# Web portal As A Knowledge Management System In The Universities

Marjan Mansourvar, Norizan Mohd Yasin

*Abstract*—The development of Web has affected different aspects of our lives, such as communication, sharing knowledge, searching for jobs, social activities, etc. The web portal as a gateway in the World Wide Web is a starting point for people who are connecting to the Internet. The web portal as the type of knowledge management system provides a rich space to share and search information as well as communication services like free email or content provision for the users. This research aims to discover the university needs to the web portal as a necessary tool for students in the universities to help them in getting the required information. A survey was conducted to gather students' requirements which can be incorporated in to portal to be developed.

*Keywords*—Knowledge, Knowledge management system, Knowledge sharing, web portal.

## I. INTRODUCTION

In recent years, there has been continuing trend among youths to pursue higher education in their quest to become better qualified and better skilled. Acquiring knowledge have become the main objectives for students in the universities. Knowledge is necessary to make informed decisions, especially, in critical situations. Knowledge and knowledge management (KM) in any organization are crucial to give it a competitive edge in today's challenging and globalised environment. Knowledge should presents as the value in the academic environment. Knowledge management is become the hot topic in the area of information technology at the campus. New technologies, especially, the Internet have made a huge impact on knowledge management and information dissemination in education. The web portal as a knowledge management system is very popular topics in many organizations including universities. Universities have been at the forefront of website development, which later led to the development of web portals to provide more compressive links to information resources.

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Web portals become important because of student's need to access the required information on-line. It is vital that universities have a dynamic connection with the students by sharing the organized knowledge via the portal and help the students from messy information on the Web. There are various types web portals with various utilities that provide benefits to the users. Each user can have his or her own distinctive definition of web portals. Simply, a portal is a gateway to online network accessible resources through the Intranet, extranet or Internet, thus a simple web page could adjust this definition, as could a complex site involved of thousands of web pages. The early portals were very simple, offering their members a static view of contents from a small number of sources. Generally, a web portal allows the users to access information from varied sources in an integrated way. Apart from the standard search engine, web portals provide other services such as e-mail, news, stock prices, information, and entertainment, depending on the nature of business of the portals host institutions.

The rest of this research is arranged as follows. First of all, the paper presents a literature review including the web portals definition as the knowledge management systems and the briefing of portal types, and then it argues the methodology continues by results and discussion, the last part brings the conclusions.

## II. LITERATURE REVIEW

Before discoing on web portals as an essential knowledge management system in the universities, this paper starts with some basic definition of knowledge, knowledge management and web portal.

### A. Knowledge Definition

To have a precise definition of knowledge management system (KMS), it is important, first look at knowledge contents. Knowledge is derived from data and information. Data is a collection of words, numbers, observations or facts, which are not meaningful. Data can be converted to information when it is put in a meaningful framework. Finally, knowledge is derived from information, which has been validated to be true. Vance [22] defined information as data that includes meaningful contents, while knowledge is defined as authenticated information. Alavi and Leidner [1] assumed that knowledge is information in the individual mind. It means that it is subjective information that states facts, procedures, concepts, interpretations, ideas, observations and judgments.

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Fig. 1 below shows the transformation from data to knowledge:
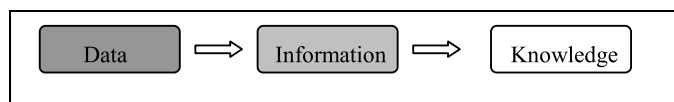


Fig. 1 The transformation from data to knowledge

Knowledge is mix frame of experience, value and experts, which prepare a tool to evaluate and merge the experiences and information. Knowledge is classified to two forms – tacit and explicit. Tacit knowledge described as knowledge that is derived the human mind during the experiences while explicit defined as knowledge that is in the papers, documents, books and training courses. Tsoukas [21] stated knowledge should not be as two distinct types, tacit and explicit are aspects of knowledge and no separate types of knowledge. Actually, tacit and explicit should work mutually.

### B. Knowledge Management System (KMS)

The important issue that is related to managing knowledge is about capturing and integrating knowledge. It means knowledge is not so valuable and useful if it cannot be shared. Therefore, in the network of computer systems with features for communication and information sharing, the methods for managing and integrating knowledge, improve the effect and efficiency. Information system is established in organizations to facilitate the collection, integration and dissemination of knowledge. These systems are in fact, the knowledge management systems (KMS).

KMS must have the capability of responding to changing situation fast and must be able to assist in inventing; decision-making and productivity .KMS is multi-functions system.

Productive KMS includes technology as well as culture and organizational issues. It means that the mix of cultural and organizational with technology can form a successful KMS. In some companies, there should be a culture shift to change the staff's attitude about sharing their knowledge and information. It should be borne in mind that quality and quantity of knowledge is the main issue for developing KMS. Knowledge management should be connected to the organizational performance features such as customer satisfaction, product innovation and cost. Hence, organizations establishing a KMS need to consider adding the value of knowledge. Integrated and integrative technologies architecture are two key factors in KMS. KMS needs the technology tools in three aspects: database and database management; communication and messaging; and browsing and retrieval. The tools in these three domains may be integrated to control the Internet-based KMS framework. The Internet based technology in KMS provides the connection with the external knowledge zones [1].

Benbya et al. [7] divided KMS into four categories:
1- Content management tools: These tools mix and group knowledge from different originating sources.
2- Knowledge sharing tools: These tools provide the facility for sharing knowledge among people or organizations.

3- Knowledge search and retrieval system: This provides the ability to search and retrieve knowledge from the systems
4- General KMS: These types of systems provide the requirements for knowledge management in the organizations.

### C. Web Portal

Web portals are general KMS that provide the facility for organizations or companies to share, create, exchange and reuse knowledge. Portals support knowledge management processes. Generally, a portal defines as a web site with a highlighted feature: provides quick access to services and personalized information. Pickett and Harmre [16] stated a portal is a gateway to resources in accessible networks such as Internet or intranet. Thus, a site may include many web pages or even a simple web page, which presents users a static view of available resources and information. Researchers who worked on web portal admitted that there is no unique way for definition portal until now. Bajec [6] stated that a portal is a connection, content, commerce, and community. Santa Barbara City College described portal as a knowledge management implementation to provide access to personalized information. In fact, it is fascinating that different people have different definitions of a web portal. Some researchers described a web portal as a **gateway to information** such as: Looney and Lyman [12] indicated that, basically, web portals collect a sort of applicable information resources into a single, "one-stop" Web page; this function helps to prevent users from feeling lost on the Web.

Aragones and Hart [4] stated that a portal provides a starting point for users to access and explore information on the WWW. Yahoo (www.yahoo.com) is a general portal; a university website homepage is a specialized portal. Another source had declared that portals integrate varied channels as a central point of information. Thus, essentially, a web portal is a gateway or single access point to resources on the Internet [23].

Some researchers consider a web portal as a **user–centric-community based** tool for example consumer portals like Google! Some portals provide information for a special group of user with specific interest. When other users with similar interests browse a web portal, a virtual community is formed. Hence, a web portal has to provide information and facilitate communication to community so that they can share knowledge and experiences, hold discussion forums, etc. Dias [10] mentioned that it is important for portal users to be able to connect with everyone who share common interests. It means that an efficient web portal is a community–based system to manage and present information and other resources.

Some researcher look at a web portal as a system that provides **multiple services to the community;** they believed that web portals aggregate two types of services in to a single interface:
- Personal services for users
- Maintaining information service

Powell [17] stated that a portal is a network service that collects information from different resources into a

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personalized and single point of access using searching technology such as cross searching, harvesting and alerting to help users.

Web portal was used to describe mega-sites like AOL, Yahoo and MSN for the first time because users used these sites as a starting point when searching for a special topic. However, web portals support other services except searching for users [11].

### D. History of Web Portal

Since the mid 1990s the web portal has become a hot topic everywhere because of the rapid development of the web browser. According to Robins and Sochats [18], portals have evolved at three important levels, as shown in Table I:

TABLE I
HISTORY OF WEB PORTAL

| History of Web Portal | |
|---|---|
| 1 | Early Beginning Phase |
| 2 | Growth Phase |
| 3 | Expansion Phase |

**Early phase:**
This phase also witnessed the birth of some of the components of a web portal. Portals have been defined as a door or gateway to information on the web. They were used as an entry point to information sources. In this phase, differentiation was the main idea was shown by most websites.

**Growth Phase:**
During the Growth phase, the size of web sites had increased in terms of number of pages. This situation caused a lack of general organization to the information, and also weak navigability. Following this, search engines were defined for web portals. A search service is an automatic software for scanning the web for web sites. Most search service businesses were started during this phase, for example: AltaVista, Lycos and Excite. The quality of search service provides a new concept to portal that becomes an entry of an ad hoc nature. Thus, during a search, the content displayed is specified as the latest, at the time of access.

**Expansion Phase:**
In this phase, web portals developed in terms of size (number of servers and users) and depth (content). The World Wide Web had also progressed during this stage. Technological advancements have made the web more accessible and robust when compared to the other two earlier other phases. These developments in web server and browser technology led to the existence of private virtual network. Web access to databases is another advancement made. Hence, there was a big expansion in the functions of portals to support various web services for different users.

### E. Comparison between Website and Web Portal

Azarbarzin [5] highlighted the differences between the website and web portal, as shown in Table II:

TABLE II
COMPARISON BETWEEN WEB SITE AND WEB PORTAL

| | Web Site | Web Portal |
|---|---|---|
| 1 | Website is owned by an organization or center. | Portal is user-centric, which means that a user can organize and offer information and data. |
| 2 | The user cannot interact with a website. | The user and portal can have two-way communication or interaction. |
| 3 | Website is not an essential knowledge domain. | Portal is the gateway to specific or special knowledge domain. |
| 4 | The information and sources on a website are, rarely updated. | The information sources on a web portal are updated, regularly by the owner. |

### F. Portal Services Classification

Portal services can be classified based on the following two criteria:

1- The progression and maintenance of different services need different methods, therefore this gives rise to different cost structures.

2- Members use different utilities for the different services, hence the presence of distinct usage models.

Ang et al. [3] divided web portal services into three types:

**Search**
The need to find essential information on a certain topic or subject has made the search function a very important component of a web portal. Web portals use different types of strategies such as homegrown solution or outside solutions to satisfy the members' needs.

**Information**
Web portals provide different types of information to users, news, sports, job vacancies, weather reports, etc. Users can get this information directly from portals, even without any special username and password. For example, a user can access the weather reports just by clicking on the relevant link on the web portal.

**Personal Service**
These services allow the users to customize the mode of interacting with the portal. Usually, users need to register to assign a username and password to use these services. Emails, chat rooms, messaging services or personalized home pages are some examples of these types of services. Each user has a different interface to use these services. As we are aware, when a user opens the yahoo mail, she/he has a different interface from that of other users. This reduces the time that users spend to search for information on a special subject on the Internet. This function, however, causes traffic on the portals to slow down more than the others services. Information and personal services have increased resulted in the number of visitors to web portals. Rob Allan et al. [2] listed some services available on web portals as follows:

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- Online shopping
- Query – based resource discovery
- Query – based application selection
- Job offering service
- Job submission
- Video/ audio delivery and portal-based collaborative services
- Resource scheduling
- Query and result
- Policy-based authorization
- Deployment service
- Lifecycle management

*G. Types of Portal and differences*

Portals can be distinguished based on their contents and the target users. Murray [15] classified portals into four types:
- **Information Portals**: These portals provide information to users.
- **Collaboration Portals**: These portals connect users and provide facilities for them to collaborate in activities, etc.
- **Expertise Portals**: These portals allow users to communicate with each other and share their experiences, special interests and services.
- **Knowledge Portals**: These portals provide users a combination of all the abovementioned services.
As we have seen, these portals are different based on their functions.
Dane Phillip [8] divided portals into 6 categories based on their contents:

**-Vertical Portals:**
These portals concentrate on the industry domain or vertical portals. A vertical portal acts as a gateway to present the products and services of a specific industry to the users. A vertical portal, also called vortal provides all the tools, information, articles, research findings and statistics related a domain or vertical. A good example of these portals is cnet.com, which presents computer and related information; mp3.com that focuses on mp3, audio, production, etc.
There are 2 main types of vertical portal available:
1 - Corporate Portal: Allows personalized access to specific resources of an industry.
2- Commerce Portal: Provides business-to-consumer, business-to-business, and e-commerce information.

**- Horizontal Portals**:
These portals are single entry point of a web surfer to provide a variety of resources and information on different topics to the general users. Yahoo.com and msn.com are classic examples of horizontal portals. They are considered as "megaportal" and they have search engines to help users search for information on a large variety of topics such as weather, stock or news. Horizontal portals facilitate their members with personalized web page through different channels.

**- Intranet Portals:**

These portals are used by members who are in the enterprise network or intranet of organizations, institutions, etc. Enterprise portals provide employees with updated information such as documents for management system, applications, online training, etc, as well as facilities to communicate using emails, messaging, or web meetings.

**- Knowledge Portals:**
Knowledge portals service users by providing access to useful information and resources. These portals increase the effectiveness of searching.

**- Enterprise Portals:**
These portals have become one of the hottest topics in the new age of technology. Enterprise portals also called corporate portals support their members by providing accessing to suitable resources of the certain company or organization. An enterprise portal is useful for the company's own employees as well as the company's business partners such as suppliers and customers. With its link to public web portals, an enterprise portal provides a virtual workplace for each user. Hence, the website of a company is not only a corporate portal; it also provides personalization and navigation functionalities to its users. One of the most important advantages of this portal is the ability to access its services via mobile devices services like cell phone, PDA's or hand-held PC's which are useful when out in the field, for decision-making and other business or company's tasks.

**- Market Space Portals:**
These portals support business-to-business and business-to-customer e-commerce.

## III. METHODOLOGY

This study is a part of fulfilling the requirement for master research in the Faculty of Computer Science and Information Technology (FCSIT), University of Malaya (UM). The researcher used a quantitative method to capture student's problem with the current portal in the faculty, determine the functionality of web portal in the university and their role in accessing online information. A quantitative approach used survey questionnaire that distributed between 6o bachelor students in difference categories, age and gender. The main target of the survey is directed to find the problems that students are facing to them related the lack of information and resources in the faculty. The questioner tried to find the student requirements for developing the new portal. The questionnaire form is presented in the full project report.

## IV. DISCUSSION

*A. Why are portals useful?*

The main reason for using the portals: **efficiency**. A portal helps users to make more efficient use of their time [16]. Moore [14] highlighted the integration of applications that portals provide for users, rather than being merely a simple collection of contents.
Devedzic [9] believed that people are attracted to portals because of their ease-of-use. Usually, users start their sessions

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on the Internet by opening a portal to retrieve information such as news, weather, bulletins, etc. Users also make use of the free personal communication services such as email, message boards, via portals. It is not surprising that portals are the most visited sites on the Internet [20]. However, it must be borne in mind that a portal cannot fulfill all of information needs of users.

*B. Conceptual portal framework*

The portal is a favorite topic among programmers because of its ease of development, easily customized interface, rich functionalities, and pluggable architecture. When users face a problem, they search the relevant portal to find a solution. Portal framework can provide benefits, but it is clear that no framework can provide solutions to all problems. It is important to understand the of technology used and the framework before starting the development process.

Allen et al. [2] identified 5 standard features to consider when selecting a portal framework:
- Integration with the existing functionality
- Easy to develop new functionality
- Programming language independence
- Standards to access content
- Standards for interoperability and portability

Figure. 2 presents the conceptual framework with the basic knowledge management system that includes some main components of a portal administration, decision support, document management, Web management, content communication, and programs.

*C. The role of portal in the university*

In 1998, a proposal was submitted to SHEFC1 to build an online interface for students to access electronic information sources. The main aims of this project included: Students in institutions of higher education need to access and manage electronic data. They need to use computers and have access to networks to retrieve training materials, databases, financial data, etc. Thus, a web portal for university students is essential to learning. It is also important for the university portal to be integrated with the university IT infrastructure, both internal and external. A university portal can be viewed as a single point, which provides comprehensive access to information on courses, data search tools, educational resources, interactive teaching materials, communication tools, etc. It can act as a gateway, to provide access to learning resources for experts, teachers or researcher, and also allow interactive access to online information, and to other students [13]. Over the last few decades, there had been rapid technological advances in online services. Universities have been at the forefront of this development, and they started to upgrade their websites to portals for online transactions. Some online transactions include: online courses enrolment, delivery, and materials, digital library, and etc.

University websites are also acting as a web portal, today, providing a single point of access to information and applications. A university web portal is a single point of access to resources and information that include web mail,

course information, examination results, and tuition payments, etc., for users such as the students, faculty, and staff.

Presently, most universities use the web portal for various educational goals such as monitoring knowledge, controlling educational processes such as providing access to educational resources, and etc. Some modern universities even use external educational resources in their portals, for example, electronic catalogues, which are published overseas.

Portals have become one of the popular facilities in higher education institutions for various uses. Almost all universities developed their portals to provide for specific new needs [6]. The portal Framework Project undertaken by the Java Special Interest Group (JA-SIG), linking up 20 universities and colleges together, is a good example. Portals help the university to unlock all internally and externally forms which store information, provide users in the university a single gateway to access the knowledge and resources.

Goodman et al. [11] mentioned that universities consider three aspects pertaining to use of the portals:
- Systems integration
- Utilization of e-business technology
- Provision for a wider use of data and services offered by existing systems

▪ **Systems Integration**

By increasing the use of the Internet, universities have tried to have a more integrated IT system within their campuses. In this way, universities can transform more effectively and offer more varied services to the campus community.

▪ **Utilization of e- business technology**

Today, companies use the Internet to provide better and more efficient services to their staff, and customers. Universities and other educational institutions have done likewise. In some countries, some important processes in e-business have been developed by educational institutions to offer better services to the staff and students.

▪ **Provide wider use of data and services of existing systems**

The knowledge and resources in the existing information systems of universities could be useful if the students and lecturers have easy access to them. Portals can be used to facilitate access to the required information.

Tate et al. [19] noted that universities, which have been at the forefront of online service provision, have gradually changed, and are beginning to provide their online services using the web portal. These portals act as a single point of online access to information as well as provide utilities to perform enrolment, course delivery, course support, library transactions, job search, etc. Sulaiman and Alias [20] believed that it is essential for the universities to conduct further study on web portals that will enable students to have access to much needed data and resources that are pertinent to their studies.

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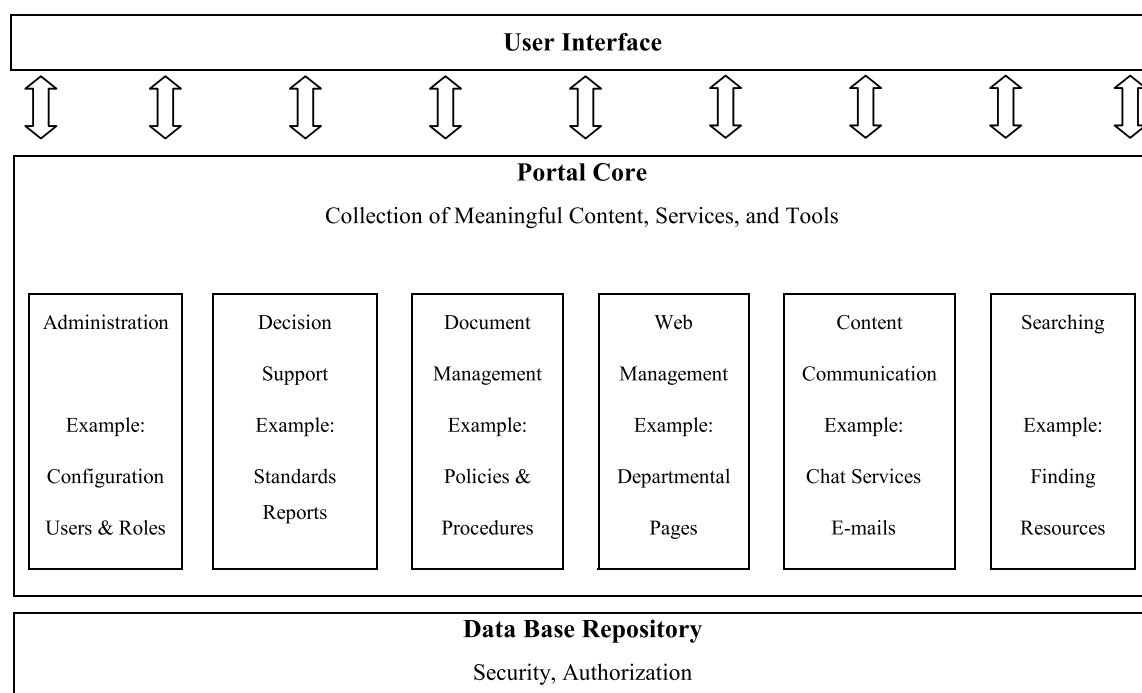International Journal of Information and Communication Engineering
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Fig. 2 Conceptual Portal Framework

## V. CONCLUSION

This research focuses on the web portals and their vital role as a knowledge management system in the universities. Generally, the web portal provides a gateway to access information as well as search, analytical and communication center for the target users. It is important for the universities to have emphasis on knowledge sharing for supporting the students to access the required resources and information. However, it should be considered that a web portal will never cover all of the needed information of members.

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