

## **OFIS: online faculty information system**

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### **Keywords**

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### **Abstract**

Isfahan University of Medical Sciences, as one of the major medical universities in Iran, is an academic organization which is also responsible for all health-related services in Isfahan province. By development of IT infrastructures in the university, top management decided to utilize the capabilities of the growing IT infrastructures in order to solve data and knowledge management problems. Faculty members who are the key component in academic activities are selected as the data entity and data source. This paper describes the process of building a Web-based information system to collect information related to faculty members' activities from themselves and produce an organizational knowledge base. An online faculty information system is now growing towards a nation-wide system and is available at: [www.ofis.ir](http://www.ofis.ir)

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## **Background**

With a 50-year history of medical education and 20 years of health system management, about 600 faculty members, 7,000 students (in 21 undergraduate and postgraduate programs) within seven schools, Isfahan University of Medical Sciences (IUMS) is considered as one of the major medical universities in Iran. All schools and the major teaching hospital are located in a huge campus. As part of a movement towards quality improvement in academic activities and strategic management, IUMS leaders demanded an accessible, valid, up-to-date and reliable academic information system. This demand was emphasized by the centralized organization of medical universities in Iran, which are totally governed and supervised by the Ministry of Health and Medical Education (MOHME). The desired information system was expected to be used, not only for short-term decision making and evaluations, but also for accreditation purposes, and strategic decisions. According to the organizational complexity of a medical university, an integrated university knowledge portal was proposed. The portal was supposed to include several compatible sub-systems, such as faculty information system, curriculum information system, research information system, resources information system, etc. Since faculty members are the key functional entity in the university, in the first step, development of "faculty information system" was approved and granted by the University Research Council as an applied research project (license no: 79278;1379/12/9). The main characteristics of a campus-wide information system (Wiggins, 1994a,b) and an optimal decision support system (Guan, 2002) were considered as the framework for system development.

By increasing availability of IT infrastructures in the university, and development of diverse incompatible and fragmented databases in different units, managers decided to construct a comprehensive and interactive data collection and reporting system, using the potential of information technology to assist in assessment and quality improvement. This may be considered as a preliminary step to linking assessment and

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information technology as Welsh has suggested (Welsh, 2002).

Naturally, both academic organizations and health service providing organizations face demands for continuous changes in their input, processes and outputs. Such ever changing organizations, especially ones involved in both educational and health related areas, need an efficient monitoring system to manage their changes. Therefore, design and implementation of OFIS as a Web-based data management system in an academic organization was suggested as an initiative monitoring system in Iran. Before OFIS, some old databases and data management systems based on offline technologies were used in different units, but no Web-based or even network distributed database existed for such purposes in Iranian academic organizations. When the project started even we could not find Web-based academic information systems similar to what finally was reached according to most common search engines on the World Wide Web. Today, such Web-based systems could be found, but they are mostly protected from public access. For instance, Gadsden State Community College in Alabama has developed an online faculty information system which is available only to their members at: [www.gadsdenstate.edu/fsos](http://www.gadsdenstate.edu/fsos) Also, University of Maryland University College has an interactive faculty information system (IFIS) at [www.umuc.edu/cgi-bin/isis/fverify.cgi](http://www.umuc.edu/cgi-bin/isis/fverify.cgi) and Association of American Medical Colleges is collecting comprehensive information on the characteristics of paid faculty members at accredited allopathic US medical schools at: [www.aamc.org/data/facultyroster/start.htm](http://www.aamc.org/data/facultyroster/start.htm) Also, a report on mission-based reporting systems for faculty members was published in 2002 (Howell, 2002). None of these systems provide public reports about non private data.

Conventional management information systems and decision support tools mostly rely on relatively fixed data sources for input, process, and output which are best suitable for industrial management. Since in OFIS all activities are somehow related to an individual faculty member, the faculty members were selected as both data-source and data-provider for the knowledge portal. They were asked to enter their personal activity logs into the system to help knowledge workers transform it into valuable organizational knowledge.

The present work was started in this context in 2000 to build up a knowledge portal which was finally called OFIS.

It is proposed that even in the US about 31 percent of projects on information system design and implementation will fail to reach their objectives, and 52 percent finish using more than

the predicted budget and go over time without reaching all objectives. Only 16 percent are finished on time, within the predicted budget and reach all objectives (Choase Reports, 1994). One of the failure reasons widely mentioned in the literature is lack of relation between top management and the implementing team (Sohal, 2001; Whittaker, 1999; Remenyi, 1999).

This project was started with the support of top management and they are actively involved in the steering committee.

This paper describes the process that has led to the development and implementation of OFIS as a university Web-based information system (available at: [www.ofis.mui.ac.ir](http://www.ofis.mui.ac.ir)) and, ultimately a nation-wide Web site at: [www.ofis.ir](http://www.ofis.ir) for academic information management.

## Definition

OFIS is a Web-based information system for monitoring academic activities of faculty over a university. It collects data from faculty members and provides them with valuable services such as eCV (electronic CV), automatic personal home page, a private personal profile which shows their activity status compared to the average in department, school and university. It also utilizes data to produce profiles and statistics that might be used for evaluation and accreditation of departments, programs or university as a whole. OFIS collects data over time and produce reports in different timeframes, a critical characteristic for a data warehouse to be useful for monitoring and management of change over time.

## System analysis and design

At first there were two questions in hand: what data items should be collected from the functional level of the organization and what knowledge means was needed to draw out of this data? Also for each item who is the accessible data-provider and who is the valid data source?

A two-step Delphi survey was conducted to determine the data categories. In this survey a series of questionnaires was completed by 50 faculty members and academic managers in the Isfahan University of Medical Sciences, as well as three other medical universities nation-wide. Also, top managers in MOHME were interviewed. The items for academic promotion were chosen as the basis for negotiations. Each activity was considered as an item and different data on it was asked for. The consultants were asked to accept or reject predefined data and knowledge items and

add any more items or details they themselves are willing to monitor about their academic organizations. For each item they were asked to suggest a reliable and accessible data source and data provider and to determine the people who need the data. Also, they were asked to mention which data should be kept private and which could be published.

According to the interviews, the faculty member was selected as the basic data entity. The data related to faculty members was divided into five categories:

- (1) Members' personal data.
- (2) Data on research activities.
- (3) Data on teaching activities.
- (4) Administration and public service related data.
- (5) Evaluation data.

For details on data structure see Table I.

In the second stage a team comprising computer specialists from a private company and university

representatives started the database design. This collaborating team has started to work in the university campus in order to be involved in the real world situation of the university environment including network capabilities, internet connections, campus LAN problems, support personnel potentials, staff's daily use of computers and internet. A data schema was built and a relational database system was designed based on it.

By reviewing the present flowcharts of academic activities, faculty members were chosen as the most reliable, up-to-date, accessible, and accurate source for providing comprehensive data on their own activities. Of course, relevant school authorities (for instance school Deans), were assigned for data validation and the flowchart for validation process was later approved by the University Council.

To prepare the software, initially a Windows® based database application was designed and a

Table I

Category	Activity item	Data details on activity
General	Personal data	Name, security data, work and home addresses, family data, home and work phone, e-mail
	Academic history: degrees obtained	Date, university, qualifications
	Professional history: job history	Academic and non-academic, organization, time course
	Self-development activities	Title of courses or workshops, duration and date, place, holding organization
Research activities	Research interests	Field and description
	Research projects and grants	Title, granting specifications, duration, collaborators, predicated time and budget, final time and budget, result, abstract
	Publications: journal articles	Title, citation specifications, result of (if this article is a result of a university granted project or thesis), language, keywords, abstract
	Presentations in scientific meetings (seminars, and...)	Title, place, date, result of (if this presentation is a result of a university granted project or thesis), language, keywords, abstract
Teaching activities	Books or book chapters	Co-authors, date, publisher, role (translator, editor, author), if is supported by university grants
	Innovations	Title, approving authority, date, keywords
	Courses	Course ID number, class size, student level, teaching part
	Field teaching	Ward rounds, lab training, pharmacy sessions, lab work
	CME (Continuing Medical Education)	Attending or holding CME sessions or activities
Administrative and executive activities data	Thesis supervision	Title, place, date, keywords
	Administrative positions	Level, date, duration, description
	Executive activities	Title, date, duration, description
Evaluation data	Committee membership	Title, duration, place, description
	Assignments	Title, duration, role
	Awards	Title, awarding authority, date, description
	Teaching evaluation <sup>a</sup>	This is a detailed report consisting of students and peer evaluation
	Workplace attendance <sup>b</sup>	Currently as a qualitative measure

Notes: <sup>a</sup> provided by Medical Education Development Center; <sup>b</sup> provided by Faculty Dean

sample of 30 faculty members were asked to report their activities in some predefined paper data sheets. A trained data operator entered it into the database. For example, they completed a sheet for each paper they had published, or each research project they have started, or even each course they had taught.

Before any widespread use of the off line information system, fast internet access became available inside university campus via a high speed LAN. Therefore, the team decided to build and replace a secure Web site for faculty members and ask them to enter their own data online.

The structure of database was kept, but network distributed windows® application was changed to a Web-based database application. The new system might have invaluable advantages. It could be more reliable and more accessible, less expensive and more up-to-date. Also, Web features would facilitate public demonstration of academic activities through automated public reports and personal homepages.

### Technology selection and software design

A Web-based solution was selected. In the days before the project began Web-based solutions were considered new and many thought they are insecure and unreliable. Web-based solutions are accepted nowadays, reduce the costs of client configuration for each new version, have lower user training costs, use the existing infrastructures and support personnel, can be accessed from anywhere anytime and on many (or any) devices.

A Web site was built which has some private pages which are only accessible for users after they log in and some public pages representing public reports and an introduction for public users. A data entry page was designed for each data category. The page contains relevant fields to be completed for each activity. It also supports editing and provides the option to have separate printer friendly pages (containing cumulative data in the page) in Farsi and English. Each member has a profile (electronic CV) which is a public page that is currently replaced by electronic CVs common in academic Web sites. Also, they have a home page which is secured for each user to compare him/her with the average of department, school and university. All pages are dynamic pages and generated online. Until now with a Pentium III 800 MHz server and 512 MB RAM, with average of 20 users and 200 visitors daily, no bottlenecks were encountered.

It was planned to move to ASP.Net technology to be able to support the greater needs of a national solution.

Some special problems in technology selection and implementation were faced:

- (1) Since one of the major purposes of information technology is facilitation of academic communications, the development team decided to gather and present information bilingually (to serve both English and Farsi users). Farsi is the official language in Iran, thus, nearly all official and unofficial communications are in Farsi. Also, a Farsi Web site or software user interface would be more acceptable and user friendly for Iranians than an English one. Thus, Farsi language support was required as well as an English one. In order to implement a bilingual system, some problems were confronted in the development of a user interface. This was because of the right to left orientation of the Farsi language, which interferes with the left to right orientation of English segments. At the beginning of the project there were many different solutions for Farsi language support but soon UNICODE standard Farsi language support in Windows 2000 became the first choice.
- (2) According to the official calendar in Iran, Jalali (Shamsi) calendar support was required too. Because there is no international standard for the Jalali calendar support in operating systems' the programmers have built custom support into software.

Because almost every Iranian user is using Microsoft™ Windows® as an operating system and Internet Explorer® as a Web browser, no resources were spent to support other browsers.

MS-SQL server 2000 ® was used as a database server. MS-IIS was chosen as a Web server and Active server page (ASP) technology and occasionally ISAPI dlls were used.

The clients were recommended to use Windows XP or 2000 professional or other right-to-left languages enabled versions of Windows 98, which all support Farsi language (Table I).

### Reports

The system provides three types of reports: public (accessible to public without registration), private (which is available only for faculty him/herself) and management reports which are mostly cumulative reports (which could be public or password protected). One of the most useful public reports is personal homepage which includes faculty CV. It is automatically built and upgraded as faculty enters his/her activities into the database. Also, pictorial statistics of the university activities is another



public report that may provide added value to the university home page without additional effort and cost. Faculty may have access to printable details of their activities as private reports both in Farsi and English. Reports are automatically sorted based on time sequence. Also, the Gregorian calendar is automatically replaced for Jalali calendar in English reports.

The format of managerial reports is being developed, but according to the comprehensiveness of the data system, it is predictable that a vast number and varieties of reports can be formulated and compiled on managerial requests. This may be statistics (mean, max, min, activity per capita, time series ...) or trends and comparisons. On the other hand, cumulative reports will help managers to estimate performance of different departments and schools as the building blocks of university organization. Also, a decision support query option is being developed to help all people of interest to find "who is who" in their field.

## Implementation

As soon as main data entry frames were available, faculty were encouraged to begin data entry. "Report once, use as frequently as you need, get rid of boring questionnaires on your academic performance for ever" was the most attractive motto to increase incentives for self reports. Also, working from anywhere, anytime, and on any device, without restrictions of accessing to the physical university campus and LAN, easier self-representation on the Internet were presented to them as the most important advantages of OFIS. A Web-based solution reduced the workload of support personnel for building and updating faculty home pages. Whenever a research is conducted, or a lesson is taught, or a paper is published, the system automatically builds personal profiles and Web-based reports. After a trial period in which faculty members voluntarily visited the site, registered and started entering their data, a committee was assigned for supervision and policy making by the university chancellor. This committee comprised five members:

- (1) Director of Medical education development center at IUMS who was main investigator for OFIS development, too.
- (2) Information and communication officer.
- (3) University Chancellor.
- (4) Faculty promotion committee representative.
- (5) OFIS project representative.

This committee started regular meetings and declared an announcement for general policies of

university about OFIS. The committee is responsible for legislation and incorporation of OFIS into routine flow of information in the university. It was proposed that all faculty members should register online and schools should provide them with training and technical assistance. Also, all faculties were asked to use the OFIS profile in their members' home page in their Web site. The adequacy of OFIS profile is now considered as the prerequisite for academic promotion.

## Progressive development

A link to "Send feedback to webmaster" page was put in all pages. This resulted in a collection of the users' ideas and problems.

Also, an error reporting system was implemented which logs every error which occurred on the site with complete information about the situation (user id, time, page, data being entered or retrieved, error occurred). The steering committee receives bi-weekly reviews and passes them to the technical team.

## National distribution

After presentations in some national seminars and exhibitions some other universities asked for OFIS and a new server in an international data center was hired for OFIS. Recently, the Ministry of Health and Medical Education decided to implement OFIS for all Iranian medical universities.

## Conclusion

Despite the potential for information technology to assist knowledge workers in assessment and quality improvement, a globally accepted model for IT use in data collection and analysis in an academic organization is not available. It has been proposed that use of IT has a great potential for data collection, analysis and reporting. The correct selection and implementation of IT can enhance the process of quality improvement through facilitating the data collection and analysis steps. What is needed today is a model for enterprise-wide approaches to assess the utilization of IT (Welsh and Sukhen, 2002).

Successful assessment can have a dramatic impact on the performance of colleges and universities by creating a solid foundation for decision making at all levels of the organization. If faculty and administrators have a system that

measures quality on a continuous basis, they can see the results of their decisions over time (Alstete, 1995; Camp, 1989).

Accordingly, OFIS may be represented as a prototype Web-based faculty information system that is open to facilitate communication among medical universities and faculty members, while respecting personal privacy. It also has the benefit of flexible reports on managerial requests. These reports are frequently asked for accreditation of universities and programs. It also may be considered as both operational information system and, according to the user-defined cumulative reports, as a valuable part of a university management information system. The data warehousing in the OFIS may be used for decision support and change management. According to its bilingual structure, OFIS may be a useful example for those universities which have a similar bilingual culture who wish to easily demonstrate themselves on the Web and have the benefits of a comprehensive faculty information system, simultaneously.

As IT infrastructures are developing, the demand for utilizing IT to solve every day problems of knowledge management is increasing. Unfortunately, many who have tried to implement information and knowledge management systems in educational organizations fail to achieve their objectives.

There is a resistance to implementation of knowledge management systems as well as other changes in most organizations. Also, some of specific problems with knowledge management systems, like the fear of being monitored, uncertainty about security and privacy, adds to resistance. Faculty partnership from the very beginning of OFIS development helped to stop these concerns. Also, overcoming cultural barriers as well as technical problems were achieved by the close relationship of the technical staff and the organization's top management.

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