All Sciences Proceedings

5th International Conference on Applied Engineering and Natural Sciences

July 10-12, 2023 : Konya, Turkey

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Turkish Adaptation of the Chatbot System, Information and Service Quality Scale

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Abstract – This study aims to adapt the "Chatbot System, Information and Service Quality" scale developed by Nguyen, Chiu, and Le (2021) into Turkish. Validity and reliability studies of the scale were conducted. The original scale consists of 7-point Likert scale and 18 items. The aim of the scale is to examine the perception of system, information, and service quality for the sustainability of the use of chatbots. This research was conducted with university students. All of the scale adaptation stages were followed in the research. In the analysis of the data, various analyses were included for the validity and reliability studies of the scale. As a result of the research, a valid and reliable scale that can be used to determine the quality of chatbot systems based on information, service and system has been introduced to the literature.

Keywords – Chatbot, Chatbot Technology, Chatbot Usage, Chatbots Quality, System Quality, Information Quality, Service Quality.

I. INTRODUCTION

The use of mobile technology and social media environments is increasing very rapidly. This situation facilitates the adoption and diffusion of new technologies [1]. In this context, the use of chatbots by integrating them into social media environments and instant messaging applications increases their usage potential. However, chatbots are technologies that can use artificial intelligence, machine learning and natural language processing or different technologies as infrastructure. Chatbots can provide human communication and interaction through text and voice [2].

Chatbots have the mission of supporting interpersonal communication in different sectors ([3], [4]). However, there are many factors that can cause this communication to break down in online environments. It is important to determine what is the factor that enables users to continue using chatbot features in different fields. This study aims to introduce a data collection tool to the Turkish literature to understand the perception of system, information and service quality for the sustainability of the use of chatbot technology for university students.

II. MATERIALS AND METHOD

A. *Research model and participants*

The participants of this study are university students studying at a state university in Turkey. The age range of the participants is between 18-30.

B. *Data Collection Tools*

In this study, data were collected using a personal information form and the "Chatbot System, Information and Service Quality Scale". The data collection tool was applied to the students online.

Personal information form was used. This form is related to gender, age, and grade level.

Chatbot System and Information Quality Scale: This scale was adapted for the context of this study

based on the framework proposed by Nguyen, Chiu and Le [5] (developed in the context of the constructs proposed by Teo et al. [6]). The scale is a 7-point Likert scale. In this scale, the sub-dimensions are "information quality, system quality and service quality".

C. *Data Set and Analysis*

The data were collected with an electronic form containing Likert-type items from scales whose validity and reliability were ensured. For the adaptation of the data collection tool, scale adaptation permission was obtained from the scale owner. During the data collection process, the data collected through Google online forms were transferred to the spreadsheet program.

Construct validity and item analysis were conducted for the adaptation of the scale. LISREL 8.72 software was used to analyze the data. Construct validity of the scale was examined within the scope of validity studies.

III. RESULTS

D. *Descriptive findings*

The mean, standard deviation, skewness and kurtosis values of the items in this scale adapted into Turkish are given in Table 1.

Table 1. Mean, standard deviation, kurtosis and skewness values of the scale items

Items	**Item No**	**Mean**	**Standard Deviation**	**Skewness**	**Kurtosis**
Item 1	S1	5	1,802	-0,539	-0,922
Item 2	S2	5,03	1,723	-0,538	-0,859
Item 3	S3	5,07	1,733	-0,632	-0,728
Item 4	S4	5,14	1,729	-0,58	-0,866
Item 5	S5	5,2	1,674	-0,626	-0,732
Item 6	S6	4,78	1,657	-0,367	-0,842
Item 7	S7	4,79	1,644	-0,356	-0,842
Item 8	S8	5,02	1,666	-0,545	-0,781
Item 9	S9	4,98	1,644	-0,502	-0,807
Item 10	S10	4,8	1,661	-0,342	-0,9
Item 11	S11	4,84	1,681	-0,43	-0,865
Item 12	S12	5,03	1,69	-0,554	-0,815
Item 13	S13	4,86	1,698	-0,388	-0,944
Item 14	S14	5,09	1,72	-0,583	-0,798
Item 15	S15	4,5	1,791	-0,304	-0,945
Item 16	S16	4,89	1,704	-0,449	-0,875
Item 17	S17	4,83	1,708	-0,404	-0,944
Item 18	S18	4,82	1,741	-0,416	-0,933

According to Table 1, the mean scores of the items ranged between 4.50-5.20 and the standard deviations between 1.644 and 1.802. Skewness and kurtosis values were found to be between +1.5 and -1.5. These findings related to skewness and kurtosis show that the scores obtained from the items are normally distributed.

E. *Confirmatory Factor Analysis*

For the factorial validity of the Chatbot System and Information Quality scale, confirmatory factor analysis was applied for the model consisting of

three factors and 18 items. As a result of the analysis, fit indices were found as [$\chi 2(132)=1261.04$, RMSEA= 0.10, NFI= 0.98, NNFI=0.98, CFI=0.98, IFI=0.98]. These values indicate that the model shows acceptable fit and/or excellent fit. Since the fit indices were within the recommended range and all of the estimated factor loadings were below one, no item was removed from the scale. Standardized factor loadings and item structure parameters as a result of confirmatory factor analysis are presented in Figure 1.

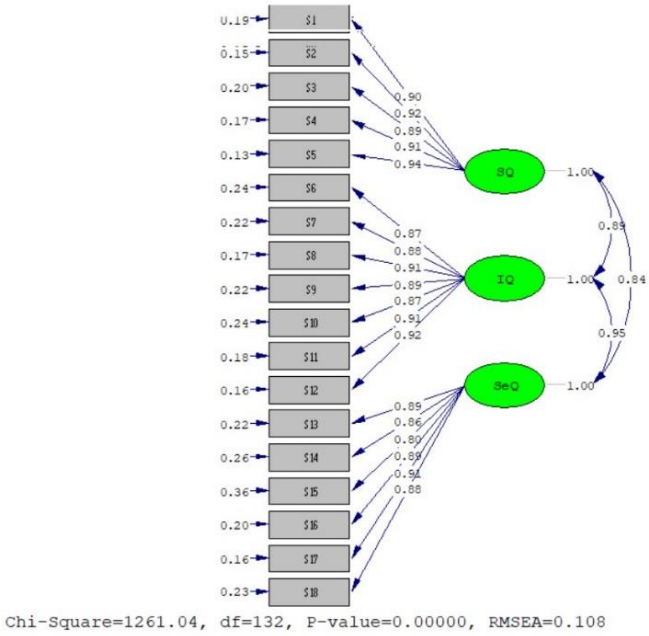

Figure 1. Confirmatory factor analysis results

** SQ: System quality; IQ: Information quality; SeQ: Service quality*

According to Figure 1, the factor loadings are between 0.80 and 0.94. According to the t-test findings, all connections are statistically significant. These findings indicate that there is sufficient evidence for factorial validity.

The reliability of this scale was tested in terms of internal consistency with Cronbach α coefficient. The Cronbach α internal consistency coefficient of the eighteen items in the scale was calculated as 0.980. The Cronbach α internal consistency coefficient for the information quality factor was 0.962, 0.965 for system quality and 0.950 for service quality. These values being higher than 0.70 indicate that reliability is ensured.

IV. DISCUSSION

The purpose of this study is to adapt the Chatbot System, Information and Service Quality Scale into Turkish. In this adaptation study, validity and reliability studies of the scale were conducted.

The developed scale aims to determine the perception of system, information and service quality for the sustainability of the use of chatbot technology. In the context of this study, the "Chatbot System, Information and Service Quality Scale" developed by Nguyen, Chiu, and Le (2021) was adapted into Turkish.

The opinions of language experts were taken during the translation process of the scale into Turkish. Then, the opinions of experts in the field of Computer and Instructional Technologies were consulted for the suitability of the scale items.

Exploratory and confirmatory factor analysis of the scale was conducted. For reliability, Cronbach's Alpha internal consistency coefficients were analyzed. No item was removed because of the adaptation study. As a result of the adaptation study, an 18-item 7-point Likert-type scale with 3 sub-dimensions was introduced to the literature.

V. CONCLUSION

As a result of this study, it can be said that the items in the scale adapted to Turkish accurately measure the perception levels of system, information, and service quality for the sustainability of the use of chatbot technology. Therefore, the scale adapted in this study can be used to determine the quality of chatbots used in different fields by users.

ACKNOWLEDGMENT

This study was conducted under the supervision of the second author within the scope of the first author's thesis study.

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