# Effect of Cultural Factors on Students of Pakistan

Nazia Hameed, Maqbool ud din shaikh, Fozia Hameed

**Abstract**— Pakistan as culturally diverse country possesses wide range of cultural factors. These cultural factors affect the living style, traditions, values and norms as well as the education. As e-learning is global mode of education so learners from different backgrounds enrolled in learning management system. Diversity of culture and learning styles should keep under considerations while designing elearning environment. In this research work e-learning cultural factors highlighted by bently et. al are incorporated to find the learner level. After assignment of level, learner respective Learning Management System(LMS) is allocated to learner. The focus is to concentrate on cultural factor in e-learning system. Furthermore; a prototype of the proposed system is implemented for the validation of proposed architecture.

*Keywords*— Culture, Culture Diversity, E -learning, Online learning, E-learning architecture

#### I. INTRODUCTION

The most promising outcome of the Internet and information technology is e-learning. E-learning has made rapid development and has become a global mode of education. It is an umbrella term that describes learning done at a computer, online or offline. E-learning is the process of delivering knowledge to the learner with the help of computers, the Internet, Intranet, the Web, from the hard drive, CD or DVD of the learner computer. In e-learning there are many issues need to be further investigated. One of the issues that need to be explored is cultural differences [1],[2],[7]. It is an umbrella term that includes living life style, education system, place, gender, race, history, nationality, language, sexual orientation, religious beliefs, ethnicity and aesthetics.

Pakistan is a developing country occupying a vital geographical position. Different regions of Pakistan are culturally different from each others. In Pakistan, there are many educational institutes having different educational environment. Student enrolled in e-learning system belongs to different regions and different educational institutes having different culture values. Their education system, medium of instruction, course contents etc. are different. Students of backward areas don't have good exposure of information and

computer technology (ICT). Most of existing e-learning systems do not consider these differences due to which learners face many problems during their study. Cultural

differences are major problem which effect e-learners [1],[3],[4],[5],[6],[7].Most of current e-learning system does not consider cultural diversity of learners.

In this paper, authors designed and proposed an e- learning system that caters the cultural difference issue of learners. Furthermore, authors have developed a prototype of proposed system.

The rest of the paper is organized as follows. Section II illustrates the literature review; Section III describes the proposed architecture, section IV presents system implementation and section V shows results and discussions.

#### II. LITERATURE REVIEW

#### A. e-learning

According to Badrul H. Khan, "E-learning can be viewed as an innovative approach for delivering well-designed, learnercentered, interactive, and facilitated learning environment to anyone, anyplace, anytime by utilizing the attributes and resources of various digital technologies along with other forms of learning materials suited for open, flexible, and distributed learning environment" [6]. E-learning is also defined as "e-learning is the use of technology to enable people to learn anytime and anywhere. E-learning can include training, the delivery of just-in-time information and guidance from experts" [7].

## B. Mode of e-learning

There are two modes of e- learning, i.e. synchronous and asynchronous. In synchronous mode, classes take place in a classroom in real-time. Communication between instructors and learners through teleconferencing or a chat room are examples of this mode. In asynchronous mode, learners can access educational material in their convenient time anywhere. In synchronous mode, learning takes place in real time but in asynchronous, it is not take place in real time. A brief description of these modes is presented in [12],[13].

## C. Modalities of e-learning Activities

According to Som Naidu, there are four types of e-learning activities i.e. individualized self-paced e-learning online, individualized self-paced e-learning offline, group-based e-

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learning synchronously; and group-based e-learning asynchronously [14]. In individualized self-paced e-learning online; learners use the internet for accessing learning resources. In individualized self-paced e-learning offline, learners access learning resources without the Internet. In group-based e-learning synchronously, groups of learners are working together in real time via the Internet. In group-based e-learning asynchronously, groups of learners are working over the Internet but not in real time[10], [14].

## D.e- learning Models

Several e-learning models are proposed by different researchers [6],[9],[10],[14]. Some models emphasis on the interactions between the teacher, student and the content [5], [8] while others focus on embedding tacit knowledge in pedagogical model to enhance e-learning [13].

Khan proposed P3 model for e-learning in [6]. The P3 model is divided into two phases; (1) content development and (2) delivery and maintenance. Content development involves planning, design, development and evaluation of e-learning content and resources. Implementation of online course offerings, monitoring and updation of e-learning environment are included in delivery and maintenance phase.

Terry et. al. in [9] proposed a model of e-learning in which different types of interactions are illustrated. Two major human characters of e-learning i.e. teachers and student are represented in the model. It represents interaction between the teacher, student and content. Learners can directly interact with the content as the e-learning material can easily be access using the Internet.

Rizwana et. al. in [14] proposed a structure for embedding tacit knowledge in pedagogical model. Her proposed pedagogical framework includes following three phases; content organization, quality assessment and content delivery phase. In the contents organization phase, the contents used for learning are collected and organized based on the requirements put forward by the industries. Quality assessment phase analyzes and assesses the contents developed and gathered based on theoretical and experimental methods. In contents delivery phase, the learner is assessed to find out their aptitude and level.

Another architecture of e-learning system is proposed in [10] that incorporates industrial and academics needs and requirements both. Contents are developed on the basis of these needs and requirements. To enhance the quality of e-learning system, quality assessment and assurance processes are added into this architecture. These processes will insure the quality of knowledge delivered to the learner.

## E. Culture Difference in e-learning

Culture can be defined as "the beliefs, value systems, norms, mores, myths, and structural elements of a given organization, tribe, or society" [16]. Culture refers to the norms, beliefs of the groups of individuals living in the society. Culture affects the learner's behaviors of online education and these effects must be taken into consideration to make e-learning more effective and practical. As shown in Fig 1, the cultural environment affects online learning environments in two aspects i.e. design and use.



Figure 1: Effect of Cultural Environment on online learning Environments

## *F. Effects of Culture on the Design and Development of elearning System*

E-learning system is build taking into consideration, needs and the customs of learners. Without keeping these considerations the system cannot be effective and thus unable to attain the required results. To analyze the differences, the communication disciplines involved are computer-mediated communication, cross-cultural communication, cultural context interaction mode and communication form [17] as shown in Fig 2.



Figure 2: Cultural Environments

With the advent of new technologies in distributed learning, elearning courses can be accessed throughout the global world. While designing e-learning environments the diversity of culture and learning styles should kept under considerations in order to enhance learning for all. One of the difficult issues in e-learning is cross-cultural communication [18].Gender also affect the learning capabilities of the learners [19]. Eight educational value differentials are highlighted by Bentley et. al. in [22] to understand the cultural issues. These issues are language differential, educational culture difference, technical infrastructure differential, local versus global differential, learning style differential, reasoning pattern differential, high- and low-context differential and social context differential. The authors not only incorporate the language and technology but also learning styles and local and global context.

## III. PROPOSED ARCHITECTURE

The proposed architecture is discussed below and shown in Fig 3.

## A. e-learning

In registration process, student registers a course through elearning system. In first step student is asked for signup. During signup student enter two types of data; personal and cultural. Student data is stored in student data repository which is divided into three sub repositories i.e. personal repository, cultural repository and feedback repository.

Personal Repository

Personal information of students is stored in the personal database.

Cultural Repository

To cater cultural diversity, student's cultural and educational information regarding is required. After gathering personal information student enter his educational and culture information. Cultural educational background includes the school type i.e. government school or private school, medium of instruction of primary secondary and master level, course contents of previous study, area from which student belong, computer skills, school environment, economic background etc. This information is stored into educational and cultural repository. When student entered personal, educational and cultural information he is successfully registered in the system. • Feed Back Repository

Students feed backs are stored in this repository for future decision making.

# B. Aptitude Test

Aptitude test is used to judge the student knowledge level. After signing in student take the aptitude test. Quality is a major concern in designing of the aptitude test. In our system Quality Manager assure that the questions designed for aptitude test are according to educational standards. Aptitude test consists of four portions; English, Mathematical Reasoning, Computer and Intelligence Quotient. Students registering for e-learning should know basics of computer and technology. Therefore, to judge the student knowledge about the computer portion related to computer questions is included.

Each portion consists of ten questions and each question carry one point. Aptitude test starts with English portion. When English portion is successfully completed, students solve mathematical reasoning, computer and intelligence quotient portions respectively.

## C. Aptitude Test Evaluation

When aptitude test is successfully submitted, the score of English ( $S_E$ ), Mathematical Reasoning ( $S_{MR}$ ), Computer ( $S_C$ ) and Intelligence Quotient ( $S_{IO}$ ) is evaluated individually.

Total score of aptitude test is calculated using equation 1. After evaluating total, percentage is calculated. Total score and percentage of a student's aptitude test is then stored into in the student repository.

## D.Inference Engine

Inference engine check the educational background of the student and calculate the reference value ( $refvalue_{student}$ ) of the student.  $refvalue_{student}$  of students depends on the cultural and educational information.  $refvalue_{student}$  is based on following factors:

• Learning language (Medium of Instruction)

Medium of instruction is a key factor that should be considered in e-learning system. Students who have English language as medium of instruction perform better in education as well as got better jobs then the students who have local language as the medium of instruction [20]. Hengsadeekul et. al in [21] emphasize the importance of English and conclude that for better intercultural communication English should be better understand.

# • Computer Knowledge

An important factor in calculation of *refvalue*<sub>student</sub> is student's knowledge about computer. Marzano et. al. in [23] stressed the importance of having background knowledge and concluded that insufficient background knowledge causes lower achievement in learners.

• Course Contents (Local or International)

Another Important factor is course contents of the student's previous study. Contents of the course and the language affect a lot on the learner knowledge [24].

• Percentage Marks of Aptitude Test

Other factor considered for  $refvalue_{student}$  is student's percentage marks of aptitude test. Levels are assigned to the

students and level depend on *refvalue*<sub>student</sub> and Total. There are three levels in which students are categorized listed below:

- Beginner
- Intermediate
- Skilled



Figure 3: Proposed Architecture

The assignment of levels is summarized in the pseudo code below:

IF (((  $^{Average_{refvalue}}=7)$  && ( $^{\% age}>=60$ )) OR ((  $^{Average_{refvalue}}=6)$  && ( $^{\% age}>=70$ )) OR ((  $^{Average_{refvalue}}=5)$  && ( $^{\% age}>=80$ )) OR ( $^{Average}$ 

 $(( {}^{Average_{refvalue}} = 4) \&\& ( {}^{\% age} > = 85)) OR (( {}^{Average_{refvalue}} = 3) \&\& ( {}^{\% age} > = 90)))$ 

```
Level = Skilled
```

```
Else IF ((( ^{Average_{refvalue}} = 7) && (( ^{\% age} < 60) && ( ^{\% age} > =50)) OR
(( Average_{refvalue} = 6) \&\& (( age < 60) \&\& ( age > = 50))) OR
(( ^{Average}_{refvalue} = 5) \&\& (( ^{\% age} < 75) \&\& ( ^{\% age} >= 60)) OR
(( {}^{Average}_{refvalue} = 4) \&\& (( {}^{\% age} < 85) \&\& ( {}^{\% age} > =70))) OR
(( ^{Average}_{refvalue} = 3) \& \& (( ^{\% age} < 95) \& \& ( ^{\% age} > = 80))))
Level = Intermediate
}
Else IF ((( ^{Average_{refvalue}} = 7) \&\& (( ^{\% age} < 50) \&\& ( ^{\% age} >= 40)) OR
(( ^{Average}_{refvalue} = 6) \&\& (( ^{\%}age < 50) \&\& ( ^{\%}age > = 40))) OR
((^{Average}_{refvalue} = 5) \&\& ((^{\% age} < 60) \&\& (^{\% age} > = 40)) OR
(( \ ^{Average}_{refvalue} = 4) \&\& (( \ ^{\% age} < 70) \&\& ( \ ^{\% age} > = 40))) OR
(( \ \ ^{Average}_{refvalue} = 3) \& \& (( \ \ ^{\% age} < 80) \& \& ( \ \ ^{\% age} > = 40))))
Level = Beginners
Else IF (% age < 40)
ł
    Then not eligible for the degree
}
End IF
```

# E. Inference Engine

After the levels have been assigned to the students, student is allocated to the respective learning management system (LMS) as shown in Fig 4.LMS is defined as "LMSs facilitate learning by providing a centralized location were learning material reside and through integrated tools that enable various teaching and learning activities such as communication and collaboration with peers and lecturers, self-assessment and progress tracking" [25].





# F. Student Evaluation

Students are evaluated after they successfully complete the course. During their course they are evaluated frequently with assignments and quizzes. If the students fail in evaluation they again take the course.

# G. Case base Reasoning

Case base reasoning is an additional feature in the proposed architecture. Every student who successfully passes the course is stored as new case in case base repository with all the relevant data. When new student is registered, his educational culture background is matched with the cases stored in case base. If the case matches with existing case, the LMS of match case is assigned to newly registered students.

# H. Feedback

Feedback from students should be considered in to e-learning systems. Feedback form is evaluated from students who successfully pass the course. The suggestions are stored in the feedback repository. These suggestions are helpful for making future improvements in the system.

# IV. SYSTEM IMPLEMENTATION

In the working prototype, there are two main interfaces (1) admin end and (2) user end.

# A. Admin End

Admin end is created to facilitate the administrator of the system. Using admin panel, administrator can manage aptitude test. Administrator can easily add, modify and delete questions in the test. Fig 5,6,7,8 shows main admin panel window. When admin successfully login into the system, administrator can perform function like managing test, system and students.

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Admin Name: Password:		Adm Pass	nin Name:	Logout Successfully	
Login	Cancel		Login	Cancel	
Copyright €	© eTaleem.com All Rights Reserved.		Copyrigh	t © eTaleem.com All Rights Reserved.	
Figure 5: A	dmin Panel (Login)	-			



# B. User End

User end is used by students for registration and to take aptitude test. Fig. 9 shows the front end. Users first have to register themselves before taking any course. During registration student will enter its educational and cultural information as shown in Fig. 10.

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	Home   Query Form   Courses   AboutUs   Sign In   Contact Us @ 2010 eTaileam, All Rights Reserved



		eTaleem: A collaborative process for enhancing individual and organizational performance in a continually evolving environment.
		Logged In:nazia   Home  Edit Account   Log Out
		Welcome to Admin Panel
<b>.</b>	Hinazia	

🖶 Home	Hi nazia,
🛒 Profile	Welcome to the admin section. You can perform different functions related to test , students etc.
🛃 Logout	MANAGE ENTRY TEST
	Click on manage entry questions to add new questions, view class details, edit class and to delete class.
MANAGE ENTRY TEST	
English Questions	MANAGE STUDENT
Mathematical reasoning	Click on manage student to add new student, view student details, student class, search student and to delete student.
<ul> <li>Analytical Resoning</li> <li>Computer Questions</li> <li>General Knowledge</li> </ul>	SYSTEM OPTIONS
	Click on system options to edit the email address for admin.

# Figure 6: Admin panel Home page

		Logged In:nazia   Home	Edit Account   Log Ou
CONTROL	English Questions	s List	
Home Profile	Click on respective question type to view details.	/	Add English Question:
an object	QUESTION	CORRECT ANSWER	ACTIONS
MANAGE ENTRY TEST  English Questions  Mathematical reasoning  Anslytical Resoning  Construction	Choose the word or phrase which is most nearly opposite in meaning to the word in capitals OFFHAND:	premeditated	<b>2</b>
General Knowledge	Choose the word or phrase which is most nearly opposite in meaning to the word in capitals EXPIRE:	come to life	
♥ Contact Us ♥ Degrees ♥ Courses	Choose the word or phrase which is most nearly opposite in meaning to the word in capitals METAMORPHOSE	remain unaltered	<b>2</b>
MANAGE USERS	Choose the word or phrase which is most nearly opposite in meaning to the word in capitals ABOMINATE :	adore	
MANAGE NEWS	Select the lettered pair of words, that have a certain relationship to each other, ADULT : CHILD::	cat : kitten	



	STEP 1			
PERSONAL INFORMATION>>EDUCATION CULTURE INFORMATION				
💷 By registering you will b	e able to access eTaleem module. Fill the following fields and click on next button.			
User Name: • (For Login Purpose) First name: •				
Last Name :				
Father Name: *				
Email: •				
Re-type Email: *				
Password: *				
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Picture:	Choose File No file chosen (image size should be less then 2 MB)			
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Gender:*	Male     Female			
Occupation: •				
Date Of Birth: *	Month 💌 - Dz 💌 - Year: 💌			
Home Phone Number:				
Mobile Phone: •				
	(Next) (Cancel)			

## Figure 10 (a): Registration Process



Figure 10 (b): Registration Process

After successful registration student will sign in to take the test. Login screen is shown in Fig 11.



Figure 11: Login When student click on start Aptitude test button, test starts.



Figure 12: Test Start screen

Test consists of different portions. A portion of English test is shown in Fig 13.

ENGLISH
Complete the sentences by choosing the most appropriate word, from the given lettered choices (A to D) below each.
Question 1
A child should not be as being either very shy or over confident.
© categorized
intoned
C distracted
refrained
Question 2
Select the lettered pair of words. that have a certain relationship to each other ZOOLOGY : ANIMALS::
ecology : pollution
🔘 botany : plants
🔘 chemistry : atoms
🔘 history : people
mathematics : geometry
Question 3
The significance of the Magna Carta lies not in its—provisions. but in its broader impact: it made the king subject to the law.
© specific
🔘 revolutionary
implicit
🔘 controversial
(e) finite

## Figure 13: English Test

Similarly student attempts computer and intelligent quotient part. On the completion of Aptitude rest, student level is calculated based upon the reference value and the marks obtain by the student. Student level is displayed on the screen as shown in Fig 14. After assigning the level, student will directed to respective LMS.



**Skilled Level** 

## Figure 14: Student level

#### V.RESULTS

The prototype is evaluated from different users. Authors evaluated the prototype from students of Islamabad Model College for girls, (IMCG) F6-2, Islamabad and COMSATS University, of Science and Technology, Islamabad. 54% students are male and 46% are female as shown in Figure 15.



Figure 15: Research Result (Population)

Students categorized into different levels as shown in Fig 16 prove that the educational factors affect e-learning. Therefore the student's cultural diversity should be considered while offering e-learning programs. Majority of students having Urdu language as their medium of instruction falls in the beginner level, therefore the conclusion develop is that medium of instruction affect a lot on student learning as shown in Figure 17.



Figure 16: Effects of Education Factors on e-learning

Results gathered shows that the students who have studied international course contents have better score results then those who studied the local course contents, which concludes that course contents also affects the learners.

Students who don't have exposure to computer face many problems during e-learning therefore Human Computer Interaction and its principles should be considered while designing systems for students having different educational culture.



Figure 17: Effect of Medium of Instruction

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