Structure Analysis of Service Quality, Satisfaction and Loyalty in Ubiquitous Living English Experience Learning Center (ULEELC)

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Abstract. This paper investigates the correlation of three extracted variables: service quality, satisfaction and loyalty in the Ubiquitous Living English Experience Learning Center (ULEELC). The results suggest that since the relationship of these three variables is positively correlated, the center needs to develop more efficient guidelines and strategies for public relations in order to encourage more students to experience it.

Keywords: Ubiquitous Living English Experience Learning Center (ULEELC), service quality, satisfaction, loyalty

1 Introduction

In recent years, with the development of Information Technology, u-learning (ubiquitous learning) has developed into “Smart Learning”, or the ability to learn in a variety of non-traditional environments. This social change has been accelerating the study of ‘ubiquitous education’ which is a new concept that transcends the limits of space and time (Nam-Suk Lee, 2008). In light of these changes, the main purpose of this study is to analyze the ULEELC’s effect on its clients, and to examine the validity of the model in terms of a successful u-learning system.

2 Theoretical Background

2.1 Ubiquitous Living English Experience Learning Center (ULEELC)

The characteristics of the ULEELC in this study are as follows (Hyeon-Gi Baek & Mun-Koo Kang, Sun-Joo Jang, 2010, Hyeon-Gi Baek & Su-Min Kim, Jung-Hwa
Kang, 2009). First, it defined the middleware APIs (Application Programming Interface) required in the center and created the internal structure of RFID (Radio Frequency IDentification) middleware. Second, through the functionality provided by RFID middleware, it developed an applied system in order to supply learners with information. Third, by visiting a company that produces RFID tags, readers and develops middleware, the center designed a business model that can apply RFID to a conventional logistic management system. Along with the features mentioned above, the center created an ONS server storing URLs and tag information and a system to load the reader onto a mobile terminal. The application which will be installed in the management category consists of Learner Management, Content Management, Study History Management and Workbook Management. Lastly, the Graphical User Interface (GUI) was developed using C++.

3.1 Research Model

This study set up a structural equation model composed of three variables: service quality, satisfaction and loyalty. Since service quality is directly connected to the overall quality of the Learning Center, it should be set as an angular point of the entire system. Satisfaction and loyalty were set as the other two angular points, because they affect each other and at the same time affect the quality of the Learning Center.

We conducted an online survey of 262 students out of 265 elementary students who attended the ULEELC in mid-2012. The main variables of this study consist of independent, dependent, and mediator variables. Based on previous studies, service quality was set as independent, loyalty dependent and satisfaction mediator variable. Based upon previous studies (Alavi, M & Leidner, D. E., Grover, V. & Davenport, T. H, Pan, S.L. & Leidner, D. E., Sambamurthy, V. & Subramani, M., Schlitz, U. & Leidner, D.E.) which measured the service quality of u-learning, the standard for measurement utilized in this study was developed. Given the impropriety of measuring the quality of the ULEELC using the existing standards of measurement, the new standard was developed by examining previous studies. Based upon previous studies (Shin, N. M. & Chan, J, 2004) and revised it to fit the environment of the ULEELC. As a result, four questionnaires, each using the 1-7 Likert Scale, were used to measure learners' satisfaction. According to the reliability analysis of the tool used to check satisfaction in this study, its internal consistency (Cronbach's alpha) showed a coefficient of .89. In addition, the reliability coefficient of satisfaction was Cronbach's alpha .91, which is generally regarded as high.

In this study, loyalty is defined as users' recommending the ULEELC to others, as well as their positive attitude towards revisiting the ULEELC. The reliability coefficient of the loyalty was Cronbach's alpha .88, which is generally regarded as high.
3.2 Data Analysis

“SPSS 19.0” and “AMOS 18” were used as statistic software for the empirical analysis of this study. Exploratory Factor Analysis (EFA) was utilized to secure the validity of each factor and also the factor value among the variables was found through it. For reliability, as mentioned above, Cronbach’s alpha coefficient verification was utilized. After EFA, Confirmatory Factor Analysis (CFA) was used to extract measurement models from items which had gone through the verification. In addition, Frequency Analysis was used to verify the characteristics of the subjects. Lastly, with the analysis of the structural equation model, the propriety of the study model and hypothesis for this study were examined.

4 Results

4.1 Respondents Characteristic

This study conducted a survey of elementary school students in North Jeolla province South Korea, who had experienced the ULEELC for two months from April 30th in 2012 to May 12th in 2012.

4.2 Analysis of Validity and Reliability

4.2.1 Exploratory Factor Analysis (EFA)

To prove the validity of the data, Exploratory Factor Analysis (EFA) was utilized. For Factor Analysis, principal component analysis was used and variables such as service capacity, certainty, reactivity, customization, cognitive faith, emotional faith, loyalty were analyzed through varimax rotation. From the outcome of the analysis, the final seven factors which are all above eigenvalue 1 could be determined. Judging from the Cronbach’s alpha coefficients of the extracted factors, the three variables, service quality (0.924), satisfaction (0.906), loyalty (0.920), showed high reliability by internal consistency.

4.2.2 Confirmatory Factor Analysis (CFA)

To test the validity of variables proved by EFA, Confirmatory Factor Analysis (CFA) was implemented. In order to check consistency levels between potential factors and measured variables, after removing less meaningful items, both convergent and
discriminant validity were verified. Given the outcome of the convergent validity, Potential Factors Reliability and Average Distribution Extracted Value showed above 0.7 and 0.5 respectively, both of which are statistically meaningful. The discriminant validity has subsequently been verified and it was discovered that the value of $R^2$ (coefficient of determination) among all factors ranged from 0.008 to 0.280. Since each value of Average Variance Extracted (AVE) was bigger than that of $R^2$, the discriminant validity was also high.

4.3 Result of Correlation Analysis

In this study, to verify correlation among variables, Average, Standard deviation, and Pearson Correlation analysis were analyzed. From the outcome of the correlation analysis, the positive correlation, which was statistically meaningful, was proved between service quality and both satisfaction ($r=0.569$, $p<.001$) and loyalty ($r=0.311$, $p<.001$). In addition, the correlation between satisfaction and loyalty also showed the same positive correlation ($r=0.53$, $p<.001$) as is in the case of the above.

4.4 Result of Structural Equation Model

The structural equation used in the study was analyzed to check the fit index. After meeting this standard, the path coefficient between the main variables was also analyzed. Except $\chi^2$, on the whole, the fit index of each metric was above .90, which shows it is statistically meaningful. In the case of $\chi^2$, since it is affected by not only sampling model error but also sample size, and the more variables are measured, the bigger the gap among covariance matrices would be. Although the index of $\chi^2$ doesn’t appear to be meaningful, this does not necessarily mean that suitability is low. Therefore, seen in this perspective, the statistical significance of the path coefficient was also tested. In other words, service quality was affected directly by satisfaction and it also affected loyalty indirectly via satisfaction.

5 Conclusion

The considerations advanced in this study lead to the following conclusions. First, from correlation analysis, the relation of three variables was shown to be positively correlated. Second, looking at the findings of structural equation analysis, the path coefficient of satisfaction, which affects loyalty, turned out to be meaningful. Service quality affecting loyalty via satisfaction also turned out to be meaningful as well in terms of an indirect effect. However, the path coefficient service quality affecting loyalty was not meaningful. Proceeding from this fact, the direct effect of satisfaction against loyalty was proved to be the strongest.
References