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ITJ

ISSN 1812-5638

# INFORMATION TECHNOLOGY JOURNAL

**ANSI***net*

Asian Network for Scientific Information  
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan

## Online Evaluation of Ibn Sina Elearning Environment

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**Abstract:** This study presents an evaluation of Ibn Sina elearning environment. The environment evaluation consisted of integration of the tool into the university curriculum and then collection of feedback from students and teachers. The evaluation focused on the use of Ibn Sina in practice, not on technical or purely functional issues. It concerned usefulness of the environment for learning, aspects of instruction improvement, collecting observations about how the environment is used by students at the university, as well as their opinions about the ICT application direction chosen. The methods included online feedback forms and questionnaires.

**Key words:** Evaluation form, questionnaires, elearning environment, evaluation interface

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### INTRODUCTION

The evaluation covered practical usage of the environment elements in the context of courses at the Computer Science Department of Batna University in Algeria. This concerned teaching and learning as mutually dependent but different processes. Opinions of students and teachers were collected in the form of statistical data. The expertise of environment developers was an important part of the evaluation too, since the developers often get immediate response from students and teachers concerning problems, therefore giving suggestions for improvement (Hû *et al.*, 1999; Mahmoud and Ben Henda, 2001; Lim *et al.*, 1996).

### OVERVIEW OF IBN SINA ENVIRONMENT

Ibn Sina (Avicenna in Arabic) is a online web-based multilingual elearning environment. It has a structure similar that of Learning Space, Top Class, Librarian or WebCT. Based on client-server architecture, the environment is developed in PHP/MySQL, it runs on the most common Web browsers and it's independent of the software environment. The data set is stored on the server in a centralized database (Hû *et al.*, 1999).

Ibn Sina environment contains three systems (Zidat *et al.*, 2005a):

- A production authoring system (teacher interface) contains the necessary tools for tasks' production. It contains amongst other things a content design environment and an evaluation space to improve the learner knowledge and abilities.

- A communication and management server made up of several modules. An information module, which contains the various files and data needed by the user's teaching or training activities. A cooperative and communication module which has the means to make it possible for users to interact with each other, to accomplish team works or to take part in discussions. In order to favor the co-operative learning, the interfaces are conceived in such a way to make the presence of the others known by providing indication of their availability and their remarks on the teaching material.
- A help system (learner interface) that makes it possible for the learner to obtain assistance or advise or an adaptation of the environment from the computer system. The objective of the designed system is to give the learner the possibility to locate him/herself with respect to time and space during a training session. The learner is presented with a chart of courses and visited pages, thus enabling him/her to have an explicit representation of the virtual space. Various visualization levels are set up in order to make the chart more visible and not overloaded. A temporal panel is displayed permanently allowing the learner to monitor and optimize the training time. The user has also the possibility to access online help and a glossary containing the terms frequently found on Internet and likely to be misunderstood by beginner. The system gives access to a set of tools: notebook, diary, work plan, etc. (Hû *et al.*, 1999; Zidat *et al.*, 2005a).

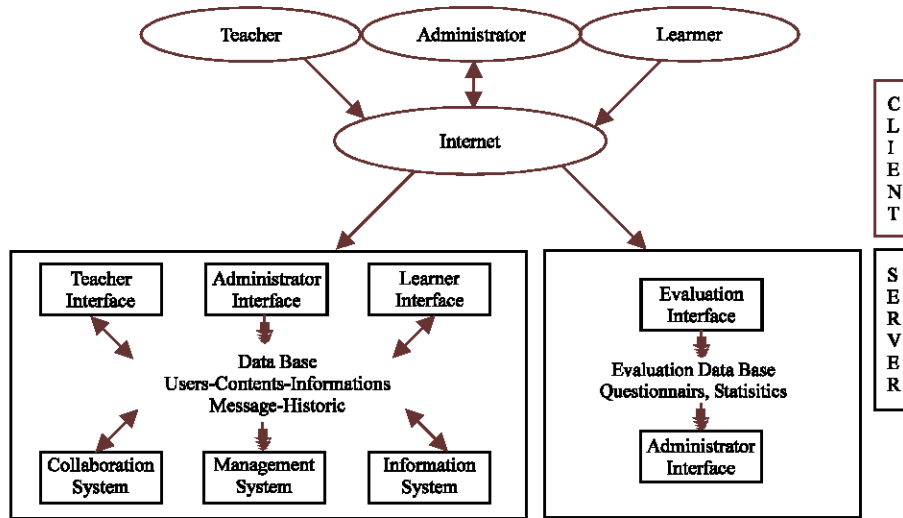


Fig. 1: Ibn Sina platform architecture and evaluation system

**COMPONENTS TO BE EVALUATED**

The software components concerned with the evaluation are the various modules residing on the server. These modules are the management system and the customers' tools needed for content design and learner assistance. Figure 1 presents the modules that were operational at the time when we carried out our environment evaluation.

**Information system:** The information system of Ibn Sina contains various documents and data needed by the user for his/her teaching and training activities. Ibn Sina must be equipped with an information and orientation system to allow the future learner and/or their parents to familiarize themselves with the virtual university structure and components, to be aware of the different proposed programs and courses, to know the necessary requirements to join one of these programs and the needed papers to submit for the final administrative inscription and to be able to pre-register online. Once the registration is accepted, the learner will be sent a login name and a password so that he/she can access the Ibn Sina environment.

**Teacher interface:** The production authoring system contains the necessary tools for works production. It comprises a content design environment and an evaluation space to improve the learner's knowledge and abilities.

It thus allows an instructor to design teaching contents intended for distance education within the virtual university. The goal of the system is to allow the creation of courses that will be usable by various professors. Each instructor will have the possibility to

customize his/her course according to its objectives or specific problems. For this purpose there is a need to decompose the teaching material into learning objects that are as independent from each other's as possible. Each instructor can then create his/her course by choosing from a database of learning objects those that meet its problems and/or its aim. They are organized in a logical way to establish a semantic network between these units or concepts

**Collaboration system:** The cooperation and communication system that contains the means that allows the user to communicate with other users, to complete tasks in a team work or to participate in discussions. In order to support the co-operative training, the interfaces are designed and implemented in such a way to make the presence of the other participants known by providing indices of their availability and their annotation on the pedagogical contents (Hû *et al.*, 1999; Zidat *et al.*, 2005b).

**Learner interface :** An assistance system which makes it possible to obtain assistance, advice or environment adaptation on behalf of the information processing system. The objective of the designed assistance is to allow learners to locate themselves in time and space during a training session. A map of the courses and the visited pages is displayed for the user, thus enabling him/her to have an explicit representation of virtual space. Different visualization levels are set up in order to make the map chart clear and not overloaded. A time panel displayed permanently allows the learner to monitor and thus optimize his/her training time. The Learner has also the possibility to access a help and a glossary containing

the terms frequently seen while browsing the Internet and likely to be misunderstood by inexperienced learners (Zidat *et al.*, 2005b, c).

**Management system:** A management system which gives access to the working tools: notebook, diary, work plan, etc. The objective of the comments in the notebook is to set up an automatic saving of information related to the learner's activity when he/she executes a scenario of activity on a learning object (date and duration of each connection, chapters of the courses, exercises of auto-evaluation, etc.). This requires an effort of structuring of information and an implementation within Ibn Sina environment. An exploitation of this information by the learner can guide him/her through the personalized training path.

The design of a user interface to explore comment in the notebook according to relevant criteria would be a valuable help for the learner and the tutor. Lastly, a statistical study of the comments in the notebook of a group of learners on the same activity would give a synthetic vision of the training of the group. It would be useful to all contributors in the training.

### EVALUATION OBJECTIVE

The evaluation is a function, which consists in carrying an appraisal, as systematic and objective as possible, of a completed project or in progress, a program or a set of actions lines, its design and implementation and results. It is a question of determining the relevance of the objectives and their degree of realization, efficiency in comparison with the development, the effectiveness, the impact and viability.

The evaluation must have the possibility of improving the policies, programs and projects of the future years based on the lessons learned from our previous experiences and provides the elements necessary to justify the actions taken, with the information intended for the public.

Our objective is to set up an online system for Ibn Sina environment evaluation. It is a question of making it possible for different users of the environment to provide their opinion on the whole or a part of the environment. This is accomplished via the filling of online contextual forms. The collected data will be then sent to the server to be processed. This server can be different from the environment server (Colace *et al.*, 2005).

### EVALUATION APPROACH

The evaluation concerned usefulness of the environment, aspects of instruction improvement,

collecting observations about how the technology is used by students, as well as their opinions about the ICT application direction chosen.

The approach of gathering the environment information on the same server makes it possible to have a more important sample. May be it can be used to recognize the problems specific to the categories of users according to the place and context of use. It also allows the environment developers and administrators form to respond to the users requests.

**Conceptual choice:** Each component evaluation is based on different criteria (general and specific). Each criterion is described at the beginning of the section and it is presented in a form of a title and a declaration in the form of a simple sentence. The user answers the evaluation questions corresponding to each component. Every questionnaire included multiple-choice questions, true/false questions etc. For each multiple-choice question the user will choose a value from the 4 or 5 values ranging from "fair" to "excellent". The user has also the possibility of adding comments to justify for example the choice made (Britain and Liber, 2004).

**General architecture:** The evaluation system contains:

- Presentation of the components to be evaluated
- Evaluation interface form based
- Evaluation result storage
- Statistical data processing

The system is developed in PHP/MySQL. It works on any software platform (Windows, Unix, Mac OS) and does not require any specific software except a standard navigator (Graf and List, 2005; Geldermann *et al.*, 2004).

### EVALUATION OF COMPONENTS

Any E-learning environment and provision should give opportunities to improve the quality and the variety of teaching and learning, which would not otherwise be achieved through traditional methods. The following elements are of importance (Colas *et al.*, 2005):

- Learners and their relationships are to be at the center of attention;
- The learning scenario should be enhanced by allowing a rich variety in communication;
- Focus should be put on the social environment;
- The individuality of learning styles should be acknowledged.

**Evaluation of collaboration environment:** Learning is particularly effective:

- When learners work together towards a common goal
- When learners are engaged in real argumentative situations
- When they are part of negotiations to achieve a shared solution
- When they can exchange ideas and opinions actively the level of interest and participation is raised
- Learners can perform at higher intellectual levels when they work collaboratively
- Learners win by the application of the diversity of knowledge and competences among them
- Cooperative learning methods can enhance problem solving strategies
- A peer support system plays an important role in helping learners to internalize external knowledge

As a step in evaluation this refers to assessing environment functions and how they optimize and support the learner and manage to engage him in dialogues and constructive discussions.

**Evaluation of teaching methods:** Organizing students, helping them to learn, selecting from the multitude of resources and devices available are important teaching activities to make learning beneficial for learners. In the light of this, it is our aim to evaluate the methods and techniques employed within the environment for disabled learners and to see how well the constructivist approach is employed to improve learning for disabled learners. This further manifests itself in the following key issues:

- Knowledge construction;
- Communication and collaboration;
- Iconic and symbolic representation;
- Taking initiatives;
- Awareness of progress in time;
- Sharing and contributing.

All these characteristics ask for technological features to give extra value to the whole system (Colace *et al.*, 2005).

## ADMINISTRATOR INTERFACE

Preparation of good sets of multiple-choice questions is a complex issue. The typical simplification in the quiz creation is mistakenly done by focusing on checking basic knowledge about facts, names, etc. and ignoring the importance of actual intellectual efforts for knowledge application.

The evaluation data is treated in confidence and only used by Ibn Sina evaluation team for the purposes of evaluation the environment. The participation of the users has contributed to understanding Ibn Sina platform and its potential impact on learning and teaching.

The use of the system in the administrator mode is allowed only via login (using a password). The administrator can do:

- Users (evaluators) management (login, personal data, categories...)
- Evaluation components addition, deletion and modification
- Evaluation criteria addition, deletion and modification
- Questionnaire different possible choices addition, deletion and modification
- Evaluation results statistical data recovery

**Evaluation objects update:** In Fig. 2 the administrator has the right to add, modify and remove the evaluation objects

**Questions update:** In Fig. 3 the administrator has the right to add modify and remove the questions concerning each object to evaluate.

## EVALUATION FORM

**Evaluator identification form:** In Fig. 4 the evaluator provides personnel information (last name, first name, sex, age...). These are used in the survey of site users behavior.

**Sample form:** A click on the button "Send" will record this information in the data base of the server on which the evaluation is running. This server could be a different server than the one on which Ibn Sina is running (Fig. 5).

**Evaluation form processing:** Using the forms, the user thus transmits information to the evaluation server. The forms are based on a relation between the user and Ibn Sina platform and on the PHP scripts located on the evaluation server. At the time when a PHP script is started, the parameters fixed in a HTML definition of a form are automatically imported and made available in PHP script as variables bearing the same name. In order to avoid collecting erroneous data we have chosen a method in which the user chooses from given possibilities only. This approach will eliminate the possibility of errors. The mechanism is to choose ready-made options (list boxes, radio buttons operator, check boxes, ...). The access to the data is possible only

**Add Component to be evaluated :**

Objects List			
N°	Objects Label	Update	
1	lbn Sina Environment	<a href="#">Delete</a>	<a href="#">Modify</a>
2	User Interface	<a href="#">Delete</a>	<a href="#">Modify</a>
3	Usability	<a href="#">Delete</a>	<a href="#">Modify</a>
4	Managment System	<a href="#">Delete</a>	<a href="#">Modify</a>
5	Task Collaborative Resolution	<a href="#">Delete</a>	<a href="#">Modify</a>
6	Learner Evaluation Tool	<a href="#">Delete</a>	<a href="#">Modify</a>
7	Learner Assistance	<a href="#">Delete</a>	<a href="#">Modify</a>
8	Language	<a href="#">Delete</a>	<a href="#">Modify</a>

Fig. 2: Evaluation objects update

**Add Question :**

Questions List			
N°	Question Label	Update	
11	Does the background color of the screen allow an efficient consultation?	<a href="#">Delete</a>	<a href="#">Modify</a>
12	Are the characteres and the background color in harmony?	<a href="#">Delete</a>	<a href="#">Modify</a>
13	How is the characteres choice?	<a href="#">Delete</a>	<a href="#">Modify</a>
14	Are the color sober?	<a href="#">Delete</a>	<a href="#">Modify</a>
15	how is the clarity of the presentation?	<a href="#">Delete</a>	<a href="#">Modify</a>
16	Do the images of site have a signified contribution?	<a href="#">Delete</a>	<a href="#">Modify</a>
17	Do the images make the site more attractive?	<a href="#">Delete</a>	<a href="#">Modify</a>
18	Are the images of good quality?	<a href="#">Delete</a>	<a href="#">Modify</a>

Fig. 3: Questions update

**Goal**

Before you start thank you for answering the following preliminary questions:

First Name  \*

Last Name  \*

Gender

Age

Profession

Did you use other E-Education Platform ?

If yes wich ?  \*

\*:Optional

Fig. 4: Identification form

Learner assistance		
N°	Questions	
1	How is environment learner centred ?	Fair
2	Can a learner monitor their own activity ?	Good
3	Does the environment provide time management tools for the individual student to organise them work ?	Good
4	Can the learner get a view of current and completed modules ?	Poor
5	Does the environment provide synchronous and asynchronous collaboration tools for group learners?	Excellent

Fig. 5: Samples of evaluation form

via the administrator account, which gives the permission to examine, print, delete and synthesize the data recorded in the database (Harous *et al.*, 2004).

### RESULTS

We have experimented our evaluation system with a limited number of users (92 students and 4 teachers). These users liked the idea of having forms with the same design shape independently of the module to be evaluated. In addition, they found the user interface attractive and administrator interface very easy to use (addition, modification and the deletion of components, questions and criteria). They raised the shortcoming of the administrator module because it supports in a very limited way the statistical processing and the results presentation in graphical form according to the users categories.

A major part of the students declared the high value of Ibn Sina in facilitating home study. Nevertheless, not all the students had a positive impression: around one-fifth of them did not find the environment useful and expressed preference for more traditional learning media. The majority of the negative opinions concerned content quality, which directly related to weaknesses of the content production and review process.

Due to the evaluation, we have collected rich experience and know-how in the field of active knowledge repositories. The experience will be used for development of a more sophisticated learning environment working in the global Internet environment.

### CONCLUSIONS

We presented in this paper the evaluation system of the distance education environment Ibn Sina. This system

is presented as a server that provides application and data. It makes it possible for various users to give their opinion on the structure, the operation and the components of Ibn Sina. This evaluation has already allowed the environment developers and administrators, based on the user requests and suggestion, to carry out the corrections and the technological adjustments, which are essential to ensure the accessibility and the correct operation of the environment.

The approach of having the whole of information on only one server makes it possible to have an important sample. It will also allow, through a large-scale experimentation, the discovery the problems that are specific to the users categories, to place from where the system is being used and/or context of use. These criteria are not final others may come up at the time of the exploitation on a large scale of the environment.

The results are expected to be useful for teachers applying ICT in their daily work and also for digital content developers. The teachers will be able to correct their attitude towards computer tools for instruction. Developers will be able to reconsider the importance and efficiency of particular instructional solutions. The learners might benefit from the work indirectly, when their expectations and needs are met in a better way (Fedulov, 2005).

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