

AN INVESTIGATION ON THE ROLE OF PERCEIVED EASE OF USE, PERCEIVED USE AND SELF EFFICACY IN DETERMINING CONTINUOUS USAGE INTENTION TOWARDS AN E-LEARNING SYSTEM

Thiruchelvi Arunachalam

Associate Professor, Department of Management Studies, CEG Campus, Anna University, Chennai, Tamilnadu, India. PIN: 600025.

thiruchelvi_y@annauniv.edu, thiruchelvi_y@yahoo.com

ABSTRACT

There is a paradigm shift in the way organisations impart training and development to its employees with the advent of e-learning system. The study aimed to understand the role of perceived ease of use, perceived use and self efficacy in determining the continuous usage of an e-learning system among employees of software companies. The study also tried to understand the mediating role of learner satisfaction and the moderating role of gender in the relationship between perceived ease of use, perceived use and continuous usage intention. The data was collected from 250 employees in the Information Technology Industry, who had done at least a course in the e-learning platform. The results show that the relation between perceived usefulness and behavioural intention, perceived ease of use and behavioural intention and self efficacy and behavioural intention are all mediated by e-learner satisfaction. This implies e-learner satisfaction has to be enhanced if the continuous usage intention is to be improved.

Keywords: e-Learning; Continuous Usage Intention; Satisfaction; Perceived Ease of Use; Perceived Usefulness; Self Efficacy; Gender.

1. Introduction

There is an ever increasing demand for knowledge workers who are capable of higher-order thinking and reasoning to solve intricate problems in the work place. This again results in a need to build more cost-effective and efficient workplace learning environments to meet both individual and organizational objectives, requiring organizations to educate and train employees at multiple sites and times (Ong & Lai, 2006). The number of e-learning programs implemented in a corporate setting has increased exponentially over the last few years and e-learning has become a major form of training and development within organizations (Ho & Kuo, 2010).

E-learning refers to any kinds of the use of electronic devices for learning purpose. The benefits of e-learning are numerous: the participants can access the courses at their convenient time, at the place they feel comfortable, with asynchronous interactions discussion can stay more on-track, and people can get a chance to craft their responses, there are new opportunities for groups to work together by creating shared electronic conversations and discussions, etc. (Liaw & Huang, 2013).

Understanding learners' attitudes toward e-learning is a critical issue for improving e-learning usage (Liaw, 2008). The real success of implementation of e-learning system results only when there is a continued usage of the system by the employees. This study tries to analyse and figure out how the process of behavioural intention to continuously use e-learning system happens, so that the results could be used to formulate strategies to improve the intention to continuously use the e-learning system among employees.

2. Theoretical development

2.1. The theory of planned behaviour

The theory of planned behaviour postulates that a person's intention to perform or not to perform behaviour is the most important immediate determinant of that action. According to this theory intentions are functions of three basic determinants: attitude toward the behaviour, subjective norm and perceived behavioural control. The theory also assumes that the relative importance of the factors depends in part on the intention under investigation. So, to analyse behavioural intention of employees towards e-training system, attitude toward the behaviour and perceived behavioural control gains more importance.

Attitude towards behaviour is determined by accessible beliefs about the consequences of the behaviour, termed behavioural beliefs. It is determined by the person's evaluation of the outcomes associated with the behaviour and by the strength of these associations. In e-learning context the attitude towards the behaviour can be measured in terms of perceived usefulness and perceived ease of use.

Perceived behavioural control is a function of beliefs about the presence or absence of factors that facilitate or impede performance of behaviour. The more the required resources individuals think they possess and the fewer obstacles they anticipate, the greater will be the perceived control over the behaviour. These control beliefs lead to the perception that one has or does not have the capacity to carry out the behaviour. In e-learning context the Perceived behavioural control can be measured in terms of self efficacy.

2.2. Moderating effect of gender

Gender differences also play an important role in e-learning. Women and men differ in their decision-making processes regarding acceptance and usage of e-learning. This implies that efforts should be made to examine gender differences in e-learning to better understand how gender influences learners' attitudes towards e-learning, predicting how learners will respond to it, and then utilizing it (Ong & Lai, 2006). Gender can have moderating effect on relationship between attitudes and continuous usage intention.

2.3. Mediating effect of E-Learner satisfaction

It is obligatory on part of the organizations should ensure that the employees are satisfied with their e-learning system, only then employees will have the intention to continually use the e-learning system and also encourage their peers to use e-learning setup. After taking up e learning courses employees should be happy about their decision and consider that the courses have satisfied their needs (Sun, Tsa, Finger, Chen, & Yeh, 2008). Employees attitudes affects e-learning satisfaction which in turn has a positive effect on e-learning continuance intention (Roca, Chiu, & Martinez, 2006; Lee, 2010). Many studies have examined users' e-learning continuance intentions and found that they were strongly dependent on the satisfaction users felt regarding the use of an e-learning system (Lin and Wang 2012; Zhang, De Pablos, & Zhang, 2012).

Hence it is inferred that e-learner satisfaction mediates the relation between employee attitudes and continuous usage intention.

2.4. Perceived usefulness

Davis (1989) has defined perceived usefulness as the degree to which a person believes that using a particular system would enhance his/her job performance. Only if employees perceive that using the e-learning system enhances work efficiency, job outcome and learning efficiency, competence and productivity, they will possess positive behavioural intention to use it (Chen, 2010). Perceived usefulness while using the e-learning system has a positive effect on behavioural intention to continually to use the system (Lee, 2010; Liaw, Hsieu, & Chen, 2007; Liaw, 2008). Gender moderates the relation between perceived usefulness and continuous usage intention. Meanwhile E-Learner satisfaction is mediating the relationship between perceived usefulness and continuous usage intention of an e-learning system. Hence, it is hypothesized as,

H1a: Perceived usefulness has influence on continuous usage intention.

H1b: Perceived usefulness has influence on e-learner satisfaction

H1c: E-learner satisfaction mediates the relation between perceived usefulness and continuous usage intention.

H1d: Gender moderates the relation between perceived usefulness and continuous usage intention.

2.5. Perceived ease of use

Davis (1989) has defined perceived ease of use as the degree to which a person believes that using a particular system would be free of physical and mental effort. When a person perceives that performing an action is easy then he would develop positive attitude towards it. An employee should feel that it will be easy for him to become skilful by using e-learning systems. He should consider that learning to use the e-learning system is not a tedious process. On the whole the employees should believe that using e-learning system is effortless, only then they would develop positive intention to use e-learning system (Sun, Tsa, Finger, Chen, & Yeh, 2008). Perceived ease of use while using the e-learning system has a positive effect on continuous usage intention (Lee, 2010; Liaw, Hsieu & Chen, 2007). Researchers have revealed that perceived ease of use has an important direct effect on behavioral intention to use an e-learning system (Terzis and Economides 2011).

Gender moderates the relation between perceived ease of use and continuous usage intention. Meanwhile E-Learner satisfaction is mediating the relationship between perceived ease of use and continuous usage intention towards an e-learning system. Hence, it is hypothesized as,

H2a: Perceived ease of use has influence on continuous usage intention.

H2b: Perceived ease of use has influence on e-learner satisfaction

H2c: E-learner satisfaction mediates the relation between perceived ease of use and continuous usage intention.

H2d: Gender moderates the relation between perceived ease of use and continuous usage intention.

2.6. Self efficacy

Roca (2006) has defined self efficacy as the degree to which an individual is confident that he/she can perform a specific task or achieve a specific goal. When an employee feels that he is capable of making use of the e-learning system, he will have positive intention to make use of the system. Behavioural intention to use e-learning system will be influenced by the perceived self efficacy (Liaw, Hsieu & Chen, 2007). Gender moderates the relation between self efficacy and continuous usage intention. Meanwhile E-Learner satisfaction is mediating the relationship between self efficacy and continuous usage intention to use e-learning system. Hence, it is hypothesized as,

H3a: Self efficacy has influence on continuous usage intention.

H3b: Self efficacy has influence on e-learner satisfaction

H3c: E-learner satisfaction mediates the relation between self efficacy and continuous usage intention

H3d: Gender moderates the relation between self efficacy and continuous usage intention.

3. Methodology

3.1. Instrument

A questionnaire instrument was developed for this study. These scale items were developed based on the existing literature. The four items to measure perceived usefulness are adapted from the study of Ong and Lai (2006). The three items to measure perceived ease of use as documented by Lee and Lee (2008) are used. The four items to measure self efficacy are adapted from the work of Liaw and Huang (2013). The five items to measure e-learner satisfaction are adapted from Sun, Tsai, Finger, Chen, and Yeh (2008). The six items to measure behavioural intention as designed by Li (2013) are used for this study. All variables are subjectively measured using the five-point Likert Scale, with 5 being “Strongly Agree” and 1 being “Strongly Disagree.”

3.2. Data Collection

The Survey is conducted in Chennai, TamilNadu. The participants were employees of various software companies, who have undergone at least one e-learning course through their companies’ e-learning system. 250 such participants have responded to the questionnaire.

4. Data Analysis

A correlation matrix of independent variables is presented in table 1. The extent of inter correlation among independent variables is not very high implying that results of further analysis are not spurious.

Table I Intercorrelation of Independent Variables

Variables	1	2	3
1 Perceived usefulness	1	0.620**	0.418**
2 Perceived ease of use		1	0.587**
3 Self efficacy			1

Multiple regression analysis is carried out to test the hypotheses that comprise the direct effects of perceived usefulness, perceived ease of use and self efficacy on continuous usage intention. The analysis has revealed that perceived usefulness, perceived ease of use and self efficacy are found to have significant impacts on continuous usage intention towards an e-learning system. The standard beta values and the R² values are as shown in table 2.

Table II Multiple Regression on Continuous Usage Intention

Variables	Standard Beta	t-value
Perceived usefulness	0.315	7.484**
Perceived ease of use	0.374	7.926**
Self efficacy	0.335	8.219**
R ²	0.734	
Adjusted R ²	0.731	

*** p value less than .001

To test the mediating effect of e-learner satisfaction, the influence of independent variables on e-learner satisfaction is to be confirmed. So, multiple regression analysis is carried out to test the direct effects of

perceived usefulness, perceived ease of use and self efficacy on e-learner satisfaction. The standard beta values and the R^2 values are as shown in table 3.

Table III Multiple Regression on e-Learner Satisfaction

Variables	Standard Beta	t-value
Perceived usefulness	0.265	5.774**
Perceived ease of use	0.373	7.236**
Self efficacy	0.347	7.792**
R^2	0.682	
Adjusted R^2	0.679	

*** p value less than 0.001

The independent variables of the study are having significant influence on both continuous usage intention and e-learner satisfaction. Now, a mediation analysis is done to detect whether the relation between perceived usefulness, perceived ease of use and self efficacy and continuous usage intention are mediated by e-learner satisfaction. The mediation effect of e-learner satisfaction on the relation between independent variable and continuous usage intention is measured in SPSS with INDIRECT macro designed by Preacher and Hayes (2008). The strengths of the mediated paths are shown below in table 4.

Table IV Mediated paths

Tested Path	Path a	Path b	Path c	Path c'
PU-SAT-CUI	0.6424 (0.0487)**	0.8631 (0.0259)**	0.6925 (0.0465)**	0.1380 (0.0259)**
PEOU-SAT-CUI	0.8062 (0.0463)**	0.8428 (0.0298)**	0.8391 (0.0446)**	0.1596 (0.0324)**
SEF-SAT-CUI	0.6958 (0.0480)**	0.8929 (0.0279)**	0.7105 (0.0477)**	0.0892 (0.0287)**

Standard errors are in parenthesis

*** p value less than 0.001

The hypothesis H1c which states that the relation between Perceived usefulness (PU) and Continuous Usage intention (CUI) is mediated by e- learner satisfaction (SAT) is tested to detect whether e-learner satisfaction is the one which accounts to the extent of relation between perceived usefulness and continuous usage intention. The result of testing can be viewed in table 4. The figure 1 depicts that there lies a mechanism in which perceived usefulness causes e-learner satisfaction which in turn causes continuous usage intention.

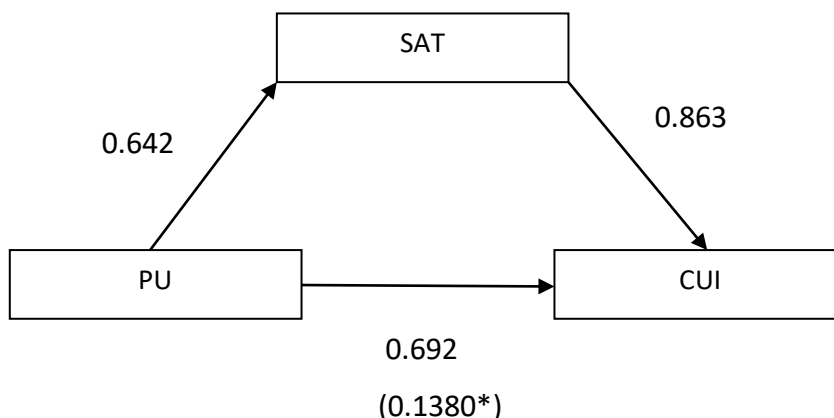


Figure I Mediating effect of e-learner satisfaction on the relation between perceived usefulness and continuous usage intention

The hypothesis H2c which states that the relation between Perceived ease of use (PEOU) and Continuous Usage Intention (CUI) is mediated by e- learner satisfaction (SAT) is tested to detect whether e-learner satisfaction is the one which accounts to the extent of relation between perceived ease of use and continuous usage intention. The result of testing can be viewed in table 4.

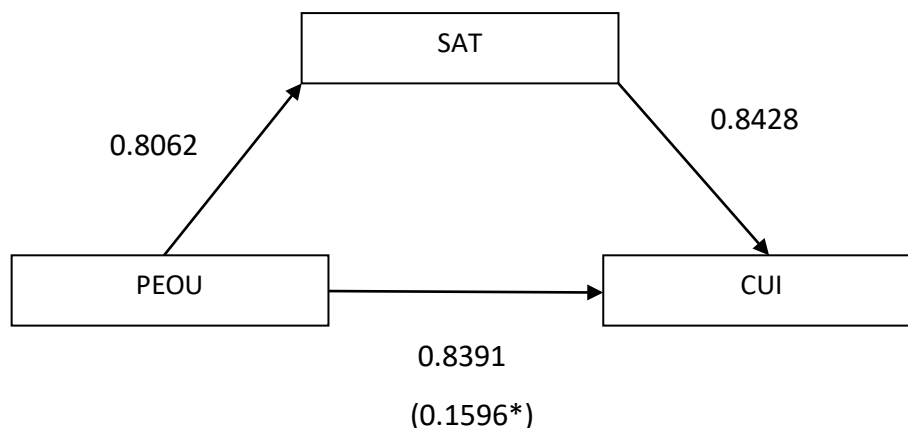


Figure II Mediating effect of e-learner satisfaction of the relation between perceived ease of use and behavioural intention

The figure 2 depicts the fact that there lies a mechanism in which perceived ease of use causes e-learner satisfaction which in turn causes continuous usage intention

The hypothesis H3c which states that the relation between self efficacy (SEF) and Continuous Usage Intention (CUI) is mediated by e- learner satisfaction (SAT) is tested to detect whether e-learner satisfaction is the one which accounts to the extent of relation between self efficacy and continuous usage intention. The result of testing table 4.

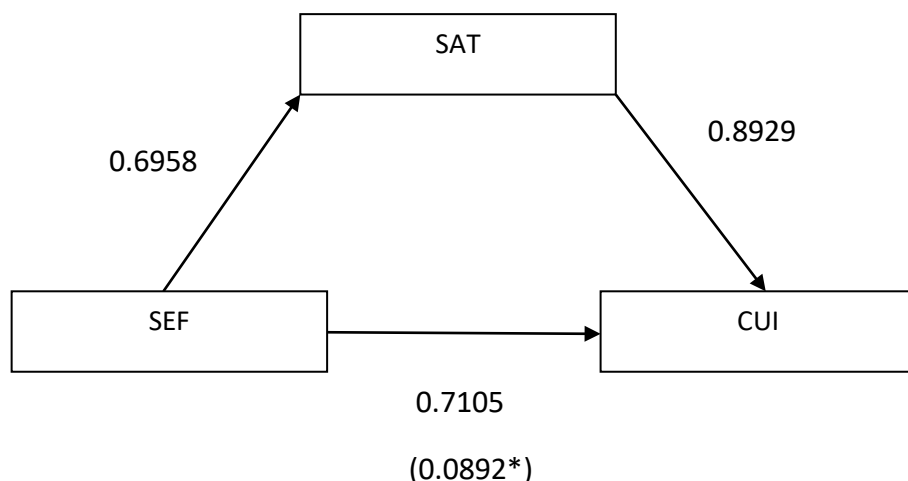


Figure III Mediating effect of e-learner satisfaction on the relation between self efficacy and continuous usage intention

The figure 3 depicts the fact that there lies a mechanism in which self efficacy causes e-learner satisfaction which in turn causes continuous usage intention

The moderation analysis is done to detect whether the relation between perceived usefulness, perceived ease of use and self efficacy and continuous usage intention are different for male and female. The moderation effect of gender on the relation between independent variables and continuous usage intention is measured in SPSS with MODPROBE macro designed by Hayes and Matthes (2009). The p-values of influence of interaction between gender and independent variables on continuous usage intention are given in table 5.

Table V Moderated paths

Moderation Paths	Significance value (p-value)
PU-BI	0.5521
PEOU-BI	0.0960
SEF-BI	0.4553

On testing hypothesis H1b whether gender moderates the relation between perceived usefulness and continuous usage intention, it has been inferred that the influence of interaction between gender and perceived usefulness on continuous usage intention is not significant. The p value of this interaction effect on behavioural intention is given in table 4. A line graph between perceived usefulness and behavioural intention is sketched to graphically test the moderation effect of gender. The line patterns for male and female can be viewed in figure 4.

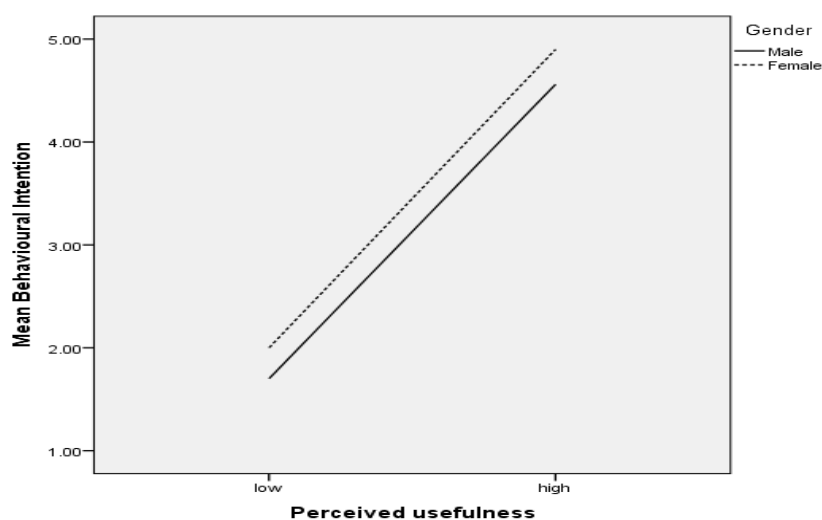


Figure IV Relation between PU and BI with lines defined by gender

The hypothesis H2b whether gender moderates the relation between perceived ease of use and continuous usage intention is tested and it is inferred that the influence of interaction between gender and perceived ease of use on continuous usage intention is not significant. The p value of this interaction effect on behavioural intention is given in table 4. A line graph between perceived ease of use and continuous usage intention is sketched to graphically test the moderation effect of gender. The line patterns for male and female can be viewed in figure 5.

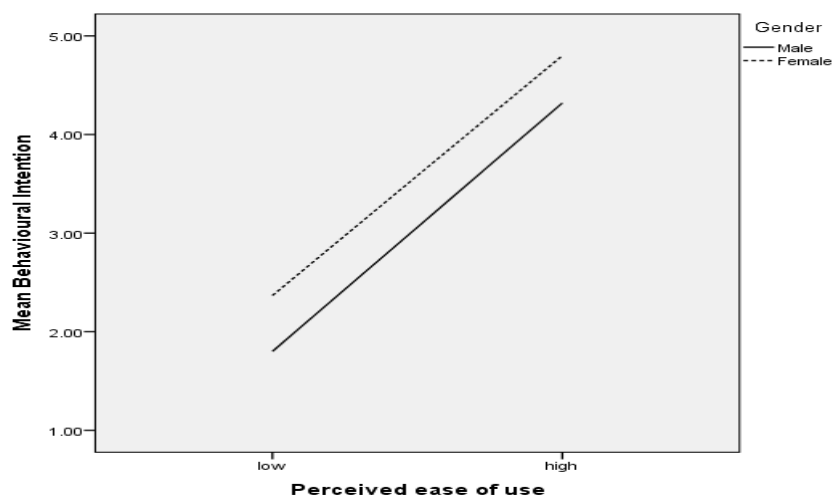


Figure V Relation between PEOU and BI with lines defined by gender

The hypothesis H3b is tested to check out whether gender moderates the relation between self efficacy and continuous usage intention and it has been inferred that the influence of interaction between gender and self efficacy on continuous usage intention is not significant. The p value of this interaction effect on continuous usage intention is given in table 4. A line graph between self efficacy and continuous usage intention is sketched to graphically test the moderation effect of gender. The line patterns for male and female can be viewed in figure 6.



Figure VI Relation between SEF and BI with lines defined by gender

5. Discussion

From table 1 it is understood that the three variables considered for the study namely perceived usefulness, perceived ease of use and self efficacy are different from one another, they are not highly inter-correlated which assures that the further analysis of those variables are valid.

From the results of multiple regression on behavioural intention in table 2 it is obvious that perceived usefulness, perceived ease of use and self efficacy are having significant influence on behavioural intention, since the p-values of the standard beta values are all less than .05. These three variables together explain about 73.4% of the variability in behavioural intention. Thus perceived usefulness, perceived ease of use and self efficacy are important determinants of behavioural intention of employees to continually undergo courses in e-learning system.

The results of multiple regression on e-learner satisfaction in table 3 shows that perceived usefulness, perceived ease of use and self efficacy are having significant influence on e-learner satisfaction, since the p-values of the standard beta values are all less than .05. These three variables together explain about 68.2% of the variability in continuous usage intention. Thus perceived usefulness, perceived ease of use and self efficacy have a strong relation with e-learner satisfaction. Since these three factors influence both the continuous usage intention and e-learner satisfaction, mediation can be tested.

In table 4 the first hypothesized (H1c) pathway from perceived usefulness to e-learner satisfaction and then to continuous usage intention is supported. E-learner satisfaction has partially mediated the effect of perceived usefulness on continuous usage intention. The direct effect of perceived usefulness on continuous usage intention is 80.07% less than total effect when e-learner satisfaction is included. Thus it is inferred that the extent of relationship between perceived usefulness and continuous usage intention is determined by e-learner satisfaction.

In table 4 the second hypothesized (H2c) pathway from perceived ease of use to e-learner satisfaction and then to continuous usage intention is supported. E-learner satisfaction has partially mediated the effect of perceived ease of use on continuous usage intention. The direct effect of perceived ease of use on continuous usage intention is 80.79% less than total effect when e-learner satisfaction is included. Thus it is inferred that the extent of relationship between perceived ease of use and continuous usage intention is determined by e-learner satisfaction.

In table 4 the third hypothesized (H3c) pathway from self efficacy to e-learner satisfaction and then to continuous usage intention is also supported. E-learner satisfaction has partially mediated the effect of self

efficacy on continuous usage intention. The direct effect of self efficacy on continuous usage intention is 87.44% less than total effect when e-learner satisfaction is included. Thus it is inferred that the extent of relationship between self efficacy and continuous usage intention is determined by e-learner satisfaction.

Thus it is proved that the relation between perceived usefulness and continuous usage intention, perceived ease of use and continuous usage intention and self efficacy and continuous usage intention are all mediated by e-learner satisfaction. This implies e-learner satisfaction has to be enhanced if the final outcome continuous usage intention is to improved. From table 3 it is inferred that of all the factors which influence e-learner satisfaction the most influential factor is perceived ease of use with standard beta value of 0.373, the next influential factor is self efficacy with standard beta value of 0.347 followed by perceived usefulness with standard beta value of 0.265.

As shown in table 5 the p-values of the interaction effect between perceived usefulness and gender on continuous usage intention is 0.5521; interaction effect between perceived ease of use and gender on behavioural intention is 0.0960; interaction effect between self efficacy and gender on behavioural intention is 0.4553. All these values are greater than 0.05. This implies that gender has no moderating effect on any of the relation between the independent variables and behavioural intention. In figures 1,2 and 3 the pattern of lines for male and female are almost similar and are not poles apart which again confirms that the direction and strength of the relation between perceived usefulness and continuous usage intention, perceived ease of use and continuous usage intention and self efficacy and continuous usage intention are not determined by gender.

Thus by improving perceived ease of use, self efficacy and perceived usefulness, e-learner satisfaction can be improved which in turn would enhance continuous usage intention to undergo more courses through e-learning system.

6. Conclusion

From the research it is obvious that Perceived usefulness, Perceived ease of use, Self efficacy have significant influence on continuous usage intention of e-learning system. Gender is not a determinant of degree of influence of these factors on continuous usage intention. The relation between these independent variables and continuous usage intention is partially but strongly mediated by e-learner satisfaction. So e-learner satisfaction is a major determinant of continuous usage intention towards e-learning system. The e-learner satisfaction in turn is highly influenced by perceived ease of use, followed by self efficacy and perceived usefulness.

Therefore to improve the continuous usage intention of employees towards the e-learning system, e-learner satisfaction has to be improved by improving employees' perceived ease of use, self efficacy and perceived usefulness.

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