An Examination of Interactive E-Learning Systems (IELS) for Adults Learning and Implementation Issues in the Education Sector of Pakistan

Syed Rashid Ali
SZABIST
Karachi – Pakistan
syedrashid2001@yahoo.com

Abstract - **In the 21st century, the Interactive E-Learning System presents exciting opportunities for adult learners. The learners received the maximum benefits at any stage with the help of IELS, if it is properly designed and implemented and also IELS enhances the learners' capabilities. Internet technologies are changing our lives and educational systems as well in many ways. IELS is an integral part of the educational environment in developed countries. IELS have a number of components in order facilitate the learning process for learners. The system software and hardware are the only requirements. This paper examines the IELS for adults learning implementation issues in the education sector in Pakistan. Animations, text, Artificial Intelligence, sound, video and graphics are an integral part of the IELS.**

Keywords: **Interactive E-Learning System, adult learning, Pakistan Education Sector, rural and urban areas, outsourcing**

I. INTRODUCTION

The knowledge era demands that people continuously seek and create new knowledge. IELS has the potential to increase the knowledge and skills of the workforce that is needed to remain competitive in a k-economy [1]. IELS is not only replacing the traditional learning but is an interactive intelligent content delivery methodology for improved learning on continuous basis. The power of IELS is the ability to deliver the right learning objects to the motivated learner when and where required [2].

IELS is an intelligent web-based learning content delivery system [3]. The concept behind developing the IELS is to have a "virtual teacher within a virtual classroom environment" and have the capability to "teach" the students rather than just to deliver the learning objects [4]. The learner progress and showing their results through graphs is a key capability of the IELS [5]. It also connects with the library, lab, experts and other students for facilitation to the learners.

This research intends to develop the understanding of IELS in the education sector in Pakistan in context with an investigation of the different factors influencing the usage of different learning methods.

The motivation for this work is marked by the limited research on the examination of IELS and their implementation issues for the education sector in Pakistan.

In this work an attempt is made to address the following burning challenges:

- Why interactive e-learning systems are necessary for education sector in Pakistan?
- What is the current status of interactive e-learning systems in education sector of Pakistan?
- How to develop the systems Model?
- What are the proposed interactive e-learning issues in the education sector of Pakistan?

A. Purpose of IELS for adults in Education Sector

The primary purpose of proposed IELS is to provide the optimal solution for increasing the literacy rate in Pakistan and enhance the knowledge / skills of adults.

Typically IELS will be helpful in the following domain:

1. *Increased Learning:* The number of respondents' feed-back significantly show that learning through IELS takes less time as compared to traditional learning in the class room and learners enjoyed and are more engaged in the whole process of the learning due to Interactive E-Learning methodology [6].

2. *Flexibility:* The study shows that learning through IELS is very flexible. In this system, we used different multimedia technologies with the combination of Intelligence web-based systems, different networks(s) topologies, etc. devices for improved learning processes [7]. These technological approaches made IELS a more flexible learning system.

3. *Modular:* The magnificence of IELS is divided into a number of module(s) and sub-module(s) and each and every module(s) has a different topic / section, therefore this system delivers a comprehensive knowledge to learners about the desired topic selected by the learner himself [8].

4. *Practical:* The study shows that adult's learners face different type of problems every day. Therefore, IELS is understand the learners issues and deliver the knowledge through different types of simulations including video, decision and simple simulations which allow learners to learn-by-viewing, learn-by-coaching and learn-by-doing effective methodologies [9]. These captioned methodologies for enhancing practical knowledge/skill and increasing information retention.

5. *Consistent:* IELS provide the same learning plate form for identical adults' learners.

6. *Engaging:* IELS provide the number of amenities to adult learners and as well s facilitator such as live graphics, audio, video, technical expert advice/feedback, for the participation of adult learners to strengthen their knowledge / skills [10].

7. *Cost-effective:* The respondents feed-back shows that IELS is less expensive and more effective than traditional classroom learning [11]. Also, IELS can save the time and cost in terms of travelling, rental accommodation and other expenses, etc.

B. Key Features of Interactive E-Learning Systems

Well-designed interactive e-learning helps learners build more effective & efficient mental models then they do text alone. There are number of interactive E-learning benefits observed during this study, some of benefits are under-mentioned.

In an on-line interactive e-learning environment
- Learning & Teaching Individual/group basis
- Additional interactivity
- Student centred
- Comprehensive checking and ranking systems
- Personalizing & modifying the unique requirements and enhanced their retention.

Convenient
- Self-service (mix & match)
- On-demand (any time, any where)
- Private learning
- Self-paced
- Flexibility (modular package)
- Same quality of education for all
- Central Control of content

Cost Effective
- Virtual learning environment
- Share lessons among school
- Cut the cost of material
- Decrease the cost of accommodation / travel

Media Rich
- Learner is engage and understanding is easier

Repeatable
- Depends on learners, as several time as learner like

Progress monitoring is easier
- Administrative work decrease
- be capable of more accurate
- Increase Productivity

II. DESIGN

Since IELS proposed model should cater for specific requirements of the educational sector, it became necessary to cater the needs of the learners in the different domain.

A. Content Delivery Model

The below IELS Contents delivery model consists on numbers of methodologies through contents will be delivered to learners. The numbers of interfaces are available in the IELS, which increase the acceptance of IELS in the region.
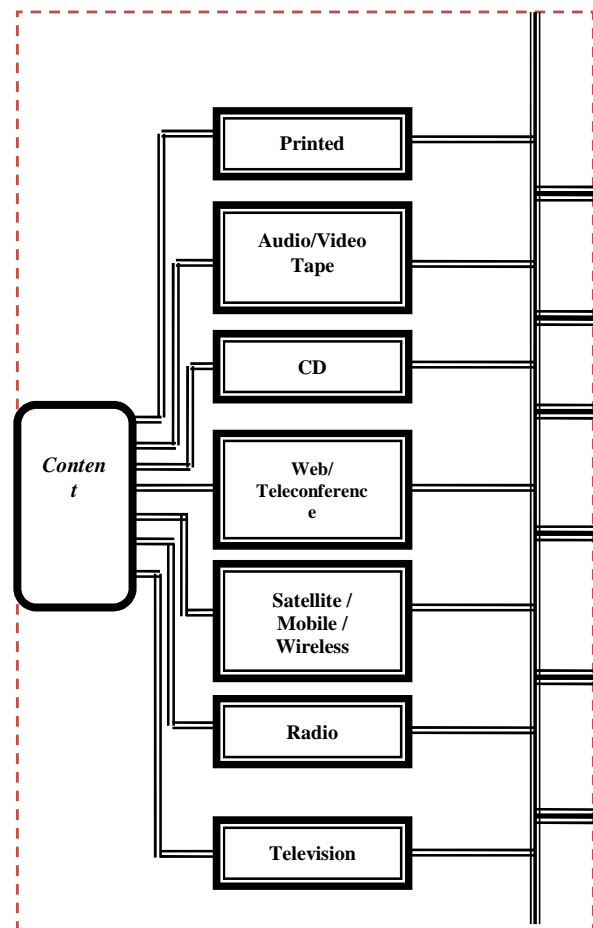

Fig 1: IELS Contents Delivery Model

Interfaces: Radio link, Postal Mail, Phone, Fax, Email, Broadcast, etc.

B. Basic Design Model of IELS

Figure-2 below describes a proposed basic functional model of an IELS. It illustrates a web-based intelligent learning content delivery system where the system intelligently store, manage and reuse the contents from the central data bank and the experts create the contents and the learners interact and reuse the contents.
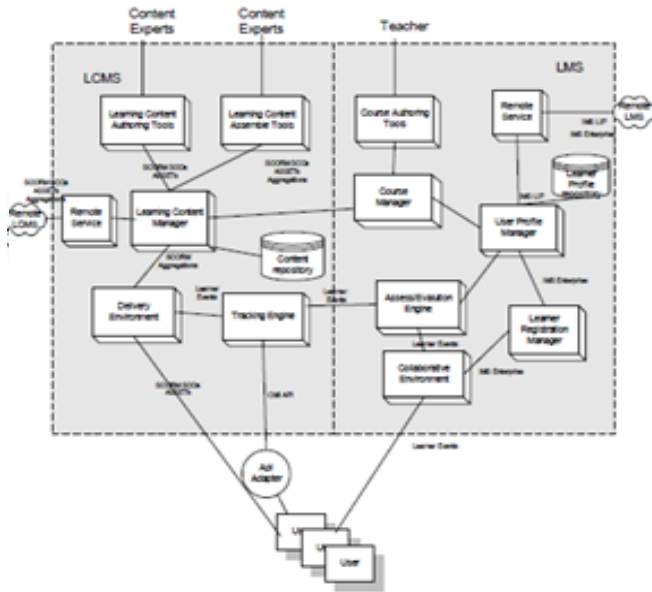

Fig 2: Functional model of e-learning system

C. Initial Data Collection

To help design a working model, it was found necessary to acquire some qualitative data and develop tangible model spaces. This data collection was carried out via surveys, personal interviews from District education departments to Federal education departments and the users from urban and rural also.

D. Questionnaire Design

A three pages questionnaire consists of twenty eight questions was designed for the examination.

E. Data Analysis and Preliminary Results

Twenty (20) participants were selected for the study for a qualitative analysis. Details as shown in Annexure – I

F. Analysis of Current Status of IELS in Education Sector in Pakistan

The initial results suggest that first; there is no availability of IELS or any intelligent learning management systems for adults learning in the education sector. (Details are shown in Annexure – II)

However, National & International NGOs do not hesitate to acquire 3rd party services when faced with lack of indigenous resources. It appears that this is the case with the educational sector in Pakistan.

For all the controlling parameters in the survey it is observed that the 3rd party support is flag most prominently. This is shown by equations 1 - 5.

H. Sampling Analysis Table

S	A	B	C	D	E	F	G	T	%
1	1	1	1	1	1	2	1	8	38.1%
2	1	1	1	1	3	2	1	10	47.6%
3	1	1	1	1	1	1	2	8	38.1%
4	1	2	2	1	2	1	1	10	47.6%
5	1	1	2	1	2	3	1	11	52.4%
6	1	1	1	1	1	2	2	9	42.9%
7	1	1	1	1	1	1	2	8	38.1%
8	1	1	1	1	3	1	1	9	42.9%
9	1	2	2	2	1	2	2	12	57.1%
10	1	2	1	2	1	2	1	10	47.6%
11	1	1	1	1	2	3	3	12	57.1%
12	1	1	2	1	2	1	1	9	42.9%
13	1	1	2	1	1	2	3	11	52.4%
14	1	1	1	1	1	1	2	8	38.1%
15	1	1	1	2	3	1	1	10	47.6%
16	1	2	2	2	3	1	1	12	57.1%
17	1	1	1	1	1	2	1	8	38.1%
18	1	2	1	1	1	2	1	9	42.9%
19	1	1	1	1	1	1	1	7	33.3%
20	1	1	1	2	1	1	1	8	38.1%
T	20	25	26	25	32	32	29	189	45.0%

Note:
S = Sample
A = IELS System availability
B = Strategic Direction for IELS
C= Commitment towards any technical implementation (Training, Funding and Implementation
D = Implementation Cycle
E = Organization Culture
F = Expectations
G = Technical Expertise
T = Total
%= Percentage
Weight: 1 – 3
1 = No, 2 = Partially, 3 = Yes

$$p < 0.00001 \quad \text{……….……… (1)}$$
$$P = 0.99 \quad \text{……….…….……… (2)}$$
$$P_{AVG} = 0.499 \quad \text{……….……….. (3)}$$

The 'p' value for the above data is found to be less than 0.00001, while P (Fisher Scale) with Max is 0.99 and P_{AVG} is 0.499

If there is exists external environment 'E' with various degrees of availability of services 'S' that are missing in indigenous systems 'I'.

Then, this can be shown as:

$$E(S) \quad 1 / I(S) \quad \text{……………... (4)}$$

$E(S) = \quad / I(S)$ (Where   is the coefficient of proportionality)

$$= E(S) * I(S) \quad \text{(where} \quad 1)$$
$$n = \text{sample elements (a, b, c, d, e, f, g)}$$

We have divided the above chart into three classes:

E / I

- Absolutely   : 80 / 20
- Must consider   : 50 / 50
- Can be done in-house : 49 / 51

$$T = \sum_{x=1}^{x=3} TX$$

With the following assumed classifications of the various Threshold 'T' values, we have come up with the following;

$$T(x) = 0.2 / 0.8 \quad => 0.025$$
$$T(x) = 0.5 / 0.5 \quad => 1$$
$$T(x) = 0.51 / 0.49 => 1.040$$

Therefore, $T = \quad * M_{max}$ ……….…… (5)

Where M_{max} is the maximum availability of a service as shown by 'n'

From chart $M_{max} = 11 * 57.1$

$$T = \quad * 57.1$$
$$\text{Therefore, } T/ \quad = 57.1$$

A careful look into the value of chart will show $M_{max >}$ 50%, hence we can see that the value of the Threshold represent that the outsourcing of IELS is the best solution for the education sector.

I. Education Technology Adaption Model

Education Technology adaption model provides the multidisciplinary facilities to learners at anywhere any time. This facilities motivate the learners in terms of enhanced their knowledge / skills.
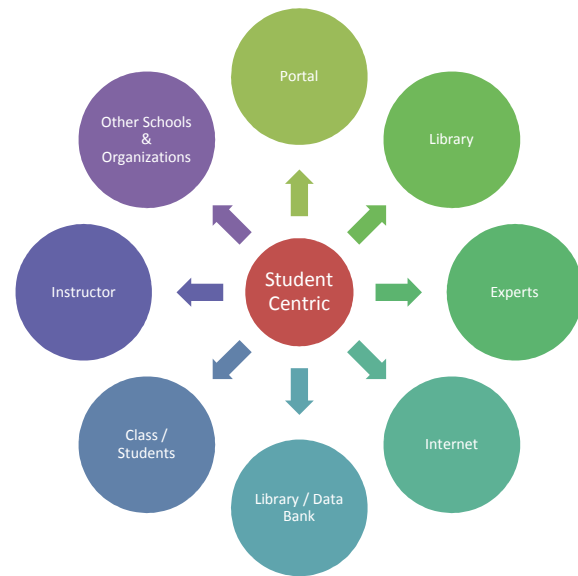

Fig.3: Education Technology Adaption Model

III. DEVELOPMENT OF IELS

The IELS is developed in two stages: In the first stage, a macro-level representation of external elements of IELS is made. In the second stage, a micro-level representation of internal elements of IELS is made. Input-output-process framework development of IELS used in system theory has been employed for micro-level development. Physical resources for education, financial inputs, human resources, members of management and management styles are taken to be the input variables [12]. Interaction among the various input variables reflected in client management, learning processes and evaluation procedures are taken as the process variables.

A. Critical Elements in the Development of IELS

In the development of IELS, following critical elements are considered.

- Development of technical Infrastructure in the Education Sector.
- Provide the technical training to users.
- Information Management.
- Create Positive Internal as well as external Environment in education sector for acceptance of IELS.
- Involvement of users for learning through IELS.

B. Key factors for the success of IELS Development by 3rd Party

This model assumes the following key factors for the success of IELS Development by 3rd party:

- Technical sound expertise
- Proper Infrastructure
- Proper control for Data Management
- Comprehensive Strategy to met the objectives
- Internal/External Motivation
- Increase awareness in the region
- Continuous maintenance of the system
- Systems training

IV. DISCUSSION

IELS should not be implemented in the same way as transactional and operational systems. The approach to implementing an IELS is crucial to its ultimate success and value.

As shown in equation (5) above, we discovered that the best choice is outsourcing of IELS. However, at the time of implementation the IELS in education sector, 3rd party must be careful in the following areas:

- Development and maintain the technical Infrastructure
- Users training/Motivating
- Communicate & train to overcome Organizational and as well as learners resistance
- Meet HR, Operational and Financial challenges adequately
- Implementing confidentiality and security of data issues in education sector

V. CONCLUSIONS AND FUTURE RESEARCH

The IELS model developed will work best if used by 3rd party outsourcer as an IELS service provider. This research is trying to describe a complete scenario of the IELS in the education sector in Pakistan to satisfy the need for more rapid increasing learners' education and skills particularly in the rural areas. Outsourcing seems to be the ideal solution for large scale provision of IELS services. However, certain considerations must be addressed before adoption:

- Goal definition and planning
- Determine the critical success factors (CSF) of the System
- Use a prototype approach
- Ensure that the IELS development team must be professionals
- Firm resource integration
- Confidentiality of data

Further work is needed to address these concerns by finding opportunities to enhance further the proposed IELS.

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