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International Journal of Psychology and Educational
Studies



Analysis And Improvement Of Prospective Teachers' Educational Facebook Use and Development A Model For Educational Purposes

Onur İşbulan¹, Dr. Mübin Kıyıcı²

¹Computer Education and Instructional Technologies Department, Sakarya University, Sakarya, Turkey

²Computer Education and Instructional Technologies Department, Sakarya University, Sakarya, Turkey

ARTICLE INFO

Article History:

Received 27.01.2020

Received in revised form

03.04.2020

Accepted 27.04.2020

Available online

04.05.2020

ABSTRACT

Within the scope of this research, prospective teachers' opinions on Facebook use for educational purposes was examined, and a modeling study was conducted in accordance with these views. In this study in which mixed method research patterns were used as research model, opinions were taken from 462 prospective teachers with a view to develop Acceptance of Facebook Use for Educational Purposes Scale and Acceptance of Facebook Use for Educational Purposes Model; scale development and model development studies were completed. With Facebook Use for Educational Purposes Activity in accordance with the developed model, level of acceptance of Facebook use for educational purposes among prospective teachers was analyzed. Pilot application of Facebook use for educational purposes activities was carried out with 76 students, and its application was carried out with 67 students; at the end of application, interviews were made with 17 students through semi-structured interview form. At the end of the study, Acceptance of Facebook Use for Educational Purposes Model was created based on Technology Acceptance Model 2, and through the educational purpose Facebook activity, a significant increase was achieved in prospective teachers' level of acceptance to Facebook use for educational purposes.

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Keywords:

Social Network, Technology Acceptance Model, Facebook, Facebook Use for Educational Purposes

1. Introduction

Together with the developing technology, number of Internet users, duration spent on the Internet and opportunities to access to the Internet are increasing day by day in the world. Around the world, many people are able to benefit from opportunities of Internet and make Internet a part of their lives. In addition, users create their own contents together with the developing technology, and it is observed that social networks are increasingly becoming widespread by offering opportunities such as socialization (Amichai-Hamburger and Vinitzky, 2010). Educational systems also adapt themselves to continuously improving technology and make use of opportunities of the technology. Especially together with inclusion of Web 2.0 technologies in education systems, it has become easier to establish interactive learning environments, support systems have been developed, and learning has been removed from a single-learning state in classroom environment and started to become independent of place and time. At the same time, due to rapid increase in human population today, failure of educational environments in responding to the rapid population growth and people's need towards receiving lifelong education rather than a certain duration period, at the point of people's self-development and seeking answers to their questions have all lead people to new alternative environments outside school. It can be said that Internet-based social networks are one of these alternative medias (Öztürk and Akgün, 2013).

¹ Corresponding author's address: Sakarya University, Sakarya, Turkey

Telephone: +902642953397

e-mail: oisbulan@sakarya.edu.tr

Orcid: <https://orcid.org/0000-0001-5326-071X>

* This article was derived from the doctoral dissertation titled "Review and Development of Teacher Candidates' Educational Facebook Usage According to Technology Acceptance Model" by Onur İŞBULAN, under the consultancy of Mübin KIYICI.

<http://dx.doi.org/10.17220/ijpes.2020.02.005>

Social networks are defined as online environments in which users can create profiles and establish a personal network to communicate with other users (Lenhart and Madden, 2007). Social networks are web sites in which individuals keep their public or semi-public profiles recorded in a system, share a link, view list of other users, share likes and activities of individuals from online communities and share messages, e-mails, discussion videos, voice chat and files with each other over the network (Boyd and Ellison, 2007). One of the working principles of social networks is the process of transferring relationships among individuals to a virtual environment, and this process is indicator of the power of bond between people. These networks consist of many people who interact with each other. Not only an individual's friends or family but also his/her teacher, neighbors, friends from any non-governmental organization he/she is registered can be included in this network.

According to Ellison, Steinfield and Lampe (2007), social networks offer people the opportunity to express themselves, establish their own social environments, communicating and interacting with other users and maintaining this connection. While Wang, Moon, Kwon, Evans and Liu (2010) define social network as establishing a personal profile page that contains personal information, photographs and videos and as meeting with unknown people; Kim, Jeong and Lee (2010) interpret social networks as sharing of contents such as photographs and videos by means of a profile page established. Social networks increase their popularity at the same rate as their increasing number of users day by day, as places where people express their thoughts and ideas freely, where they find entertainment medium and gather together in according to common goals, where users affect each other. People are able to establish virtual communities thanks to such social networks and become part of a virtual community. Today, the social network with the most number of members in the world and in Turkey is "Facebook".

It has been observed that there are increases in success, satisfaction and skill acquisitions when social networks are used for educational purposes (Yuen and Yuen, 2008; Lockyer and Patterson 2008; Munoz and Towner, 2009). Analysing the status of Facebook for educational purposes, it is revealed that this tool increases the level of interaction in providing student-student, student-content and student-teacher interaction, and it supports collaborative learning (Kalafat and Gökteş, 2011). Positive change in students' learning process with the new dimension acquired in interpersonal communication is important in terms of providing permanent learning (Yu, Stella, Doug and Kwok, 2012). Together with social networks such as Facebook becoming more widespread, educational systems have also taken its share from this development process, and social networks have begun to emerge as places where training and education take place or support processes are managed. Therefore, prospective teachers need to accept the use of such technology in educational context. One of the important models analyzing the acceptance of a new emerging technology by individuals is "Technology Acceptance Model".

Based on the Induced Behavior Theory developed by Fishbein and Ajzen (1975) and Planned Behavior Theory developed by Ajzen (1991), Technology Acceptance Model was developed by Davis within the scope of doctoral dissertation study in 1986. Technology Acceptance Model suggests that real-life use of technology is associated with behavioral intentions and this is formed with trends towards using technology (Özgen and Turan, 2009:138). According to this model, basic idea is that, for a newly developing technology to be accepted, perceived ease of use and perceived usefulness predict attitudes towards newly developing technology and use behavior for this technology.

Within the scope of the research, Technology Acceptance Model 2 was included in the study. This is because relationships between exogenous variants and factors contained in the Technology Acceptance Model 1 were not clearly defined. On the other hand, since there are so many exogenous variables in Technology Acceptance Model 3 and Combined Technology Acceptance Model, the model to be established will not constitute an exemplary model. For this reason, Technology Acceptance Model 2 which was considered to be formatted a little better compared to other models, was included in the survey.

However, the following questions also emerge. What are Turkish prospective teachers' level of accepting Facebook, a social sharing web site, in terms of educational purposes? Is there a significant difference in terms

of gender, department and Facebook use frequencies on acceptance level basis in case of using Facebook for educational purposes? Is it possible to achieve an increase in prospective teachers' acceptance levels for Facebook use for educational purposes with an application to be conducted over Facebook?

Problem Statement

This study aims at configuration of prospective teachers' acceptance levels of Facebook use for educational purposes according to Technology Acceptance Model 2 and analyzing whether increases can be achieved among prospective teachers' acceptance levels of Facebook use for educational purposes with various training-oriented activities to be designed in Facebook platform. In line with this purpose, the answer to the following questions were sought:

1. Can Facebook Use for Educational Purposes Model be adapted according to Technology Acceptance Model 2?
2. Is it possible to achieve an increase in prospective teachers' acceptance levels for Facebook use for educational purposes with training-oriented activities to be carried out in Facebook platform?

2. Method

In this section, information about the research model, work groups of the study, data collection tools, application processes, data collection and data analysis processes is given respectively.

2.1. Model Of The Research

In the research, mixed method research patterns were employed in which quantitative and qualitative methods were used together. Mixed method research patterns are a type of research that allows to qualitative and quantitative data collection, analysis and integration (Creswell & Plano Clark, 2007). Tashakkori and Creswell (2007) define mixed research patterns as research types in which quantitative and qualitative methods are used together to collect and analyze data, in which data are obtained and procedures towards future are found. While searching answers to research problems during research process, explanatory pattern which is one of the mixed method research patterns was used. Consisting of two stages, the objective of this pattern is to support, describe or sample data collected with qualitative method with data collected with quantitative method (Creswell, 2013). Data collected with qualitative method in the research was obtained with cross-sectional and longitudinal scanning models, and data collected with quantitative method was obtained through interview technique. By using qualitative and quantitative data collection methods together, the aim was to eliminate deficiencies stemming from nature of the method used in the research. Therefore, qualitative and quantitative data collection methods are used together in mixed method research patterns to reach "correct" and "definite" judgment (Guion, Diehl & McDonald, 2011).

As one of the primary goals of the study, prospective teachers' acceptance of Facebook use for educational purposes was tested with structural equation model according to Technology Acceptance Model 2. Structural equation model is a statistical method that puts forward a confirmatory approach to solve structural theories (Byrne, 2001). Structural equation model is more advantageous than other techniques such as basic components analysis, factor analysis or multiple regression analysis since it allows researchers to interact with theory and data (Chin, 1998). With the structural equality modeling applied at the end of study, compatibility of prospective teachers' acceptance of Facebook use for educational purposes was found out according to Technology Acceptance Model 2. At the beginning of the research, acceptance of Facebook use for educational purposes was measured among prospective teachers in the application group using "Acceptance of Facebook Use for Educational Purposes Scale", then the same scale was re-applied to prospective teachers after activities were carried out. In this context, it can be that this study is also a longitudinal scanning research (Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz and Demirel, 2009).

Another stage of the research is "interview". Interview is defined as a communication process that is predetermined, conducted for a serious objective and that is based on interaction towards receiving answers by asking questions (Yıldırım & Şimşek, 2013). In face to face interview, in addition to the language

interviewee use, messages given by interviewee's gestures and facial expressions can be informative and assessed. Therefore, hints that are not reflected on forms or surveys may be obtained during interview (Pişkin & Öner, 1999). Rate of answering questions during interviews is higher compared to other techniques. Exact date, even time, of interview is evident, this allows observing background and future of events that may change interview. During the meeting, questions requiring complex, graphic, table or schema can be used and necessary descriptions can again made by the interviewer (Bailey, 1987). A semi-structured interview form was developed within the scope of research to find out prospective teachers' acceptance of Facebook use for educational purposes. With this form developed, an interview was made with voluntary students in a place and time previously determined, and interview was recorded in accordance with authorization from students, and data was analyzed using descriptive analysis method. Semi-structured interview form used for interview was discussed under the title, data collection tools.

2.2. Study Groups Of The Research

We worked with different groups in different stages of the research. These groups are listed as;

- Scale and model Development Group
- Pilot Application Group of the Research
- Application Group of the Research
- Interview Group

Data was collected separately from groups and analyzed. Groups worked together within the scope of the research are as follows:

2.2.1. Scale and model Development Group

During the process of development of Acceptance of Facebook Use for Educational Purposes Scale and development of Acceptance of Facebook use for Educational Purposes Model that were used in studies conducted within the scope of the research, 462 students attending different programs in Faculty of Educational Sciences in Sakarya University in the Fall Semester of 2012-2013 Academic Year were included in the study. As sampling method, convenience sampling among non-random sampling methods was preferred. Convenience sampling is the method in which researcher receives respondents starting from the most accessible respondents until a group of required magnitude is reached with a view to save time and cost. Among participants participating in the study with the aim of developing scale and model, 323 of them are female (70%), 139 of them are male (30%); 65 participants (14.1%) attend Computer Education and Instructional Technology Department, 30 participants (6.5%) attend Classroom Teaching Program, 26 participants (5.6%) attend Turkish Teaching Program, 80 participants (17.3%) attend Mentally Handicapped Teaching Department, 80 participants (17.3%) attend Psychological Counseling and Guidance Department, 54 participants attend Primary School Mathematics Education Department, 45 participants (9.7%) attend Social Science Teaching Department, 40 participants (8.7%) attend Science Teaching Department, 42 participants (%9.1) attend Preschool Teaching Department; 213 participants (46.1%) are included in 19 years old and younger age group, 182 participants (39.4%) are in 20 years old age group, 67 participants (14.5%) are in 21 years old and older age group.

2.2.2. Pilot Application Group of the Research

Participants, included in pilot application group of the research, constitute of 76 students who attended Computer and Education Technologies Teaching Department and who attended Teaching Design course in spring term of 2012-2013 Academic Year. For selection of pilot study group, criterion sampling among teleological sampling methods was used as the sampling method. In this method, a study group can be established from individuals, events, objects or situations with certain qualities (Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz and Demirel, 2009). During sample selection process, units with criterion predetermined

for the sample are taken into the sample. Reason for using criterion sampling method can be shown as the fact that prospective teachers attend Teaching Design course and the requirement for having a certain technological background. Among participants participating in the pilot study conducted for acceptance of Facebook use for educational purposes, 31 of them is female (41%), 45 of them is male (59%); 5 participants (7%) are in 19 years old and younger age group, 34 participants (45%) are in 20 years old age group, 36 participants (48%) are in 21 years old and older age group.

2.2.3. Application Group of the Research

Participants, included in application group of the research, constitute of 67 students who attended Computer and Education Technologies Teaching Department and who attended Material Design in Education course in Spring Term of 2013-2014 Academic Year. For selection of study group of the research, criterion sampling among teleological sampling methods was used as the sampling method. In sample selection process, it was deemed mandatory for prospective teachers to be included in work group that they attended Material Design and Use in Education course and had a certain technological background, and criterion sampling method among teleological sampling methods had to be used. Among participants participating in the application conducted for acceptance of Facebook use for educational purposes, 29 of them is female (43%), 38 of them is male (57%); 24 participants (36%) are in 19 years old and younger age group, 28 participants (42%) are in 20 years old age group, 15 participants (22%) are in 21 years old and older age group.

2.2.4. Interview Group

Semi-structured interview form is one of the data collection tools applied to students after the application process applied. Using this form, volunteer students were interviewed one-to-one at the end of application process, and interviews were recorded. The study group, in which semi-structured interview form was applied, constitutes of 17 participants who participated in the application applied in fall semester of 2013-2014 academic year and who were selected among students volunteered in participating in the interview.

2.3. Data Collection Tools

In the research, data was collected using "Acceptance of Facebook Use for Educational Purposes Scale" and semi-structured interview form developed by the researcher were used. Detailed information about developed and used scales is given in this chapter.

2.3.1. Development Process for Acceptance of Facebook Use for Educational Purposes

Development process for Acceptance of Facebook Use for Educational Purposes began with item writing process by considering theoretical basics of Technology Acceptance Model 2. A 32-item draft scale was prepared determined in accordance with factors and external variables included in Technology Acceptance Model 2. The scale was prepared in 5-point Likert type and poles were listed between 1 = "Strongly Disagree" and 5 = "Strongly Agree". After developing draft items of the scale, these items were analyzed by 5 experts working in Computer and Education Technologies Training Department, 1 expert in Measurement-Evaluation in Education Department and 1 expert in Turkish Language Training Department. In expert opinions received, opinions were requested on whether items included in the scale were suitable for factors and items could be used in the scale. By deleting 6 items from the scale following experts analysis, exploratory and confirmatory factor analysis was applied on the scale with a total of 26 items and 8 factors.

2.3.2. Exploratory factor analysis study for acceptance of Facebook use for educational purposes scale

Exploratory factor analysis was applied to calculate item load values of 16 items included in the scale and reveal their factor structures. Using SPSS 21 Packaged software, exploratory factor analysis was carried out using basic components analysis technique and Varimax Vertical Rotating Techniques. Primarily, to conducted exploratory factor analysis, Kaiser-Meyer-Olkin (KMO) Test was analyzed which tests sample adequacy. As a result of analysis, KMO values was found as .93. Since KMO value was greater than .70, it can be said that sample compliance is sufficient for conducting exploratory factor analysis (Bryman & Cramer, 1999). To test whether obtained data were suitable for applying exploratory factor analysis, Bartlett Sphericity Test was examined. As a result of analysis ($\chi^2= 6681.07$, $p= .000$), it was concluded that data was suitable for

applying exploratory factor analysis (Bryman & Cramer,1999). As a result of exploratory factor analysis carried out, a 26-item structure was found as collected in 8 factors with eigenvalue higher than 1. As a result of analysis, explained variance in 8-factor pattern is 72.38%. Factor load values of items included in 8 factors and factors they belong to are given in Table 1.

Table 1. Result of Basic Components Analysis of Acceptance of Facebook Use for Educational Purposes Scale

Factor	Item	Factor Loads
Perceived Usefulness	M17	.671
	M18	.799
	M19	.724
	M20	.702
Result Demonstrability	M10	.649
	M11	.822
	M12	.560
Image	M13	.824
	M1	.793
	M2	.763
Perceived Ease of Use	M3	.637
	M21	.729
	M22	.852
Output Quality	M23	.534
	M7	.682
	M8	.711
Subjective Norm	M9	.519
	M14	.848
	M15	.805
Job Relevant	M16	.496
	M4	.595
	M5	.677
Intention towards Use	M6	.759
	M24	.739
	M25	.625
	M26	.739

2.3.3. Confirmatory factor analysis study for acceptance of Facebook use for educational purposes scale

Confirmatory factor analysis was applied to data set with a view to uncover latent variables and test relevant theories. The structure consisting of 8 factors and 26 items found out in exploratory factor analysis was applied with confirmatory factor analysis. Names of factors were determined as “Useful” for Perceived Usefulness, “Res_Dem” for Result Demonstrability, “Eas_Use” for Perceived Ease of Use, “OutQ” for Output Quality, “SubNorm” for Subject Norm, “Job_Rel” for Job Relevant and “Intention” for Intention towards Use. As a result of the first analysis applied, it was observed that desired values were not achieved in fit indices especially including RMSEA, GFI and AGFI. Therefore, modification indices were analyzed, and it was concluded that modifications to be conducted between M7 and M8, between M10 and M11, between M11 and M13, and between M14 and M15 would result in great contributions to χ^2 . Following modifications applied, confirmatory factor analysis was repeated. New obtained values were found as $\chi^2=592.80$ (sd=267, $p<.000$), $\chi^2/sd=2.20$, RMSEA= 0.051, S-RMR = 0.046, GFI=0.91, AGFI=0.88, CFI=0.99, IFI= 0.99, NNFI=0.98. With regard to these values, Sümer (2000) and Şimşek (2007) indicate that good fit will be shown if χ^2/sd value equals to 3 or below; if RMSEA value is .08 or below. Byrne (1998), on the other hand, indicates that RMR and SRMR values should equal to .10 or lower for a good fit. In addition, it is emphasized that IFI, CFI, NFI and NNFI

with a value over .90 will express a good model. Büyüköztürk, Akgün, Demirel and Özkahveci (2004) emphasize that AGFI with .80 or higher and GFI with .85 or higher value express good fit. Considering from this aspect, it can be said that all values have a quality to express good fit. Path diagram related to confirmatory factor analysis applied is shown in Figure 1 and Figure 2.

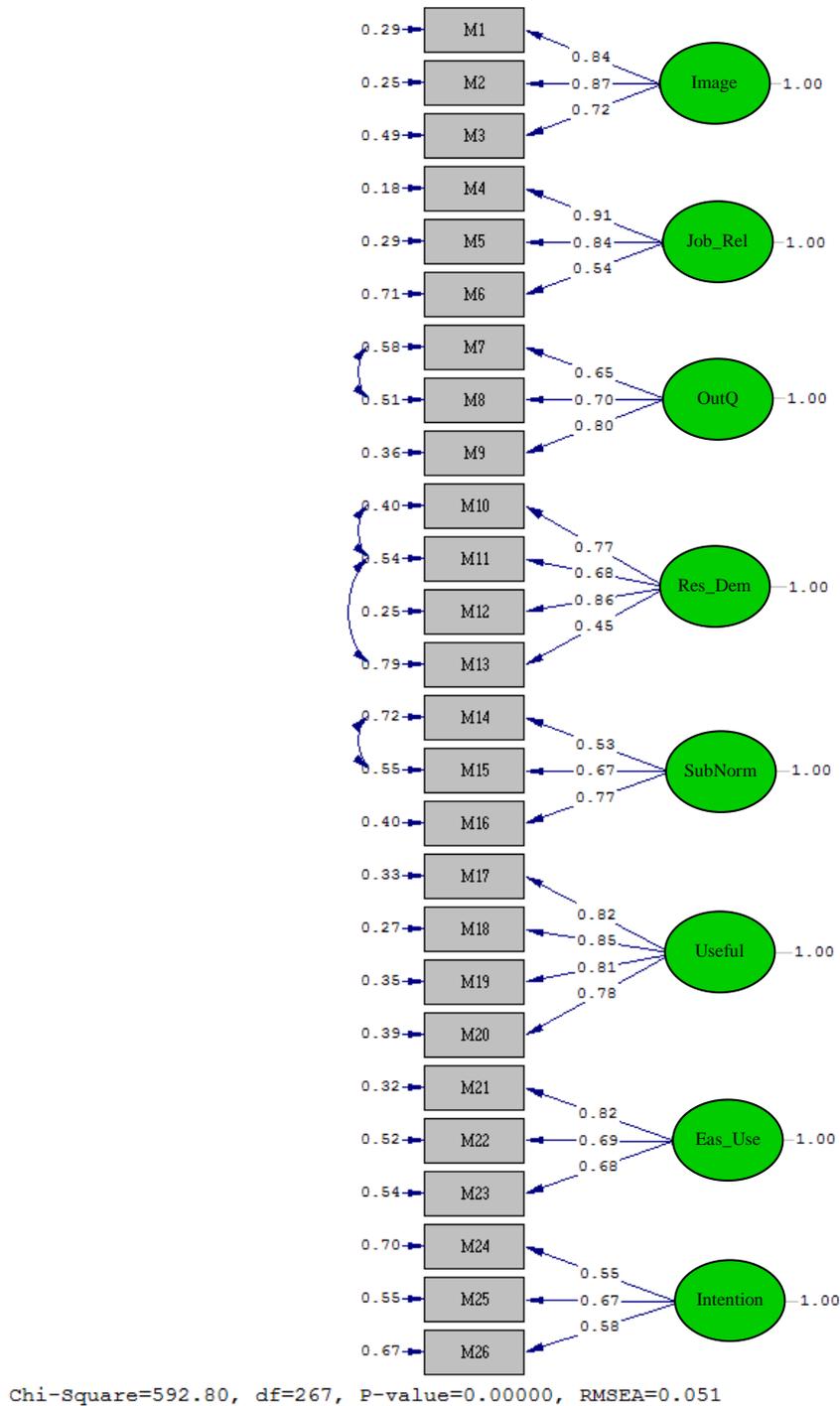
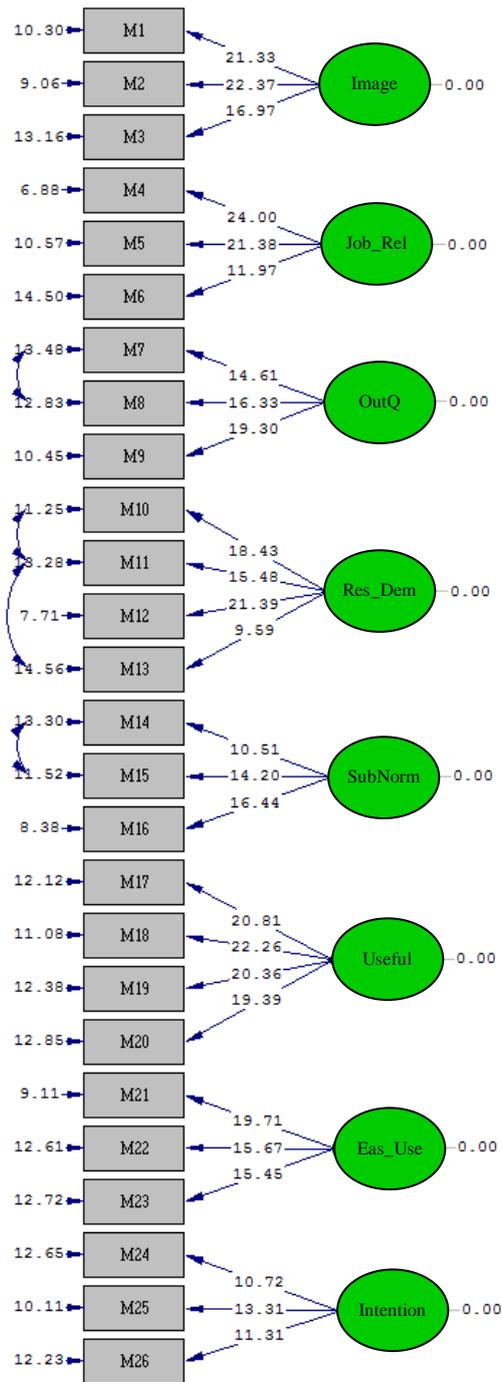


Figure 1. Confirmatory Factor Analysis Path Diagram for Acceptance of Facebook Use for Educational Purposes Scale (Standard Coefficients)



Chi-Square=592.80, df=267, P-value=0.00000, RMSEA=0.051

Figure 2. Confirmatory Factor Analysis Path Diagram for Acceptance of Facebook Use for Educational Purposes Scale (t Values)

As a result of confirmatory factor analysis, values emerging related to items are given in Table 2.

Table 2. Confirmatory Factor Analysis Results

	SC	TD	R ²		SC	TD	R ²		SC	TD	R ²
M1	.84	21.33	.71	M10	.77	18.43	.60	M19	.81	20.36	.65
M2	.87	22.37	.75	M11	.68	15.48	.46	M20	.78	19.39	.61
M3	.72	16.97	.51	M12	.86	21.39	.75	M21	.82	19.71	.68
M4	.91	24.00	.82	M13	.45	9.59	.21	M22	.69	15.67	.48
M5	.84	21.38	.71	M14	.53	10.51	.28	M23	.68	15.45	.46
M6	.54	11.97	.29	M15	.67	14.20	.45	M24	.55	10.72	.30
M7	.65	14.61	.42	M16	.77	16.44	.60	M25	.67	13.31	.45
M8	.70	16.33	.49	M17	.82	20.81	.67	M26	.58	11.31	.33
M9	.80	19.30	.64	M18	.85	22.26	.73				

For reliability analyses of factors included in scale’s model, Cronbach α and Omega (ω) and average variances extracted (AVE) were calculated. In reliability studies, Cronbach’s α coefficient is calculated for all scales and factors. Cronbach α is especially used frequently in cases when answers are obtained in rating scale (Büyüköztürk et al., 2009). However, Omega ω coefficient must be given for congeneric measurements (situations where factor loads are not equal) (McDonald, 1985). For the whole scale, Cronbach α value was found as .93, and Omega (ω) was found as .96.

Table 3. α , ω and OAV Values of Scale Factors

	α	ω	OAV
Image	.84	.85	.65
Job Relevant	.80	.81	.60
Output Quality	.80	.76	.51
Result Demonstrability	.83	.79	.50
Subjective Norm	.76	.70	.44
Perceived Usefulness	.88	.88	.66
Perceived Ease of Use	.77	.74	.53
Intention towards Use	.63	.62	.46

Correlation matrix between factors and OAV values were used to provide validity among factors of the scale. Findings relating to distinctive validity are as follows:

Table 4. Distinctive Validity of the Scale

	Image	Job_Rel	OutQ	Res_De m	SpeNorm	Useful ness	Eas_Use	Intention
Image	.80							
Job_Rel	.70	.79						
OutQ	.73	.68	.71					
Res_Dem	.54	.58	.65	.70				
SubNorm	.66	.57	.56	.44	.67			
Usefulness	.70	.74	.73	.64	.59	.81		
Eas_Use	.54	.65	.76	.66	.41	.71	.72	
Intention	.50	.57	.66	.55	.38	.63	.61	.67

As shown in Table 4, correlation values among factors were left as they were, for testing distinctive validity of the scale, and square roots of OAV values were written in bold with factors themselves and to their intersection points. As a result of the analysis applied, it was revealed that OAV values of factors were higher than correlation values emerging with other factors. Therefore, it can be said that distinctive validity among factors of the scale were provided (Fornell and Larcker, 1981).

2.3.4. Interview Form

During preparation of semi-structured interview forms, questions were prepared in accordance with factors included in Acceptance of Facebook Use for Educational Purposes Model. Then, prepared questions were analyzed by 2 field experts and 1 language expert, their approval was taken. Firstly, a "Validity Committee" was established to ensure validity and reliability of interview forms. In this committee consisting of thesis supervisor, one academic member and two experts from the field, problems faced in application on the basis of theory and methods, also suggestions towards eliminating these problems were discussed.

In addition, the researcher tried to enter long term interactions with the environment and participants both during face to face courses and in Facebook environment to ensure validity and reliability in qualitative research; the researcher conducted the study by providing interaction with student in accordance with objectives of the research and shared the data obtained from semi-structured interview form with expert academic personnel and received their approval; the researcher tried to be as much objective as possible in determining participants and in analysis and interpretation of data.

2.4. Application Process

Within the scope of the research, two application processes were carried out including pilot application and application.

2.4.1. Pilot Application

Objective of pilot application is to test activities carried out over Facebook as a preparation for the application and to implement improvements in accordance with opinions from students and experts. In this way, preparation for the application conducted in fall semester of 2013-2014 academic year was completed.

A group was created in Facebook for pilot application, and students volunteered to participate in pilot application were requested to join this group. Facebook activities with educational purposes were applied in the group consisting of 31 female and 45 male students. Activities such as subject presentation video sharing, lesson presentation sharing, establishing discussion group, web site sharing related to the subject were carried out with the students over Facebook.

2.4.2. Application

Experiences acquired with pilot application, student opinions, expert comments and application of using Facebook for educational purposes were reviewed again. In accordance with opinions received, it was decided to add more activities and to include researcher more into application. For the application conducted with 38 male and 29 female students, primarily a group called "Material Design Facebook Activity" was created on Facebook, and students were asked to join this group. General information about the course was given to student in the first week of spring term of 2013-2014 academic year, and during the following 4 weeks, face-to-face courses were carried out, at the same time, application for Facebook use for educational purposes was implemented. During the 4-week period, activities were carried out over Facebook with students including

course presentation video sharing, course presentation sharing, establishing discussion group, web site sharing related to the subject, non-course related video sharing, news sharing on the subject, image sharing separately in each week.

Collection of qualitative data after application was carried out with semi-structured interview form developed by the researcher. During termination of the application, students volunteered to participate in interviews were determined, and the researcher agreed to interview with 20 students in the following week but 17 out of 20 students attended the interview. Post Graduate class of Computer Education and Instructional Technology Department, Faculty of Educational Sciences, Sakarya University was selected as interview environment, and the researcher conducted 17 interviews ranging from 4 minutes to 10 minutes with participants between November 9, 2013 and November 25, 2013. Interviews were carried out by the researcher upon written and oral permission from participants. Then, these interviews were analyzed with descriptive content analysis method. Descriptive analysis method is an analysis method in which previously obtained data is interpreted according to predetermined themes, direct quotes are frequently used to reflect individuals' opinions dramatically and in which obtained results are interpreted within the framework of cause-effect relationships (Yıldırım and Şimşek, 2013).

2.5. Data Analysis

2.5.1. Analysis of Quantitative Data

SPSS 21 and Lisrel 8.71 Package software were used for analysis of quantitative data obtained in the study. While descriptive analyses, comparative analysis, relational analysis and descriptive factor analysis studies were conducted with SPSS Package Software; confirmatory factor analysis and structural equation modeling were carried out with Lisrel 8.71 package software.

Since application group was limited with 67 people, distribution of the group was considered for interpretation of quantitative data, and parametric or non-parametric tests were preferred according to the distribution. Kolmogorov-Smirnov test results for the application group are given in Table 5.

Table 5. Kolmogorov-Smirnov Test Results for Application Group

Factor	Kolmogorov-Smirnov Test Result	Selected Test
Image (Pre-Application)	.011 (p<.05)	Non-Parametric
Image (Post-Application)	.001 (p<.05)	Non-Parametric
Job Relevant (Prior to Application)	.002 (p<.05)	Non-Parametric
Job Relevant (Post-Application)	.014 (p<.05)	Non-Parametric
Output Quality (Pre-Application)	.000 (p<.05)	Non-Parametric
Output Quality (Post-Application)	.000 (p<.05)	Non-Parametric
Result Demonstrability (Pre-Application)	.000 (p<.05)	Non-Parametric
Result Demonstrability (Post-Application)	.000 (p<.05)	Non-Parametric
Subjective Norm (Pre-Application)	.000 (p<.05)	Non-Parametric
Subjective Norm (Post-Application)	.017 (p<.05)	Non-Parametric
Perceived Ease of Use (Pre-Application)	.022 (p<.05)	Non-Parametric
Perceived Ease of Use (Post-Application)	.006 (p<.05)	Non-Parametric
Perceived Usefulness (Pre-Application)	.016 (p<.05)	Non-Parametric
Perceived Usefulness (Post-Application)	.000 (p<.05)	Non-Parametric
Intent For Use (Pre-Application)	.000 (p<.05)	Non-Parametric
Intent for Use (Post-Application)	.000 (p<.05)	Non-Parametric
Acceptance Level Total (Pre-Application)	.064 (p<.05)	Parametric
Acceptance Level Total (Post-Application)	.200 (p<.05)	Parametric

Factor	Kolmogorov-Smirnov Test Result	Selected Test
Total Satisfaction	.061 (p<.05)	Parametric
Total Perceived Learning	.001 (p<.05)	Non-Parametric

As a result of Kolmogorov-Smirnov test applied, it was determined that 3 factors showed normal distribution, and other factors did not show a normal distribution. For groups not showing a normal distribution, logarithmic conversion, square root conversion, reciprocal conversion, logistic conversion methods were tried for right-skewed groups, and square root conversion was tried for left-skewed groups but normal distribution of data could not be achieved. Therefore, it was decided to use parametric tests for analyses towards 3 factors showing normal distribution and to use non-parametric tests for tests to be conducted for other factors. In addition to this, it was decided to use non-parametric tests during the process of analyzing a group showing normal distribution and another group not showing normal distribution together.

2.5.2. Analysis of Qualitative Data

Answers obtained in light of semi-structured interview forms for qualitative analysis were applied with descriptive analysis. Data obtained in descriptive analysis approach is summarized and interpreted according to predetermined themes. While it is possible to arrange data according to themes revealed by research questions, data can be presented by considering questions or dimensions used during interview and observation processes. Direct quotes are frequently used to reflect opinions of interviewees or observed individuals in a dramatic way in the descriptive analysis. In such type of analysis, the aim is to present findings in an arranged and interpreted way (Yıldırım and Şimşek, 2013).

In this research, coding process was conducted in accordance with factors found in Technology Acceptance Model 2. Data collected in a such coding process is subjected to a deductive analysis, and the results is revealed by the researcher. For this purpose, all data obtained during research was recorded line by line, and dimensions considered important were determined. By this way, category lists were established based on data.

After category lists are established, common directions among categories were determined and thematic coding process was applied. The objective was to establish a significant whole to ensure *internal consistency* during thematic coding and to create an integrity with distinct themes for ensuring *external consistency*. Due to extended data collected in the research and excessive number of categories determined, themes were created with reference to common relationships of categories.

For reliability of the research, another expert other than the research also evaluated data. As for calculation of reliability for the research, reliability formula suggested by Miles and Huberman (1994) was used.

$$\text{Reliability} = \text{Consensus} / (\text{Consensus} + \text{Dissent})$$

Coefficient for each theme was found higher than 0.70 for each theme in reliability study of themes. During analysis of qualitative data, Microsoft Excel 2013 software was used.

3. Results

In this chapter, results related to the research are given under headlines related to the specified problem and sub-problems.

3.1. Acceptance Of Facebook Use For Educational Purposes Adapted From Technology Acceptance Model 2

Data obtained from Acceptance of Facebook Use for Educational Purposes Scale was analyzed with Lisrel 8.70 software, and structural equality modeling was carried out.

When the model was established, “Experience” and “Voluntariness” external variables found in Technology Acceptance Model 2 were excluded from the model. The main reason for this is that individuals accepting Facebook use for educational purposes should have used Facebook previously, they should have a certain experience in Facebook use, and people attending the application process carried out according to the model should voluntarily participate in such an activity. It was considered impossible for individuals without necessary experience in Facebook use and participating such an activity reluctantly to accept Facebook use for educational purposes.

After structural equality analysis was conducted, it was found that $\chi^2=802.78$ (sd=287, $p<.000$), $\chi^2/sd=2.79$, RMSEA=0.06, S-RMR =0.05, GFI=0.88, AGFI=0.85, CFI=0.98, IFI=0.98, NNFI=0.97. With regard to these values, Sümer (2000) and Şimşek (2007) indicate that good fit will be shown if χ^2/sd value equals to 3 or below; if RMSEA value is .08 or below. Byrne (1998), on the other hand, indicates that RMR and SRMR values should equal to .10 or lower for a good fit. In addition, it is emphasized that IFI, CFI, NFI and NNFI with a value over .90 will express a good model. Büyüköztürk et al. (2004) emphasize that AGFI with .80 or higher and GFI with .85 or higher value express good fit. Considering from this aspect, it can be said that all values have a quality to express good fit. Path diagram belonging to structural equation analysis applied is shown in Figure 3 and Figure 4.

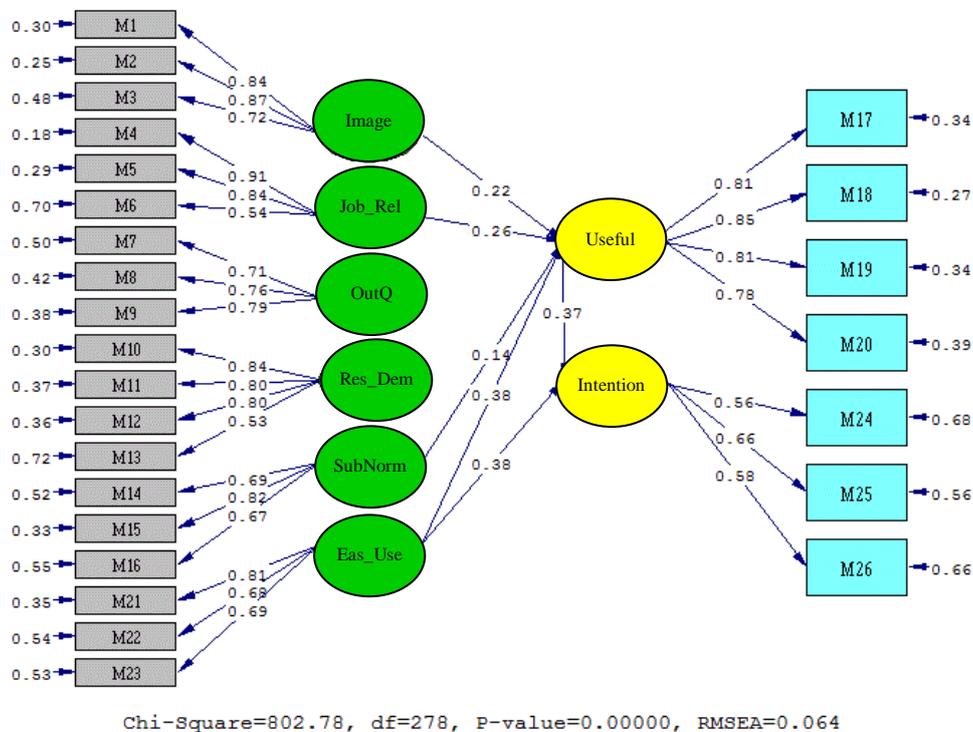


Figure 3. Path Diagram of Facebook Use for Educational Purposes Model According to Technology Acceptance Model 2 (Standard Coefficients)

As a result of structural equation modeling, it was found that standard solutions of three items included in Image Factor were between .87 and .72; standard solutions of three items included in Job Relevant Factor were between .91 and .54; standard solutions of three items included in Output Quality Factor were between .79 and .71; standard solutions of four items included in Result Demonstrability Factor were between .84 and .53; standard solutions of three items included in Subjective Norm Factor were between .82 and .67; standard solutions of four items included in Perceived Usefulness Factor were between .85 and .78; standard solutions of three items included in Perceived Ease of Use Factor were between .81 and .68; and standard solutions of three items included in Intention towards Use Factor were between .66 and .58.

However, considering from the framework of structural model applied on path scheme shown in Figure 12, it can be seen that Image (standard solution=0.22), Job Relevant (standard solution=0.26), Subjective Norm

(standard solution=0.14) factors explain Perceived Usefulness factor; Perceived Ease of Use factor explains Perceived Usefulness (standard solution=0.38) and Intention towards Use (standard solution=0.38) factors; on the other hand, Perceived Usefulness (standard solution=0.37) factor explains Intention towards Use.

Following standard solutions, t values among factors and items were considered. Jöreskog & Sörbom (1996) indicated that failure in finding red arrow related to t values demonstrated that all items were significant at .05 level. The lack of red arrows among t values showed that all items were significant at .05 level.

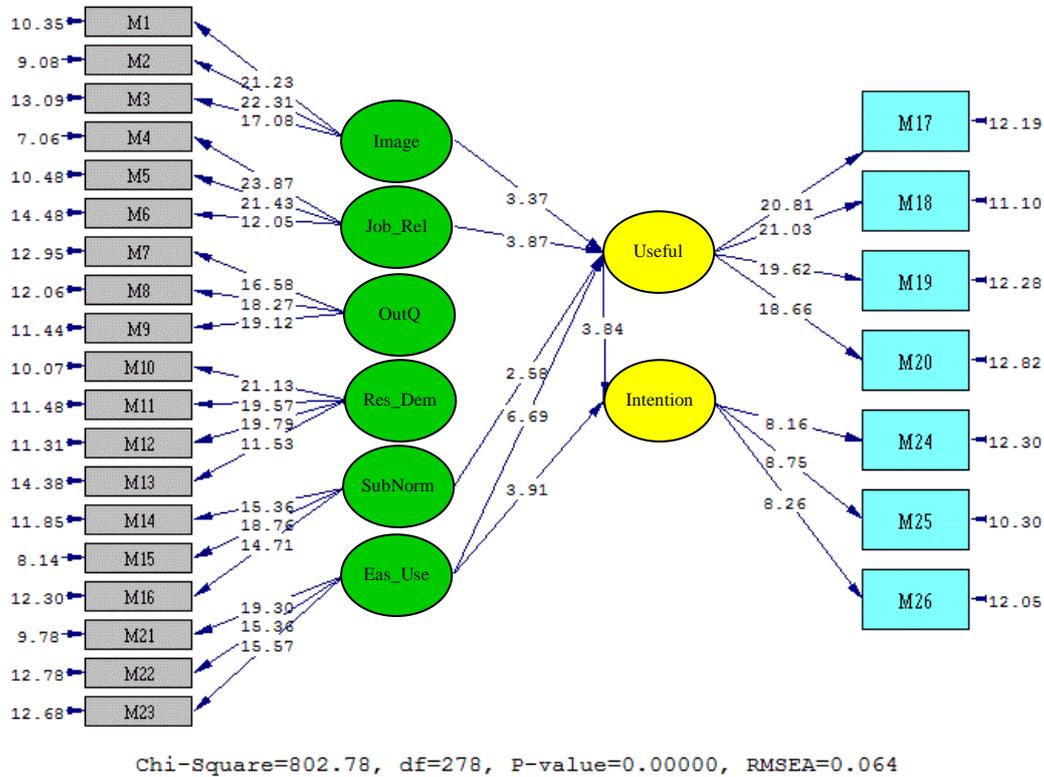


Figure 4. Path Diagram of Facebook Use for Educational Purposes Model According to Technology Acceptance Model 2 (t Values)

It can be seen that items included in Image factor have t values between 22.31 and 17.08; items included in Job Relevant factor have t values between 23.87 and 12.05; items included in Output Quality factor have t values between 19.12 and 16.58; items included in Result Demonstrability factor have t values between 21.13 and 11.53; items included in Subjective Norm factor have t values between and 18.76 and 14.71; items included in Perceived Usefulness Factor have t values between 21.03 and 18.66; items included in Perceived Ease of Use factor have t values between 19.30 and 15.36; items included in Intention towards Use factor have t values between 8.55 and 8.16. Analysing t values between factors, it can be seen that these values are 3.37 between Image and Perceived Usefulness factors, 3.87 between Job Relevant and Perceived Usefulness factors, 2.58 between Subjective Norm and Perceived Usefulness factors, 6.69 between Perceived Ease of Use and Perceived Usefulness factors, 3.91 between Perceived Ease of Use and Intention towards Use factors, and 3.84 between Perceived Usefulness and Intention towards Use factors. According to these values, significance among factors is at $p < .01$ level (Byrne, 2001).

It can be seen that Perceived Ease of Use factor included on the model has direct effect on Intention towards Use factor, at the same time, has effect on Perceived Usefulness factor. Therefore, it was investigated whether Perceived Usefulness factor mediates Intention towards Use factor in terms of Perceived Ease of Use factor.

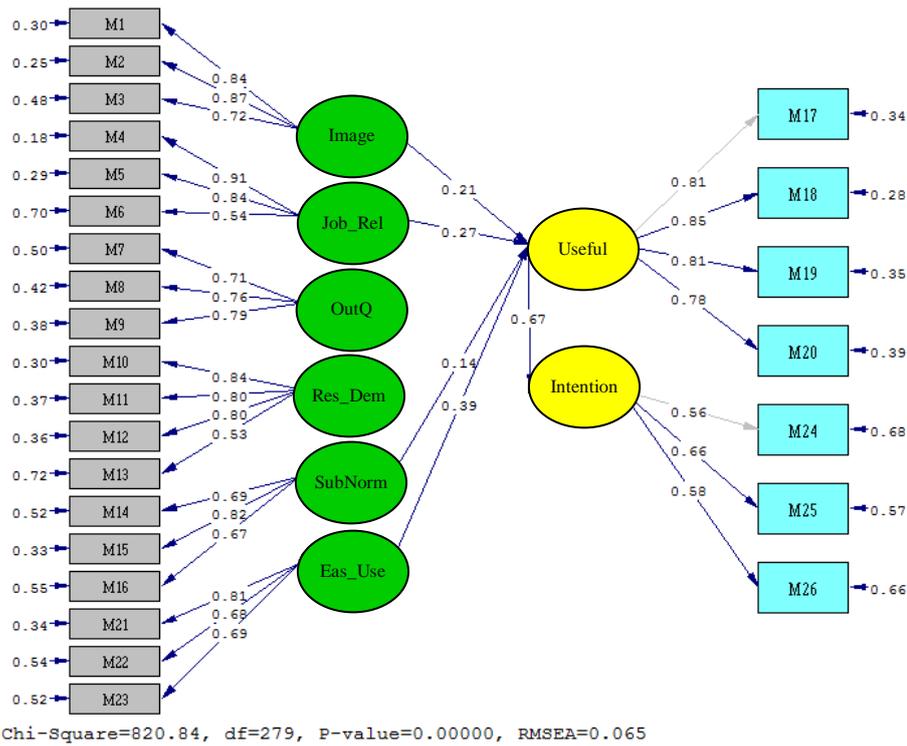


Figure 5. Removing the Path among Perceived Ease of Use and Intention towards Use Factors in the Model

As shown in Figure x, when the path between Perceived Ease of Use and Intention towards Use factors is removed, it gives very high values in terms of model goodness of fit. To understand whether Perceived Usefulness factor mediates between Perceived Ease of Use factor and Intention towards Use, the path between Perceived Ease of Use factor and Intention towards Use factor was drawn again.

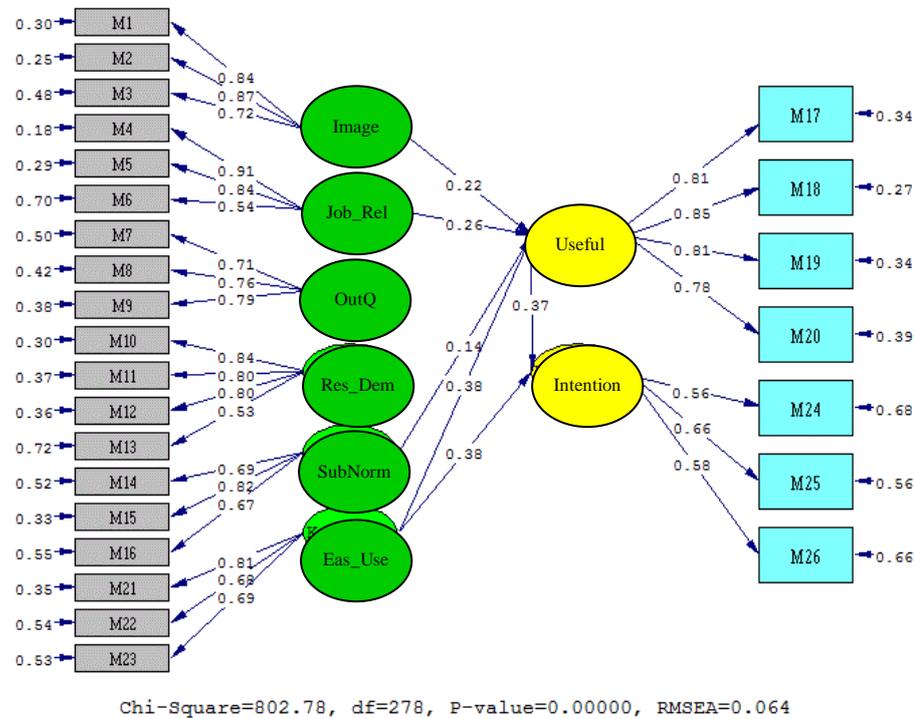


Figure 6. Combining the Path between Perceived Ease of Use and Intention towards Use Factors in the Model

As shown in Figure x, when the path between Perceived Ease of Use and Intention towards Use factors is removed, this did not show any effects on model fit. Therefore, it can be said that Perceived Usefulness factor

does not have any mediatory roles between Perceived Ease of Use and Intention towards Use, and factors function independently from each other.

Output Quality and Result Demonstrability factors have not shown fit to the model in Acceptance of Facebook Use for Educational Model aimed to be established according to Technology Acceptance Model 2. Reason for this incompatibility is discussed in conclusion sections.

3.2. Changes In Acceptance Levels Of Facebook Use For Educational Purposes Before And After Facebook Use For Educational Purposes Activity

After the Facebook Use for Educational Purposes Model was developed, it was confirmed by a semi-experimental design that the model was working. For this reason, an educational use Facebook activity has been carried out. Before and after Facebook use for educational purposes activity, change in prospective teachers' levels of acceptance of Facebook use for educational purposes is as shown in Table 6

Table 6. Changes in Factors of Acceptance of Facebook Use for Educational Purposes Model Before and After Facebook Use for Educational Purposes Activity

	Test		N	Order Avg.	Order Tot.	z	p
Image	Pretest	Negative Order	19	26.61	505	-2,053	.040
		Positive Order	35	27.99	979		
	Posttest	Equal	13	-			
Job Relevant	Pretest	Negative Order	13	22.65	294	-3,765	.000
		Positive Order	40	28.41	1136		
	Posttest	Equal	14	-			
Subjective Norm	Pretest	Negative Order	19	23.63	449	-3,167	.002
		Positive Order	39	32.36	1262		
	Posttest	Equal	9	-			
Perceived Usefulness	Pretest	Negative Order	14	19.00	266	-3,996	.000
		Positive Order	39	29.87	1165		
	Posttest	Equal	14	-			
Perceived Ease of Use	Pretest	Negative Order	16	26.19	419	-3,679	.000
		Positive Order	44	32.07	1411		
	Posttest	Equal	7	-			
Intention towards Use	Pretest	Negative Order	11	16.45	181	-3,961	.000
		Positive Order	35	25.71	900		
	Posttest	Equal	21	-			

According to the analysis performed, after Facebook use for educational purposes activity, significant difference was found in terms of image ($p < 0.05$, $z = -2.053$), Job Relevant ($p < 0.05$, $z = -3.765$), subjective norm ($p < 0.05$, $z = -3.167$), perceived usefulness ($p < 0.05$, $z = -3.996$), perceived ease of use ($p < 0.05$, $z = -3.679$) and intention towards Use ($p < 0.05$, $z = -3.961$) factors of Facebook Use for Educational Purposes Model. Comparing mean ranks, it can be seen that a significant increase occurred in factors such as Image (Mean Rank Diff.=1.38), Relation with the Profession (Mean Rank Diff.=5.76), Subjective Norm (Mean Rank Diff.=8.73), Perceived Usefulness (Mean Rank Diff.=10.87), Perceived Ease of Use (Mean Rank Diff.=5.88) and Intention towards Use (Mean Rank Diff.=9.26).

4. Conclusions

After the research was completed, Facebook Use for Educational Purposes Model was established based on Technology Acceptance Model 2. In created Facebook Use for Educational Purposes Model, "Result Demonstrability" and "Output Quality" factors belonging to Technology Acceptance Model 2 developed by Venkatesh and Davis (2000) were not included. In addition, "Experience" and "Voluntariness" exogenous variables not included in the scope of the research. The main reason for this is that individuals accepting Facebook use for educational purposes should have used Facebook previously, they should have a certain experience in Facebook use, and people attending the application process carried out according to the model should voluntarily participate in such an activity. It was considered impossible for individuals without necessary experience in Facebook use and participating such an activity reluctantly to accept Facebook use for educational purposes.

The fact that "Output Quality" and "Result Demonstrability" factors included in Technology Acceptance Model 2 were not included in the model after analysis of data obtained as a result of quantitative research methods can be explained with data obtained from qualitative analysis. Analyzing qualitative findings, prospective teachers did not make sense of questions asked with regard to "Output Quality" and "Result Demonstrability" factors or associate with teaching profession.

Example sentences that prospective teachers mentioned with regard to "Output Quality" factor and that could not be completely answered can be listed as follows:

"So now it will surely have an effect... Well, normally it is positive, namely, it is positive when considered in this way. (E.Z.)"

"Yes. That is to say. Would it be possible without it? (silence) I think it would not be, sir, namely, Facebook contributed to us. (A.G.)"

Analyzing the abovementioned examples, students' answers to questions related to "Output Quality" are not exactly satisfactory. Questions of how much qualified the expected outputs would be at the end of training process conducted with Facebook and who much Facebook was effective in completing job-related tasks were not understood by the students. However, after mutual interviews, prospective teachers gave answers on teaching profession to the questions on "Output Quality". These given answers also resemble to examples included in "Job Relevant" factor. Sample sentences are as follows:

"Since we make research, so much information is not forgotten. I mean this is what we call learning by doing. (U.K.)"

"Facebook helps. As I said earlier, interaction for each subject exists in terms of acquisitions. Rather than coming to school to ask questions to teacher, it is possible to reach teacher continuously over the web site. (O.E.)"

"This results in development on student's side, also communication between teacher and student occurs differently, namely, different from educational environment. I think it is more associated with researching. (A.T.)"

"Output Quality" factor, one of the factors specified in Technology Acceptance Model 2, explains "Job Relevant" factor and "Perceived Usefulness" factor even in the study conducted by Venkatesh and Davis (2000). Therefore, in the study for development of Acceptance of Facebook Use for Educational Purpose Model, "Output Quality" factor was ignored, only "Job Relevant" factor was included in the study.

As a result of research conducted, "Result Demonstrability" factor also emerges as one of the factor that do not appear in the modeling study established. As a result of analysis of data collected from qualitative data collection tools, it can be seen that the basic idea in "Result Demonstrability" factor is the fact that usefulness in Facebook use for educational purposes can be shared with others. In addition, Venkatesh and Davis (2000, p:192) suggest a significant relationship between "Result Demonstrability" factor and "Perceived Usefulness" factor. It was observed from obtained data that prospective teachers' answers to questions related to "Result Demonstrability" factor and "Perceived Usefulness" factor showed similarity. Examples of given answers are as follows:

"That is because we knew Facebook as a social media despite not used in courses. Now, we know about video sharing, text, audio, so I can easily discuss these activities. (M.A.)"

"So, teacher can send course documents, or whatever is required, over Facebook directly." One can be comfortable over that group created. There is no need to find teacher, and there is no need for trying hard to communicate with teacher. So, I can discuss about anything. (E.A.)"

"Because, what did we use to do while using Facebook regularly? You spend time in Facebook in vein, play games, talk to your friends at chat, in fact, you feel a loss of communication, so I was against Facebook use. However, I said, since Facebook is used for educational purposes, I can easily inform my family about Facebook use. Why do you have a Facebook account? When they ask like this, I can say that I use Facebook for educational purposes. When they ask about Facebook's use for education, I can show them comments, shares in that group. Look, one of my friend commented like this, and I added another comment. So I can discuss about its effectiveness and convince my family."

Acceptance of Facebook Use for Educational Purposes Model, which was suggested within the scope of the research, is similar to Technology Acceptance Model 2 with its dimensions excluding "Output Quality" and "Result Demonstrability" factors. Acceptance of Facebook Use for Educational Purposes Model obtained with structural equality modeling at the end of research is as follows:

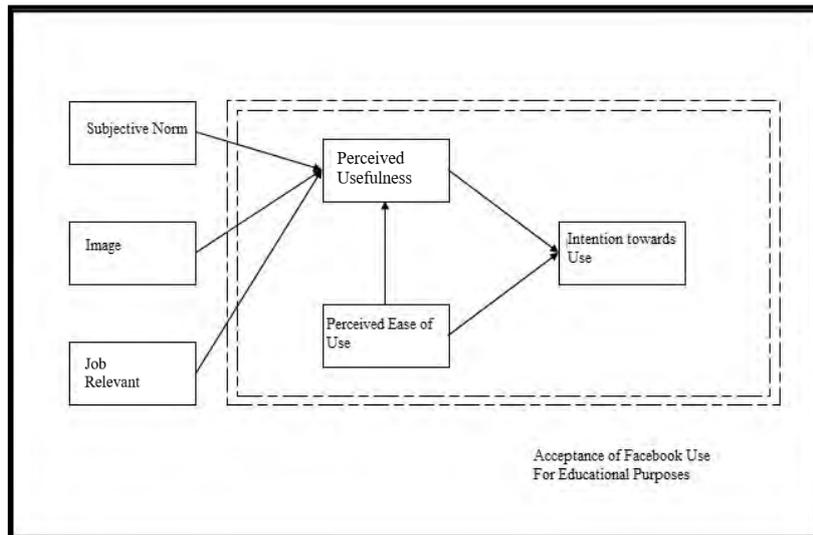


Figure 7. Acceptance of Facebook Use for Educational Purposes

After the model was created, a Facebook activity for educational purposes was designed, and this activity was applied with the study group. One of utmost importance reasons in designing the activity is testing and application of the model in the framework of this event. Before the activity carried out, prospective teachers' level of acceptance of Facebook use for educational purposes was measured, then the same test was applied after the activity. A significant increase was achieved among prospective teachers' level of acceptance of Facebook use for educational purposes thanks to the activity carried out. At the end of the event, prospective teachers accepted Facebook as a learning environment. There are studies available in the field literature supporting this finding (Munoz & Towner, 2009; Wang, Woo, Quek, Yang, & Liu, 2012; Meishar-Tal, Kurtz, & Pieterse, 2012).

Conclusions emerging as a result of discussions over findings of the research are as follows:

Acceptance of Facebook Use for Educational Purpose Model was adapted according to Technology Acceptance Model 2. In the resulting model, "Result Demonstrability" and "Output Quality" among factors of Technology Acceptance Model 2 were not included. This is because Output Quality factor was perceived together with Job Relevant factor; and Result Demonstrability factor was perceived together with Perceived Usefulness factor. After Facebook use for educational purposes activity, it was analyzed whether there were any significant increases based on factors of Acceptance of Facebook Use for Educational Purposes. After Facebook use for educational purposes activity, it was found out that there was an increase in terms of factors of Facebook Use for Educational Purpose including image, job relevant, subjective norm, perceived usefulness, perceived ease of use and intention towards use factors.

5. Recommendations

According to the findings obtained in the research;

- Suggestions towards researchers,
- Towards educators,
- Towards faculties

are listed as follows.

5.1. Suggestions Towards Researchers

- At the end of the research, students were asked to evaluate themselves and their perceived learning levels were measured. With academic achievement tests to be prepared, prospective teachers' academic achievements can be measured; effect of Facebook use for educational purposes on academic achievement can be revealed with experiment-control groups.
- Pilot application and application carried out within the scope of the research were carried out with prospective teachers attending Computer and Teaching Technologies Training Department. Conducting similar studies in other departments outside Computer and Teaching Technologies Training Department will allow for determining the level of acceptance of Facebook use for educational purpose in different sample groups.
- Facebook was included in the survey since it is the social network with the highest number of users in Turkey and in the world. Such studies can be repeated with different social networks.
- As a result of the research, students indicated that they intended to use Facebook for educational purposes. With future studies, it can be monitored whether prospective teachers will continue to use Facebook for educational purposes when they start the teaching profession.
- Modeled within the scope of the research, Acceptance of Facebook Use for Educational Purposes Model was adapted based on Technology Acceptance Model 2. A new model suggestion for Acceptance of Facebook Use for Educational can be implemented based on Technology Acceptance Model, Technology Acceptance Model 3 or Combined Technology Acceptance and Use Model which are excluded from the scope of this research.
- Together with activities carried out over Facebook, face to face courses continued. With new studies to be performed, results of studies on training-education processes conducted completely over Facebook can be compared with results of this research.
- An analysis over prospective teachers' comments on activities over Facebook was not applied. Prospective teachers' comments in activities and their answers can be analyzed with qualitative analysis methods to deepen the research scope.
- Teacher candidates' time spent on Facebook was not measured within the scope of this research. With studies in which logs are kept, acceptance of Facebook use for educational purposes can be analyzed with comparative studies.

5.2. Suggestions Towards Educators

- Activities arranged within the scope of the research are limited with activities designed by the researcher. Educators may design new activities to be used in their courses, and a similar study with new activities can be carried out.
- Duration of application in Facebook activity for educational purposes was carried out in 4 weeks within the scope of the research. Educators may arrange new applications by increasing duration based on intensity and duration of their courses or decreasing duration of application.

5.3. Suggestions Towards Faculties

- Faculties may encourage academic staff to communicate with students over Facebook and carry out some of their course process over Facebook.
- Faculties may award academic staff who are in contact with students over Facebook and support training process with social media.
- Communicative processes can be carried out more efficiently through Facebook pages to be created.

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