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# Stepwise Regression of Demographics to Predict e-Learning Problems & User-Satisfaction in HEIs of Khyber Pakhtunkhwa (KPK) Pakistan

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**Abstracts** - The role of demographic attributes on the user-attitudes is well-reported and recorded in the literature on the development and use of eLearning systems in the higher education institutions (HEIs) of the world. Given the increasing role of information and communication technologies (ICTs) in almost every aspect of life, the organizations (including education sector) are conducting research to understand the development trajectory so that the problems are identified and rectified in a systematic and skillful manner. Similarly, user-satisfaction is big predictor of users' interest and acceptability of technology therefore researchers are trying to find the satisfiers in the eLearning environments. This paper is a part of the PhD level research about the challenges and opportunities of eLearning for HEIs in KPK, Pakistan. Stepwise regression has been used to compute the impacts of different demographics on the teachers, students and administrators to find out the best predictors of the eLearning problems and user-satisfaction.

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**Classification:** *GJCST 1.2.6, G.3*



*Strictly as per the compliance and regulations of:*



# Stepwise Regression of Demographics to Predict e-Learning Problems & User-Satisfaction in HEIs of Khyber Pakhtunkhwa (KPK) Pakistan

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**Keywords:** *ICTs, HEIs, eLearning, eProjects, User-Problems, User-Satisfaction, Stepwise Regression*

## I. INTRODUCTION

Research informs that some academicians consider the classroom-based teaching as an asset and view computer-based instruction simply as an alternative delivery system for traditional pedagogy and not as a tool to implement new forms of pedagogy (Kuriloff, 2005). While others, view technology as the key answer to the problems in education and demand institutional transformation for compatibility. They come from the non-academic group of ICT-division, instructional designers, project managers, and the administrators or more precisely, the developers of eLearning systems (Juniu, 2005). Furthermore, since eLearning systems create winners and losers due to redistribution of organizational resources (particularly control over data sources) therefore there are chances of political-maneuvering to sabotage the eProjects for individual or group interests within or outside HEI (Nawaz & Kundi, 2007). Similarly, in most of the eLearning projects, the academics have been found refusing to change the curricula and pedagogic

approaches; teaching staff and instructors lack incentive and rewards; there is a lack of feedback towards higher making, and little impact on strategy definition and implementation (Loing, 2005). There are many problems levels of decision and policy-such as, low rates of participation, learner resistance, high non-completion rates, poor learner performance (Kanuka, 2007). Some are classical such as inertia of behavior or natural resistance to changes, while others who lack access to information develop a fear of isolation however, if proper eLearning environments are created, user resistance can be transformed into a collaborative learning workplace (Vrana, 2007). This research is an effort to calculate the impacts of demographic diversities on the attitudes of eLearning users in higher education institutions (HEIs) of KPK, Pakistan. Stepwise regression have been used to gradually eliminate the insignificant factors or variables by developing different models of predictors and finally find out the best fit model with most significant predictors which show noticeable impact on different attitudes (i.e., problems of eLearning and user-satisfaction) of the teachers, students and administrators. The paper is presented in the sequence of introduction, literature review, findings, final analysis conclusions.

## II. LITERATURE REVIEW

It is well-reported in the literature that the development, implementation and use of ICTs in higher education is a complex task where teachers, students, administration and technical support staff, all are affected by and affect the eLearning systems (Nyvang, 2003). The research reports that a high frequency of eProjects either fail completely or partially fail to meet the objectives like, in-time development and within budgets delivery (Turban et al., 2004:619; Nawaz et al., 2007). Differing user-perceptions and attitudes, power structures in higher education, and insufficient communication among the various groups pose obstacles to technological development in HEIs (Qureshi et al., 2009). Researchers are pointing out several obstacles in the development practices of eProjects for eLearning in HEIs of both the advanced and developing countries. For example, there is evidence that during the eLearning project development very little communication occurs between

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users and ICT professionals or developers (Shank & Bell, 2006). In the development practices, people feel that they are increasingly controlled by machines and that the human factors of their work are disappearing. They find losing their privacy and unsure about the security of data and information (Vrana, 2007).

Given the diversity of user-types, their demographic variations, and perceptual rivalries; eLearning development, implementation and use demands integration at different levels of an organization. The greatest challenge in 'using' the eLearning systems is to adapt the new computer-based systems to differently skilled learners, for example, if it is too complex, the user will be lost, confused and frustrated but too simple or non-systematic environments can engender problems of user-motivation (Sirkemaa, 2001). Thus, the individual satisfaction and perception of technologies is closely related to the attitudes (like user-satisfaction) of an individual for participating and contributing to the use of e-Learning (Klamma et al., 2007; Nawaz & Kundi, 2010a).

### 1) *Problems of eLearning*

Despite the theoretical benefits that eLearning systems can offer, difficulties can often occur (Graff, Jo & McNorton, 2001). The reported impacts of ICTs in education have not been as extensive as in other fields (Oliver, 2002) and these have hardly impacted the actual teaching approaches and practices (Valcke, 2004). This is true that many of the eLearning efforts in HEIs do nothing more than delivering the traditional print syllabus via the Internet (Wood, 2004). The HEIs in developing countries are facing multiple problems in taking-on their eLearning objectives therefore most are trying to experiment blended technologies but researchers document that traditional technologies yet dominate (Hvorecký et al., 2005; Macleod, 2005; Johnson et al., 2006; Martin & Dunsworth, 2007; Sife et al., 2007).

The marriage between education and technology has often been rocky (Buzhardt & Heitzman-Powell, 2005) facing problems like, language barrier, absence of prerequisites, technology hurdles and so on (Hvorecký et al., 2005). Given this, eLearning is still used only as a buzzword, and its deep impact on educational institutions is not seen (Baumeister, 2006). Thus, efforts for the integration of ICTs in higher education are reportedly struggling with several problems (Dalsgaard, 2006). There are a number of challenges for the universities in developing countries when they implement the eLearning systems (Sife et al., 2007; Nawaz et al., 2007; Qureshi et al., 2009).

E Learning is not merely another medium for the transmission of knowledge rather it changes the relationship between teachers and students. It demands new skills, competencies and attitudes amongst those planners, managers, teachers and trainers who are

going to design and develop materials and support learners online. Thus, the development of innovative practices and the generation of new competencies in eLearning are fast becoming key issues (Gray et al., 2003). Valcke (2004) suggests that there are "uncomfortable" and "comfortable" zones for eLearning developers and users but these issues can not be handled in isolation from educational, administrative and logistic issues. The developers and users of eLearning are facing multiple 'internal and external' challenges (Loing (2005) because this "is not a trivial process (Nyang, 2006)."

### 2) *User-Satisfaction*

It is well-documented that users are rarely satisfied with the performance of modern eLearning systems and worried about the issues of integrating the system with other organizational systems (Drinkwater et al., 2004; Russell, 2005). The HEIs are constantly facing problems of user dissatisfaction from newly emerging eLearning systems, disintegration between new technologies and existing work practices, underestimating the technological complexities by the users and inadequate end-user support (Bondarouk, 2006). Researchers also report that an individual's satisfaction is closely related with his/her commitment to participate and contribute (Klamma et al., 2007). If there is compatibility between the learning style and the new eLearning system, researchers report higher levels of user-satisfaction (Manochehr, 2007).

However, mixed results are available about the user-satisfaction from eLearning systems around the world. Irons et al., (2002) tell that eLearning-users are less satisfied than those using the traditional methods of teaching and learning. Similarly, respondents express dissatisfaction with the contemporary eLearning development practices for example, the terminology of 'instructional design' is widely used among the development community but it is considered to reflect outmoded view of the educational delivery (Gray et al., 2003). On the contrary Radosevich & Kahn (2006) have recorded higher levels of satisfaction from ICT-based tools. Whatever the findings, user-satisfaction is dependent on several factors particularly the personal characteristics, environmental pressures and the facilities available to the end-users (Klamma et al., 2007; Nawaz & Kundi, 2010a).

### 3) *Demographic Impacts*

A long list of research studies are available wherein demographic impacts have been measured on the attitudes of users and developers of eLearning in HEIs in different countries (Stockley, 2004; Marcella & Knox, 2004; Kabeil, 2005; Jiang et al., 2006; Gay et al., 2006; Thomas & Allen, 2006; Bataineh & Abdel-Rahman, 2006; Arulchelvan & Viswanathan, 2006). Researchers note that decisions made by the teacher, students and

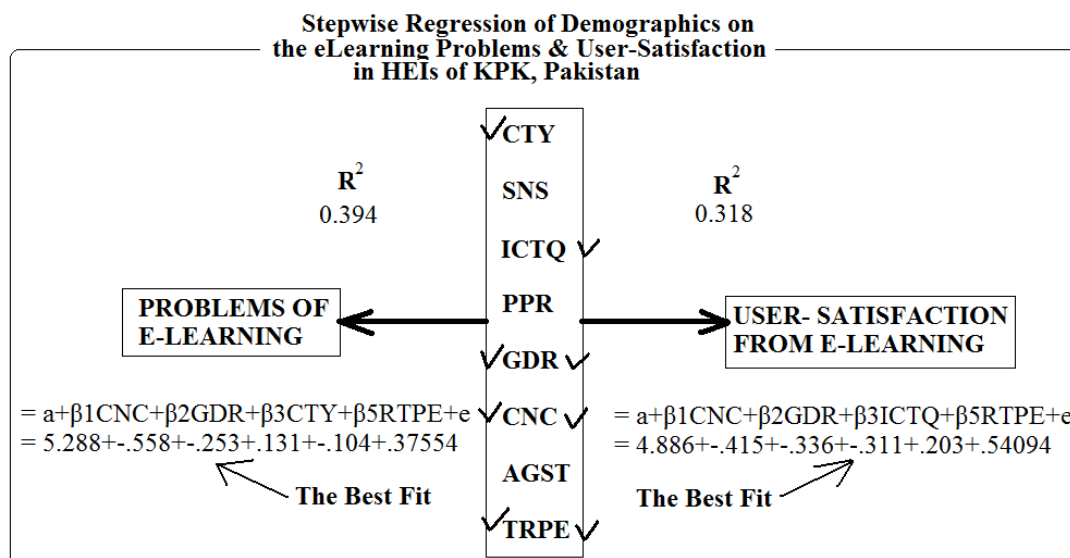
administrators about the use of ICTs in higher education are influenced by several factors including: demographic factors (i.e., age, education, gender); access to hardware; digital literacy; perception about the usefulness of new technologies in encouraging interaction, teaching more systematically, intellectual enhancement of the faculty, and experience with computers (Mehra & Mital, 2007; Qureshi et al., 2009).

Similarly, research tells that major factors contributing to Internet use are social demographic factors such as age, race, and gender, rather than socio-economic factors such as income and education, or other psychological factors (Dewan & Riggins, 2005). The problems of demographic dimensions are universal but they are more implicative in the developing countries than the advanced states. In the developing states like

Pakistan, the state of affairs about demographic implications is alarming. Here the groups are not only highly dissimilar but also the number of groups is greater. Thus, knowledge about the impacts of user-characteristics in the development and use of eLearning environments in HEIs of a developing country is the prerequisite to introduce successful eLearning systems (Nawaz & Kundi, 2010a).

Figure 1 gives a picture of the whole story in this paper. It shows the demographic (independent) and research variables (dependents) identify the research hypotheses tested through stepwise multiple regressions. Figure also tells about the empirical results in the form of  $R^2$  statistics and the best-fit models for each group of regressions.

Figure 1 Schematic Diagram of the Theoretical Framework for this Publication



### III. RESEARCH DESIGN

Population of this study includes all the HEIs in the province of KPK. While the sample consisted of all the institutions in two cities (big & small), which were selected on the basis of following features:

- Peshawar (big city) and Dera Ismail Khan (DIK) (small city).
- Both the cities host two of the oldest universities of the province (University of Peshawar – 1950 and Gomal University - 1974).
- The cities have both the oldest as well as new universities (pre-2000 and the post=2000) working in public and private sectors.
- These institutions are populated with students, teachers and administrators

from almost all cities and areas of the province.

We used a structured questionnaire developed from the literature, which included questions about demographics and perceptions about educational technologies, development & use practices of eLearning by students, teachers and administrators in sample universities (30 items on 7-point scale). The questions relating to the problems of eLearning and user-satisfaction were 11 and 9 respectively. The overall reliability of Cronbach's alpha was estimated at 0.9288, with 354 cases and 38 survey items (including 8 demographics). This value exceeds the required minimum score of 0.7 for overall reliability (Koo, 2008).

SPSS 12.0 has been used to create a database of primary data for applying statistical procedures to generate descriptive and inferential statistics and test the hypothesis. Stepwise Multiple Regression

procedures have been used to gradually exclude insignificant variables from the regression-equation. Two research-variables (user-problems and satisfaction from eLearning) and eight demographic attributes were

selected for the analysis of this publication. Demographics were first coded into 'Dummy-variables' using 0 and 1 as codes for all the variables

#### IV. FINDINGS OF THE STUDY

##### 1) *Grouping of the Factors (Demographics)*

*Table 1* Frequencies of the Demographic Groupings (n=354)

|   |                                     |           |         |               |
|---|-------------------------------------|-----------|---------|---------------|
| 1 | <b>City - CTY</b>                   | Frequency | Percent | Valid Percent |
|   | Small City (D. I. Khan)             | 145       | 41.0    | 41.0          |
|   | Big City (Peshawar)                 | 209       | 59.0    | 59.0          |
| 2 | <b>Science/Non-Science - SNS</b>    |           |         |               |
|   | Science Respondents                 | 152       | 42.9    | 42.9          |
|   | Non-Science Respondents             | 202       | 57.1    | 57.1          |
| 3 | <b>ICT Qualification - ICTQ</b>     |           |         |               |
|   | Formal Computer Qualification       | 119       | 33.6    | 33.6          |
|   | Informal Computer Qualification     | 235       | 66.4    | 66.4          |
| 4 | <b>Public/Private - PPR</b>         |           |         |               |
|   | Public Universities                 | 180       | 50.8    | 50.8          |
|   | Private Universities                | 174       | 49.2    | 49.2          |
| 5 | <b>Gender - GDR</b>                 |           |         |               |
|   | Male Respondents                    | 241       | 68.1    | 68.1          |
|   | Female Respondents                  | 113       | 31.9    | 31.9          |
| 6 | <b>Computer/Non-Computer - CNC</b>  |           |         |               |
|   | Computer (as a Subject)             | 101       | 28.5    | 28.5          |
|   | Non-Computer (other Subjects)       | 253       | 71.5    | 71.5          |
| 7 | <b>Age of the Institute - AGIST</b> |           |         |               |
|   | Pre2000 (established before 2000)   | 191       | 54.0    | 54.0          |
|   | Post2000 (established after 2000)   | 163       | 46.0    | 46.0          |
| 8 | <b>Respondent-Type - RTPE</b>       |           |         |               |
|   | Student Respondents                 | 132       | 37.3    | 37.3          |
|   | Teachers & Administrators           | 222       | 62.7    | 62.7          |

##### 2) *Regression of Demographics on the Problems*

*Models, Coefficients & Excluded Variables (PRB)*

*Table 2* Showing the Details of the FOUR Models

| Model                | R                                                                                                                                                                                                                                                                            | R Square | Adjusted R Square | Std. Error of the Estimate | F       | Sig.    |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------------|----------------------------|---------|---------|
| 1                    | .568(a)                                                                                                                                                                                                                                                                      | .323     | .321              | .39530                     | 167.841 | .000(a) |
| 2                    | .607(b)                                                                                                                                                                                                                                                                      | .368     | .364              | .38244                     | 102.199 | .000(b) |
| 3                    | .620(c)                                                                                                                                                                                                                                                                      | .384     | .379              | .37813                     | 72.711  | .000(c) |
| 4                    | .628(d)                                                                                                                                                                                                                                                                      | .394     | .387              | .37554                     | 56.751  | .000(d) |
| Detail of the Models | a Predictors in the Model: (Constant), CNC<br>b Predictors in the Model: (Constant), CNC, GNDR<br>c Predictors in the Model: (Constant), CNC, GNDR, CTY<br>d Predictors in the Model: (Constant), CNC, GNDR, CTY, RTPE<br>e Dependent Variable: <b>Problems of eLearning</b> |          |                   |                            |         |         |

*Table 3* Showing Coefficients of Regression in FOUR Models

| Model |            | Unstandardized Coefficients |            | Standardized Coefficients | t       | Sig. |
|-------|------------|-----------------------------|------------|---------------------------|---------|------|
|       |            | B                           | Std. Error | Beta                      |         |      |
| 1     | (Constant) | 5.252                       | .039       |                           | 133.511 | .000 |
|       | CNC        | -.603                       | .047       | -.568                     | -12.955 | .000 |
| 2     | (Constant) | 5.312                       | .040       |                           | 133.024 | .000 |
|       | CNC        | -.590                       | .045       | -.556                     | -13.084 | .000 |
|       | GNDR       | -.219                       | .044       | -.213                     | -5.008  | .000 |
| 3     | (Constant) | 5.226                       | .049       |                           | 107.358 | .000 |
|       | CNC        | -.570                       | .045       | -.537                     | -12.646 | .000 |
|       | GNDR       | -.225                       | .043       | -.219                     | -5.207  | .000 |
|       | CTY        | .124                        | .041       | .128                      | 3.008   | .003 |
| 4     | (Constant) | 5.288                       | .055       |                           | 96.666  | .000 |
|       | CNC        | -.558                       | .045       | -.526                     | -12.399 | .000 |
|       | GNDR       | -.253                       | .044       | -.246                     | -5.689  | .000 |
|       | CTY        | .131                        | .041       | .134                      | 3.173   | .002 |
|       | RTPE       | -.104                       | .043       | -.105                     | -2.418  | .016 |

Dependent Variable: Problems of eLearning

*Table 4* Showing the Excluded Variables in FOUR Models

| Model |       | Beta In  | t      | Sig. | Partial Correlation | Collinearity Statistics |
|-------|-------|----------|--------|------|---------------------|-------------------------|
|       |       |          |        |      |                     | Tolerance               |
| 4     | SNS   | .076(d)  | 1.430  | .154 | .076                | .616                    |
|       | ICTQ  | -.106(d) | -1.820 | .070 | -.097               | .506                    |
|       | PPR   | .002(d)  | .053   | .958 | .003                | .939                    |
|       | AGNST | .021(d)  | .505   | .614 | .027                | .979                    |

Table 4 shows that all the excluded variables carry greater p-values than the required 0.05 therefore they have no impact on the dependent variable. Thus, the alternative hypotheses relating to their role are rejected.

#### *b. Analysis I*

Above analysis describes that qualification (CNC), gender, type of cities and respondent types are top predictors of the user-problems relating to eLearning in the HEIs. 32-40. as table 2 shows that the first model explains 32% of the variation in the dependent variable

however this prediction rises to 40% in the fourth model by gradually excluding the insignificant variables from the equation.

The best-fit equation is:

$PRB = a + \beta_{1CNC} + \beta_{2GNDR} + \beta_{3CTY} + \beta_{4RTPE} + e$  (explains 40% of variation in Problems of eLearning)

$PRB = 5.288 + -.558 + -.253 + .131 + -.104 + .37554$

#### 3) *Regression of Demographics on User-Satisfaction*

##### a) *Models, Coefficients & Excluded Variables (STF)*

*Table 5* Showing Statistics of the FOUR Models

| Models               | R                                                                                                                                                                                                                                                                | R Square | Adjusted R Square | Std. Error of the Estimate | F      | Sig.    |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------------|----------------------------|--------|---------|
| 1                    | .445(a)                                                                                                                                                                                                                                                          | .198     | .196              | .58423                     | 86.992 | .000(a) |
| 2                    | .525(b)                                                                                                                                                                                                                                                          | .276     | .271              | .55610                     | 66.757 | .000(b) |
| 3                    | .545(c)                                                                                                                                                                                                                                                          | .298     | .292              | .54838                     | 49.418 | .000(c) |
| 4                    | .564(d)                                                                                                                                                                                                                                                          | .318     | .311              | .54094                     | 40.767 | .000(d) |
| Detail of the Models | a Predictors in the Model: (Constant), CNC<br>b Predictors in the Model: (Constant), CNC, GDR<br>c Predictors in the Model: (Constant), CNC, GDR, ICTQ<br>d Predictors in the Model: (Constant), CNC, GDR, ICTQ, RTPE<br>e Dependent Variable: User-Satisfaction |          |                   |                            |        |         |

*Table 6* Showing the Coefficients of Regression in FOUR Models

| Model |            | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. |
|-------|------------|-----------------------------|------------|---------------------------|--------|------|
|       |            | B                           | Std. Error | Beta                      |        |      |
| 1     | (Constant) | 4.861                       | .058       |                           | 83.626 | .000 |
|       | CNC        | -.641                       | .069       | -.445                     | -9.327 | .000 |
| 2     | (Constant) | 4.969                       | .058       |                           | 85.576 | .000 |
|       | CNC        | -.619                       | .066       | -.429                     | -9.434 | .000 |
|       | GDR        | -.389                       | .064       | -.279                     | -6.124 | .000 |
| 3     | (Constant) | 5.011                       | .059       |                           | 85.447 | .000 |
|       | CNC        | -.415                       | .089       | -.288                     | -4.657 | .000 |
|       | GDR        | -.389                       | .063       | -.279                     | -6.214 | .000 |
|       | ICTQ       | -.282                       | .085       | -.205                     | -3.310 | .001 |
| 4     | (Constant) | 4.886                       | .069       |                           | 70.475 | .000 |
|       | CNC        | -.415                       | .088       | -.288                     | -4.718 | .000 |
|       | GDR        | -.336                       | .064       | -.240                     | -5.252 | .000 |
|       | ICTQ       | -.311                       | .084       | -.226                     | -3.686 | .000 |
|       | RTPE       | .203                        | .062       | .151                      | 3.272  | .001 |

Dependent Variable: Satisfaction of the eLearning-Users

*Table 7* Showing the Excluded Variables from FOUR Models

| Model |       | Beta In  | t     | Sig. | Partial Correlation | Collinearity Statistics |
|-------|-------|----------|-------|------|---------------------|-------------------------|
|       |       |          |       |      |                     | Tolerance               |
| 4     | CTY   | .018(d)  | .400  | .690 | .021                | .950                    |
|       | SNS   | .039(d)  | .546  | .586 | .029                | .374                    |
|       | PPR   | -.007(d) | -.147 | .883 | -.008               | .899                    |
|       | AGIST | .005(d)  | .109  | .913 | .006                | .958                    |

Table 7 reveals that all the excluded variables have the p-values (.69, .59, .88 and .91) which are far greater than the required critical value of 0.05. Similarly, the last column shows that there is a big problem of collinearity. Thus, on all four excluded variables,  $H_0$  is substantiated.

#### b) Analysis II

Significant impacts have been recorded on computer/non-computer, gender, formal information

digital literacy and respondent type. CNC is most powerful predictor of the user-satisfaction meaning that the satisfaction of those with computer as a subject is totally otherwise as compared to those respondents who do not hold computer-related degrees or qualification. The first model shows 20% variation in the dependent variable but gradually moving from model 1 to 4 changes the results and in 4<sup>th</sup> model the prediction power goes up to 32%.

The best fit therefore is:

$STF = a + \beta_{1CNC} + \beta_{2GDR} + \beta_{3ICTQ} + \beta_{5RTPE} + e$  (explains 32% of change in User-satisfaction)

$$STF = 4.886 + -.415 + -.336 + -.311 + .203 + .54094$$

## V. FINAL ANALYSIS

*Table 8* Showing the Summary of Best-Fit Models and the Excluded Variables

| PROBLEMS OF E-LEARNING            |                    |                                                                                                                                          |
|-----------------------------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 1                                 | Hypothesized Model | $PRB = a + \beta_{1CNC} + \beta_{2GDR} + \beta_{3ICTQ} + \beta_{4PPR} + \beta_{5RTPE} + \beta_{6CTY} + \beta_{7SNS} + \beta_{8AGST} + e$ |
| 2                                 | Best Fit           | $PRB = a + \beta_{1CNC} + \beta_{2GDR} + \beta_{3CTY} + \beta_{5RTPE} + e$<br>$PRB = 5.288 + -.558 + -.253 + .131 + -.104 + .37554$      |
| 3                                 | Excluded Variables | ICTQ, PPR, SNS, & AGST                                                                                                                   |
| USER-SATISFACTION FROM E-LEARNING |                    |                                                                                                                                          |
| 1                                 | Hypothesized Model | $STF = a + \beta_{1CNC} + \beta_{2GDR} + \beta_{3ICTQ} + \beta_{4PPR} + \beta_{5RTPE} + \beta_{6CTY} + \beta_{7SNS} + \beta_{8AGST} + e$ |
| 2                                 | Best Fit           | $STF = a + \beta_{1CNC} + \beta_{2GDR} + \beta_{3ICTQ} + \beta_{5RTPE} + e$<br>$STF = 4.886 + -.415 + -.336 + -.311 + .203 + .54094$     |
| 3                                 | Excluded Variables | PPR, CTY, SNS, AGST                                                                                                                      |

*Table 9* Analysis of the Role played by Demographics

|   | Factors | Reg-1 (PRB) | Reg-2 (STF) | Significance |
|---|---------|-------------|-------------|--------------|
| 1 | CNC     | ✓           | ✓           | 2            |
| 2 | SNS     | -           | -           | -            |
| 3 | ICTQ    | ✓           | ✓           | 2            |
| 4 | RTPE    | ✓           | ✓           | 2            |
| 5 | GDR     | -           | ✓           | 1            |
| 6 | PPR     | ✓           | -           | 1            |
| 7 | CTY     | -           | -           | 0            |
| 8 | AGIST   | -           | -           | 0            |

Table 9 gives the following findings:

- 1) CNC, ICTQ, & RTPE are critical in explaining both the dependent variables. Computer/non-computer, formal and informal digital literacy respondent type are the top variables which truly divide the respondents into dissimilar groups with regard to both the problems and user-satisfaction.
- 2) SNS, CTY & AGIST have no roles in predicting the criterion variables. There are no differences of eLearning-problems and user-satisfaction between big and small cities, science and arts groups as well as old and new universities.
- 3) GDR & PPR are significant in regression 2 and 1 respectively. Males and females have different levels of satisfaction while there are different problems faced by public and private sector universities.

## VI. CONCLUSIONS

User-attitudes are changed due to many factors but their demographics are most widely found implicative. Not all but some of these factors are very critical in a particular situation. To understand the user problems and satisfaction from eLearning systems in HEIs, the management has to test all the possible classification of the respondents and test their significance before embarking on any eProject for introducing ICTs at the teaching, learning and/or administration level of a university. As said earlier the role of these groupings is more sensitive in the developing countries because of several social, economic, political and cultural problems specific to the developing or transitional societies as in case of Pakistan.

Stepwise regression is a handy tool to check the relevance of any set of grouping factors for their examination of any possible role in different regression-models with different combinations of the demographic variables. In every situation, totally diversified results can emerge. For example, in this paper male and female respondents are facing similar level of problems but



they have different degrees of satisfaction from the system. Likewise, the respondents from public and private sectors respondents are facing totally different problems but their satisfaction level is similar.

### REFERENCES RÉFÉRENCES REFERENCIAS

- 1) Arulchelvan, S. and Viswanathan, D. (2006). Pattern of usage of various electronic media by higher education students. *International Journal of Education and Development using ICT*, 2(4). Retrieved May 11, 2007, from <http://ijedict.dec.uwi.edu/>
- 2) Bataineh, R. F. & Abdel-Rahman, A. A. (2006). Jordanian EFL students' perceptions of their computer literacy: An exploratory case study. *International Journal of Education and Development using ICT*, 2(2). Retrieved April 10, 2007, from <http://ijedict.dec.uwi.edu/viewarticle.php?id=169&layout=html>.
- 3) Baumeister, H. (2006). Networked Learning in the Knowledge Economy - A Systemic Challenge for Universities. *European Journal of Open, Distance and E-Learning*. Retrieved April 10, 2007, from <http://www.eurodl.org/>.
- 4) Bondarouk, T. V. (2006). Action-oriented group learning in the implementation of information technologies: results from three case studies. *European Journal of Information Systems*, 15, 42–53. Retrieved April 10, 2007, from <http://www.palgrave-journals.com/ejis/>.
- 5) Buzhardt, J. & Heitzman-Powell, L. (2005). Stop blaming the teachers: The role of usability testing in bridging the gap between educators and technology. *Electronic Journal for the Integration of Technology in Education*, 4, 13. Retrieved April 10, 2007, from <http://ejite.isu.edu/Volume3No1/>.
- 6) Dalsgaard, C. (2006). Social software: E-learning beyond learning management systems. *European Journal of Open, Distance and E-Learning*. Retrieved April 10, 2007, from <http://www.eurodl.org/>.
- 7) Dewan, S. & Riggins, F.J. (2005) The Digital Divide: Current and Future Research Directions. *Journal of the Association for Information Systems*, 6(2):298-337. December.
- 8) Drinkwater, P. M., Adeline, C. M., French, S., Papamichail, K. N. & Rickards, T. (2004). Adopting a Web-Based Collaborative Tool to Support The Manchester Method Approach to Learning. *Electronic Journal on e-Learning*, 2(1), 61-68. Retrieved April 19, 2007 from <http://www.ejel.org/volume-2/vol2-issue1/issue1-art23-drinkwater.pdf>.
- 9) Gay, G., Mahon, S., Devonish, D., Alleyne, P. & Alleyne, P. G. (2006). Perceptions of information and communication technology among undergraduate management students in Barbados. *International Journal of Education and Development using ICT*, 2(4). Retrieved May 11, 2007, from <http://ijedict.dec.uwi.edu/>
- 10) Graff, M., Davies, J. & McNorton, M. (2001). Cognitive Style and Cross Cultural Differences in Internet Use and Computer Attitudes. *European Journal of Open, Distance and E-Learning*. Retrieved April 10, 2007, from <http://www.eurodl.org/>.
- 11) Gray, D. E., Ryan, M. & Coulon, A. (2003). The Training of Teachers and Trainers: Innovative Practices, Skills and Competencies in the use of eLearning. *European Journal of Open, Distance and E-Learning*. Retrieved April 10, 2007, from <http://www.eurodl.org/>.
- 12) Hvorecký, J., Manažmentu, V. S. & Cesta, P. (2005). Can E-learning break the Digital Divide? *European Journal of Open, Distance and E-Learning*. Retrieved April 10, 2007, from <http://www.eurodl.org/>.
- 13) Irons, L. R., Jung, D. J. & Keel, R. O. (2002). Interactivity in Distance Learning: The Digital Divide and Student Satisfaction. *Journal of Educational Technology & Society*, 5(3). Retrieved April 10, 2007, from <http://www.ask4research.info/>
- 14) Jiang, JJ. Klein, G. & Chen, HG. (2006) the Effects of User Partnering and User Non-Support on Project Performance. *Journal of the Association for Information Systems*, 7(2):68-68. February.
- 15) Johnson, D. W., Bartholomew, K. W. & Miller, D. (2006). Improving Computer Literacy of Business Management Majors: A Case Study. *Journal of Information Technology Education*, 5. Retrieved July 14, 2007, from <http://jite.org/documents/Vol5/>.
- 16) Kabeil, Magdy M. (2005) Perceived Requirements of MIS Curriculum: Implementation in Bilingual Developing Countries. *Journal of Information Technology Education*, Vol 4.
- 17) Kanuka, H. (2007). Instructional Design and eLearning: A Discussion of Pedagogical Content Knowledge as a Missing Construct. *e-Journal of Instructional Science and Technology (e-JIST)*. 9(2). Retrieved July 18, 2007, from [http://www.usq.edu.au/electpub/e-jist/docs/vol9\\_no2/default.htm](http://www.usq.edu.au/electpub/e-jist/docs/vol9_no2/default.htm).
- 18) Klamma, R., Chatti, M. A., Duval, E., Hummel, H., Hvannberg, E. H., Kravcik, M., Law, E., Naeve, A., & Scott, P. (2007). Social Software for Life-long Learning. *Journal of Educational Technology & Society*, 10 (3), 72-83. Retrieved June 24, 2007, from <http://www.ask4research.info/>.
- 19) Koo, A. C. (2008). Factors affecting teachers' perceived readiness for online collaborative learning: A case study in Malaysia. *Journal of*

- Educational Technology & Society*, 11 (1), 266-278. Retrieved November 10, 2008, from <http://www.ask4research.info/>
- 20) Kuriloff, P. (2005). Breaking the Barriers of Time and Space More Effective Teaching Using e-Pedagogy. *Innovate Journal of Online Education*, 2(1), Oct/Nov. Retrieved April 10, 2007, from <http://Innovateonline.info>.
- 21) Loing, B. (2005). ICT and Higher Education. *General delegate of ICDE at UNESCO. 9th UNESCO/NGO Collective Consultation on Higher Education (6-8 April 2005)*. Retrieved June 24, 2007, from <http://ong-comite-liaison.unesco.org/ongpho/acti/3/11/rendu/20/pdf/en.pdf>.
- 22) Macleod, H. (2005). What role can educational multimedia play in narrowing the digital divide? *International Journal of Education and Development using ICT*, 1(4). Retrieved May 11, 2007, from <http://ijedict.dec.uwi.edu//>.
- 23) Manochehr, N. (2007). The Influence of Learning Styles on Learners in E-Learning Environments: An Empirical Study. *Computers in Higher Education and Economics Review*, 18. Retrieved April 10, 2007, from <http://www.economicsnetwork.ac.uk/cheer.htm>.
- 24) Marcella, R. & Knox, K. (2004). Systems for the management of information in a university context: An investigation of user need. *Information Research*, 9(2), Paper 172. Retrieved April 10, 2007, from <http://InformationR.net/ir/9-2/paper172.html>.
- 25) Martin, F. & Dunsworth, Q. (2007). A Methodical Formative Evaluation of Computer Literacy Course: What and How to Teach. *Journal of Information Technology Education*, 6. Retrieved October 10, 2007, from <http://jite.org/documents/Vol6/>.
- 26) Mehra, P. & Mital, M. (2007). Integrating technology into the teaching-learning transaction: Pedagogical and technological perceptions of management faculty. *International Journal of Education and Development using ICT*, 3(1). Retrieved October 11, 2007, from <http://ijedict.dec.uwi.edu//>.
- 27) Nawaz, A. & G M Kundi (2010) Demographic implications for the eLearning user perceptions in HEIs of NWFP, Pakistan. *Electronic Journal of Information Systems for Developing Countries*, 41(5), 1-17. (a)
- 28) Nawaz, A., Kundi, G. M. & Shah, D. B. (2007). Metaphorical interpretations of information systems failure. *Peshawar University Teachers' Association Journal*, 14, 15-26.
- 29) Nyvang, T. (2003). *Implementation of ICT in higher education: A case study of teachers implementing ICT into their teaching practice*. Retrieved June 24, 2007 from <http://www.intermedia.uib.no/cscl/doc/files/Nyvang.pdf>.
- 30) Nyvang, T. (2006). *Implementation of ICT in Higher Education as Interacting Activity Systems*. Retrieved June 24, 2007 from <http://www.networkedlearningconference.org.uk/abstracts/pdfs/P27%20Nyvang.pdf>.
- 31) Oliver, R. (2002). *The role of ICT in higher education for the 21st century: ICT as a change agent for education*. Retrieved April 14, 2007 from <http://elrond.scam.ecu.edu.au/oliver/2002/he21.pdf>.
- 32) Qureshi, Q.A., Ahmad, S., Najibullah., Nawaz, A., & Shah, B. (2009) eLearning development in HEIs: Uncomfortable and comfortable zones for developing countries. *Gomal University Journal of Research*, 25(2), 47-56. (GUJR)
- 33) Radosevich, D. & Kahn, P. (2006). Using Tablet Technology and Recording Software to Enhance Pedagogy. *Innovate Journal of Online Education*, 2(6). Aug/Sep. Retrieved April 10, 2007, from <http://Innovateonline.info>.
- 34) Russell, G. (2005). The Distancing Question in Online Education. *Innovate Journal of Online Education*, 1(4), April/May. Retrieved April 10, 2007, from <http://Innovateonline.info>.
- 35) Sife, A. S., Lwoga, E. T. & Sanga, C. (2007). New technologies for teaching and learning: Challenges for higher learning institutions in developing countries. *International Journal of Education and Development using ICT*, 3(1). Retrieved July 21, from <http://ijedict.dec.uwi.edu//>.
- 36) Sirkemaa, S. (2001). Information technology in developing a meta-learning environment. *European Journal of Open, Distance and E-Learning*. Retrieved April 10, 2007, from <http://www.eurodl.org/>.
- 37) Smart, KL. & Cappel, JJ. (2006) Students' Perceptions of Online Learning: A Comparative Study. *Journal of Information Technology Education*, Vol 5.
- 38) Stockley, D. (2004). Strategic Planning for Technological Innovation in Canadian Post Secondary Education. *Canadian Journal of Learning and Technology*, 30(2), Spring. Retrieved May 14, 2007, from <http://www.cjlt.ca/>.
- 39) Thomas, T. & Allen, A. (2006) Gender Differences in Students' Perceptions of Information Technology as a Career. *Journal of Information Technology Education*, Vol 5.
- 40) Turban, E., Mclean, E. & Wetherbe, J. (2004). *Information technology for management: Transforming organizations in the digital economy*. 4<sup>th</sup> Ed. John Wiley & sons, Inc.
- 41) Valcke, M. (2004). ICT in higher education: An uncomfortable zone for institutes and their



policies. In R. Atkinson, C. McBeath, D. Jonas-Dwyer & R. Phillips (Eds), *Beyond the comfort zone: Proceedings of the 21st ASCILITE Conference (pp. 20-35). Perth, 5-8 December.* Retrieved April 10, 2007, from <http://www.ascilite.org.au/conferences/perth04/procs/valcke-keynote.html>.

42) Vrana, I. (2007). Changes required by ICT era are painful sometimes. *CAUSE98, an EDUCAUSE conference, online proceedings.* Retrieved October 10, 2007, from <http://www.educause.edu/copyright.html>.

43) Wood, R. E. (2004). Scaling Up: From Web-Enhanced Courses to a Web-Enhanced Curriculum. *Innovate Journal of Online Education*, 1(1), Oct/Nov. Retrieved April 10, 2007, from <http://Innovateonline.info>.