0,6894 | 0,09206 | 7,48834 | 208 | 1,952E-12 |
| High SE | 2,78 | 0,7158 | 0,10357 | 6,91073 | 208 | 5,788E-11 |

C. Revised conceptual model

Based on the results of the factor analysis combined with the simple slopes analysis a revised version of the conceptual model was developed. Figure 3 shows reliability as the independent variable and PSQ as the dependent variable. This relation is being moderated by self-efficacy.

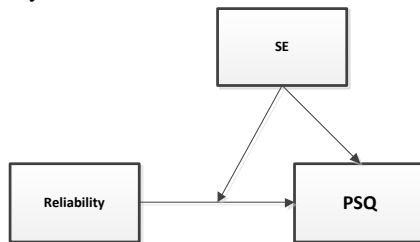


Figure 3 Proposed modification of PSQ model.

D. Conclusion

Accepting the revised conceptual model the hypothesis is only partly accepted. Self-efficacy moderates the relation of reliability on PSQ. Although literature [14], [24] suggest social influence as an important moderating factor in online learning, this case study does not confirm this. Concerning the moderating effect of self-efficacy on reliability and PSQ a plausible explanation refers to internal and external attribution. These psychological phenomena express the way in which individuals claim certain events are the result of personal or external causes. Students who believe that their own behavior rather than external circumstances lead to success or failure have an internal locus of control. This cognitive instrument is strongly related to self-efficacy. As the direction of the interaction effects shows (figure 2), a student who scores high on self-efficacy perceives the e-learning platform as being more reliable.

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Manuscript received 08 April 2011.

Published as submitted by the authors.