FWU Journal of Social Sciences, Winter 2016, Vol.10, No.2, 146-152

Determinants of behavioral intentions to use SPSS among students: Application of Technology Acceptance model (TAM)

Anam Masood
Lahore College for Women University, Lahore

Rab Nawaz Lodhi
University of Engineering and Technology, Lahore

This research is undertaken to evaluate the behavior of students towards SPSS usage. A questionnaire at five point scale has been developed to collect data from three hundred SPSS users. The data has been collected through web based survey and Facebook. Response rate remained at 90%. SPSS self-efficacy, SPSS learning value, social support and statistics knowledge has been introduced in the original technology acceptance model (TAM). The SPSS output reveals that perceived usefulness (PU) and perceived ease of use (PEU) has substantial and positive effect on intentions of students to use SPSS. Among four variables, social support seems more significant to strengthen PU and PEU. Behavioral intentions to use SPSS can be strengthened if students have social support, SPSS self-efficacy, statistics knowledge and higher learning value.

***Keywords*:** SPSS, Inferential statistics, Intentions, Usefulness, IBM, TAM

SPSS (Statistical Package for Social Sciences) developed by IBM, is the most widely used software to analyze quantitative data. SPSS is taught as a comprehensive course to all research students in Pakistan. It is mandatory, especially at postgraduate level. SPSS is effort and time saving tool to analyze large amounts of data. It provides analytical skill to assist students in research work. In Pakistan, inferential statistics are taught in earlier semesters to provide a comprehensive understanding of SPSS. Without knowledge of inferential statistics, it is not possible to understand and interpret results of SPSS. Learning manual statistics is compulsory before moving towards SPSS because it provides theoretical and conceptual backgrounds to enhance understanding of results. There are several factors which affect the intentions of students to use SPSS. Many students get depressed and worried while using SPSS (Ali & Iqbal,2012). They have difficulties in data entry, applicability of tests and interpretation of results. In a nutshell, statistics and SPSS are seen to be a phobia in students. This paper reports on findings from a research project with the following research objectives:

- To highlight factors which affect acceptability of SPSS among university students of Pakistan.
- To study the relationships between factors and behavioral intentions of students to use SPSS.

Technology Acceptance model(TAM)

To evaluate the behavior of students towards acceptance and usage of SPSS, Technology acceptance model(TAM) has been used.

Davis (1989)was pioneered to study the influence of factors present in the external environment of students, which had played an instrumental role in changing perceptions and behaviors of people towards the use of technology (Figure 1). TAM has widely been used in many research articles where researchers modified TAM model according to their environment and research objectives. TAM model has basically two variables, perceived usefulness (PU) and perceived ease of use(PEU). External factors change perception of students towards usefulness and easiness to use technology which affect their behavior to use technology. Moreover, when technology is perceived easy to use, its usefulness also increases. Perceived ease of use has a significant

Correspondence concerning this article should be addressed to Mr. Rab Nawaz Lodhi, Institute of Business Management, University of Engineering and Technology ,Lahore, Email: rabnawazlodhi@yahoo.com

positive effect on perceived usefulness (Devis, 1989;Adwan & Smedley,2013;Ng, Shroff & Lim, 2013; Rose & Fogarty, 2006).

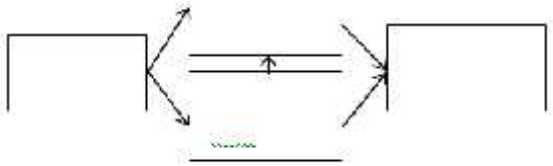

Figure 1: Original TAM model

Researchers highlighted different external factors which have affected PU and PEU. SPSS self-efficacy is a positive predictor of PU and PEU (Hsu, Wang & Chui, 2008; Hsu et al, 2009). Brezavscek, Sparl and Znidarsic (2014) modified model with three additional external variables. They found significant positive effects of statistics learning self-efficacy and statistics learning value on PU and PEU. Park(2009) found that learning self-efficacy and subjective norms affected PU whereas system accessibility and learning self-efficacy significantly affected PEU. He found that PEU had a positive effect on PU but both PU and PEU did not affect intentions to use the system. It was found that perceived usefulness of a system for professors hada positive effect on PU and intentions to use system, whereas compatibility of system with task assigned to students was positively related with PEU (Escober & Monge, 2012). Tarhini, Hone and Liu (2013) found that PU and PEU were significant and positive predictors of intentions to use technology. Strong mathematical background, practice of statistics exercises and exam performance can significantly improve overall statistics performance (Delaval, Bohec, Noel, Michinov, Guida, Musca & Dodeler,2011). Hsiao,Tu & Chung(2013) argued that social support, self-efficacy, learning strategy, learning value and environment and student-teacher interaction had significant impact on intentions to use system. Baglin & James(2013) found that knowledge of statistics and practices hada positive effect on intentions to use system. So, there area variety of external variables which affect PU and PEU and consequently intentions to use a system.

Theoretical Framework

Based on literature review, several external variables are incorporated in the TAM model of this research (Figure 2). Each external variable is defined here.

SPSS Self Efficacy: It is the belief of a person that he/she is able to use SPSS for statistical analysis of data (Brezavscek et al, 2014). If a person is highly confident in his/her ability to use SPSS, it will be easy for him/her to use SPSS. Moreover, SPSS will be perceived useful.

SPSS learning value: It refers to the feeling that people can have the benefits of using SPSS for data analysis and learning SPSS will increase ability to analyze and complete tasks in shorter time (Brezavscek et al, 2014). Learning SPSS will increase the quality of work life. If this belief is strong, students will be motivated to use SPSS. The higher SPSS learning value will increase PU and PEU.

1. **Social support:** Social support can take two

Forms-peer support and student interaction with teachers. If peers help each other in resolving SPSS issues, learning SPSS will not be a difficult task. If a student is able to ask questions from teachers and interact with them, he will be more motivated to learn and use SPSS (Hsiao et al,2013). Positive social support will increase both PU and PEU.

Statistics knowledge: If students have sufficient knowledge of inferential statistics, he will be able to learn and understand SPSS in a short time period (Delaval et al, 2013). Students without statistical knowledge will not be able to learn SPSS. Sufficient statistics knowledge will increase PU and PEU of SPSS

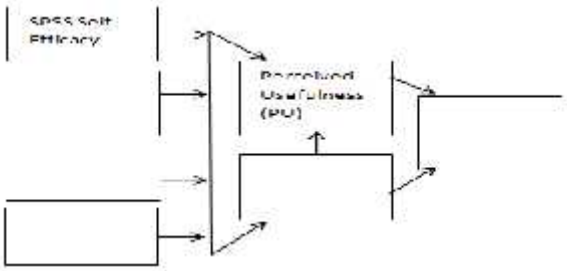

Figure 2: Extended TAM model to analyze intentions to use SPSS among students

Hypotheses

H_1:SPSS self-efficacy is a predictor of perceived usefulness.
H_2: SPSS self-efficacy is a predictor of perceived ease of use.
H_3:SPSS learning value is a predictor of perceived usefulness.
H_4:SPSS learning value is a predictor of perceived ease of use.
H_5: Social support is a predictor of perceived usefulness.
H_6: Social support is a predictor of perceived ease of use.
H_7: Statistics knowledge is a predictor of perceived usefulness.
H_8: Statistics knowledge is a predictor of perceived ease of use.
H_9: Perceived ease of use is a positive predictor of perceived usefulness.
H_{10}: Perceived ease of use is a positive predictor of intentions to use SPSS.
H_{11}: Perceived usefulness is a positive predictor of intentions to use SPSS.

Method

Instrument and data analysis technique

This research is intended to study relationship between independent and dependent variables quantitatively. Macro enabled questionnaire on a five point scale has been developed to collect data electronically. Most of the items of the questionnaire are adopted from three published questionnaires. Table 1 summarizes the number of items used to tap each variety along with the references of items adopted. The questionnaire covers demographic information as well. In order to test significance and direction of the relationship among variables, simple linear regression has been applied in SPSS 19.

Table 1
Development of questionnaire

Variables	Reference	Items
Perceived usefulness	Hsu et al 2009	6
Perceived ease of use	Hsu et al 2009	9
Intentions to use SPSS	Hsu et al 2009	4
SPSS self-Efficacy	Hsu et al 2009	4
SPSS learning value	Brezavscek et al, 2014	5
Social support	Hsiao et al, 2013	5
Statistics knowledge	Self-developed	5

Sample

Unit of analysis for data collection are SPSS users of Pakistan. Sample constitutes three hundred students from three major universities of Lahore, Pakistan.Web based survey was conducted and response rate remained at 90%.Demographic analysis of sample is shown through table 2.

Table 2

Demographic analysis of questionnaire

Gender	Degree	Age	Status
Male (100)	Graduate (40)	20-30 (200)	Student (220)
Female (169)	Postgraduate (200)	30-40 (50)	Teaching Assistant (10)
	Doctorate (29)	41-50 (19)	Lecturer (39)
269	269	269	269

Results

Evaluation of questionnaire

Cronbach alpha indicates the reliability of the questionnaire. If value is nearer to 80%, items of the questionnaire are sufficiently reliable to tap the construct under study. Table 3 shows the reliability of items under each variable. All items are reliable to measure their corresponding variables. Overall cronbach alpha for questionnaire is 80.2%.

Table 3

Reliability of questionnaire

Variables	Cronbach alpha	N
Perceived usefulness	75.5%	6
Perceived ease of use	89.9%	9
Intentions to use SPSS	80.9%	4
SPSS self-efficacy	73.2%	4
SPSS learning value	73.4%	5
Social support	68%	5
Statistics knowledge	84%	5

Assumptions of simple linear Regression:

To apply the simple linear regression, there are following assumptions elaborated in table 4. All assumptions are satisfied. All the data are normally distributed. The assumption of normality is tested through Q-Q plots of each independent and dependent variable. Secondly, scatter dot plots of each independent variable with dependent variable indicate that independent variables have a linear relationship with dependent variables in each model. Thirdly, error terms for each model are not auto correlated with each other because the value of DurbinWalton for all models lies between 0 to 4. Forth, there is no outlier in the data because cooks distance lies between 0 to 1. Table 4 shows the value of Durbin Watson and cooks distance for all the models.

Table 4

Durbin Watson and Cooks distance

Models	Durbin Watson	cooks distance
1-SE—PU	1.499	.000-.027
2-SE-PEU	2.489	.000-.028
3-SLV-PU	1.829	.000-.009
4-SLV-PEU	2.644	.000-.014
5-SS-PU	1.459	.000-.010
6-SS-PEU	2.553	.000-.044
7-SK-PU	1.481	.000-.008
8-SK-PEU	2.559	.000-.017
9-PEU-PU	1.587	.000-.011
10-PU-Int	2.362	.000-.020
11-PEU-Int	2.238	.000-.014

SE-SPSS self efficacy, SLV-SPSS learning value,
SS-Social support,SK-Statistics knowledge,

PU-Perceived usefulness, PEU-perceived ease of use
Int-intentions to use

After verification of all assumptions, simple linear regression has been applied and the results have been discussed hypothesis wise.

H_1:SPSS self-efficacy is a predictor of perceived usefulness.

R^2 is 0.1%,which shows that the strength of the model is weak. SPSS self-efficacy accounts for 0.1% variation in perceived usefulness and remaining 99.9% variation is caused by exogenous factors. Secondly, SPSS self-efficacy is not a true predictor of perceived usefulness [F(1,268)=.333,P>0.05]. This analysis does not support the hypothesis.

H_2:SPSS self-efficacy is a predictor of perceived ease of use.

R^2 is 12.8%, which shows that the strength of the model is weak. SPSS self-efficacy accounts for 12.8% variation in perceived ease of use. Secondly, SPSS self-efficacy is a predictor of perceived ease of use [F(1,268)=39.285,P<0.05]. Beta coefficient (B=-. 795) shows that a one unit increase in SPSS self-efficacy is causing 79.5% decrease in perceived ease of use. The relationship between these variables is negative. This analysis supports the hypothesis.

H_3: SPSS learning value is a predictor of perceived usefulness.

R^2 is 14.7%, which shows that the strength of the model is weak. SPSS learning value accounts for 14.7% variation in perceived usefulness. Secondly, SPSS learning value is a significant predictor of perceived usefulness [F(1,268)=46.109,P<0.05].Relationship between these variables is positive. Beta coefficient (B=. 467) shows that a one unit increase in SPSS learning value is causing 46.7% increase in perceived usefulness. This analysis fully supports the hypothesis.

H_4:SPSS learning value is a predictor of perceived ease of use.

Coefficient of determination shows that the strength of the model is weak(R^2=1. 1%). SPSS learning value accounts for 1.1% variation in perceived ease of use. Secondly, SPSS learning value is not a true predictor of perceived ease of use [F(1,268)=3.052,P>0.05]. This analysis does not support the hypothesis.

H_5:Social support is a predictor of perceived usefulness.

Coefficient of determination shows that the strength of the model is weak(R^2=6. 3%). Social support accounts for only 6.3% variation in perceived usefulness. Secondly, Social support is a true predictor of perceived usefulness [F(1,268)=18.060,P<0.05]. Beta coefficient (B=. 294) shows that a one unit increase in social support is causing 29.4% increase in perceived usefulness. This analysis fully supports the hypothesis.

H_6:Social support is a predictor of perceived ease of use.

Coefficient of determination shows that the strength of the model is weak (R^2=3. 6%). Social support accounts for only 3.6% variation in perceived ease of use. Secondly, Social support is a true predictor of perceived ease of use [F (1,268)=18.060,P<0.05] whereas the direction of the relationship is negative. Beta coefficient(B=-.478) shows that a one unit increase in social support is causing 47.8% decrease in perceived ease of use. This analysis fully supports the hypothesis.

H_7: Statistics knowledge is a predictor of perceived usefulness.

Coefficient of determination shows that the model (R^2=. 08%) is not strong enough to predict perceived usefulness. Secondly, Statistical knowledge is nota true predictor of perceived usefulness [F(1,268)=2.041,P>0.05].This analysis does not support the hypothesis.

H_8: Statistics knowledge is a predictor of perceived ease of use.

Coefficient of determination shows that the model (R^2=. 04%) is not strong enough to predict perceived ease of use. Secondly, Statistical knowledge is nota true predictor of perceived usefulness [F(1,268)=1.022,P>0.05]. This analysis does not support the hypothesis.

H_9: Perceived ease of use is a positive predictor of perceived usefulness.

Coefficient of determination shows that the model (R^2=55%) is sufficiently strong enough to predict perceived usefulness. Secondly, Perceived ease of use is a positive predictor of perceived usefulness [F(1,268)=15.689,P<0.05, B=.109].Beta coefficient shows that a one unit increase in perceived ease of use is causing 10.9% increase in perceived usefulness. This analysis fully supports the hypothesis.

H_{10}:Perceived ease of use is a positive predictor of intentions to use SPSS.

Coefficient of determination shows that the model (R^2=14. 6%) is not strong enough to predict intentions to use SPSS. Secondly, Perceived ease of use isa positive predictor of intentions to use SPSS [F(1,268)=1.022,P<0.05, B=.115]. Beta coefficient shows that if perceived ease of use increases by one unit, intentions to use SPSS will increase by 11.5%. This analysis fully supports the hypothesis.

H_{11}: Perceived usefulness is a positive predictor of intentions to use SPSS.

Coefficient of determination shows that the model (R^2=32. 4%) is moderately strong to predict perceived ease of use. Secondly, Perceived usefulness is a positive predictor of intentions to use SPSS[F(1,268)=128.2,P<0.05, B=.113]. Beta coefficient shows that a one unit increase in perceived usefulness is causing 11.3% increase in intentions to use SPSS. This analysis fully supports the hypothesis.

Discussion and Conclusion

Results indicate that seven hypotheses are fully supported. Perceived ease of use significantly affects perceived usefulness of SPSS, perceived ease of use and perceived usefulness has a positive effect on intentions to use SPSS, social support and social learning value are positively affecting the perceived usefulness of SPSS individually. So, these results are aligned with findings of Brezavscek et al (2014), Hsu et al (2009),Liu et al (2010), Tarhini et al (2013),Escobar & Monge(2012) and Hsiao et al (2013).

SPSS self-efficacy has no effect on perceived usefulness whereas it is significant impact on perceived ease of use. It is contrary to results of Brezavscek et al (2014) and Park (2009) who found positive and significant positive relationship between self-efficacy and perceived usefulness and contrary to findings of Hsu et al (2009) who found no relationship between self-efficacy and perceived ease of use.

The SPSS learning value has a positive significant impact on Perceived usefulness whereas no impact on perceived ease of use. This result is partially aligned with findings of Brezavscek et al (2014) who found that SPSS learning value was positively related to perceived ease of use and perceived usefulness.

Social support has a positive and significant impact on perceived usefulness and ease of use, which aligns with the results of Hsiao et al (2013). Statistics knowledge has no influence on the perceived usefulness and ease of use contrary to the results of Baglin & James (2013) who found statistics knowledge an important predictor of perceived usefulness and ease of use.

So,it is concluded that in Pakistani universities, Social support, SPSS learning value and self-efficacy are important predictors of perceived ease of use and usefulness. The more the support students have from teachers and colleagues, the more they will be willing to use SPSS in the future.Higher level of perceived ease of use and usefulness can increase behavioral intentions to use SPSS in the future.

References

Al-Adwan, A., & Smedley, J. (2013). Exploring students' acceptance of e-learning using the Technology Acceptance Model in Jordanian universities Amer Al-Adwan Applied Science University, Jordan. *International Journal of Education and Development using Information and Communication Technology*,*9*(2), 4-18.

Ali, A. Z., & Iqbal, F. (2012). Statistics Anxiety among Psychology Graduates: An Analysis. *International Proceedings of Economics Development & Research*, *53*.

Baglin, J. (2013). Applying a Theoretical Model for Explaining the Development of Technological Skills in Statistics Education. *Technology Innovations in Statistics Education*, *7*(2).

Brezavšček, A., Šparl, P., & Žnidaršič, A. (2014). Extended Technology Acceptance Model for SPSS acceptance among Slovenian students of social sciences. *Organizacija*, *47*(2), 116-127.

Davis, F. D. (1985). A technology acceptance model for empirically testing new end-user information systems: *Theory and results* (Doctoral dissertation, Massachusetts Institute of Technology).

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340.

Delaval, M., Le Bohec, O., Noël, Y., Michinov, N., Guida, A., Musca, S., & Dodeler, V. Helping psychology students improve their statistics performance: A test of the Exo-St@ ts web-based training environment.

DeVaney, T. A. (2010). Anxiety and attitude of graduate students in on-campus vs. online statistics courses. *Journal of Statistics Education*, *18*(1), 1-15.

Escobar-Rodriguez, T., & Monge-Lozano, P. (2012). The acceptance of Moodle technology by business administration students. *Computers & Education*,*58*(4), 1085-1093.

Hsiao, H. C., Tu, Y. L., & Chung, H. N. (2012). Perceived Social Supports, Computer Self-Efficacy, and Computer Use among High School Students.*Turkish Online Journal of Educational Technology-TOJET*, *11*(2), 167-177.

Hsu, M. K., Wang, S. W., & Chiu, K. K. (2009). Computer attitude, statistics anxiety and self-efficacy on statistical software adoption behavior: An empirical study of online MBA learners. *Computers in Human Behavior*, *25*(2), 412-420.

Hsu, M. K., Wang, S. W., & Chiu, K. K. S. (2008). Influence of attitude, anxiety and self-efficacy toward statistics and technology on statistical package software usage behavior. In *South West Decision Sciences Institute Conference*.

Liu, I. F., Chen, M. C., Sun, Y. S., Wible, D., & Kuo, C. H. (2010). Extending the TAM model to explore the factors that affect Intention to Use an Online Learning Community. *Computers & Education*, *54*(2), 600-610.

Ng, E. M., Shroff, R., & Lim, C. (2013, July). Applying a Modified Technology Acceptance Model to Qualitatively Analyse the Factors Affecting E-Portfolio Implementation for Student Teachers' in Field Experience Placements. In*Proceedings of the Informing Science and Information Technology Education Conference* (Vol. 2013, No. 1, pp. 355-365).

Park, S. Y. (2009). An Analysis of the Technology Acceptance Model in Understanding University Students' Behavioral Intention to Use e-Learning. *Educational Technology & Society*, *12*(3), 150-162.

Rose, J., & Fogarty, G. J. (2006). Determinants of perceived usefulness and perceived ease of use in the technology acceptance model: senior consumers' adoption of self-service banking technologies. In *Proceedings of the 2nd Biennial Conference of the Academy of World Business, Marketing and Management Development: Business Across Borders in the 21st Century* (Vol. 2, pp. 122-129). Academy of World Business, Marketing and Management Development.

Tarhini, A., Hone, K., & Liu, X. (2013). Factors Affecting Students' Acceptance of e-Learning Environments in Developing Countries: A Structural Equation Modeling Approach. *context*, *10*, 17.

Received: November 27th, 2015
Revisions Received: