Developing Education Portal for E-Learning

Mohd. Sapiyan Baba & Saranjeet Kaur
University of Malaya, Kuala Lumpur
pian@um.edu.my

Abstract:

Education portals are now used to disseminate learning content. However, many users are not aware of the different types of education portals. Some may consider a web portal as no different from a web site. This paper shows this point by reviewing existing education portals for secondary education communities in Malaysia. The focus is on the networking education portals. A prototype is developed based on six important elements that are outlined, as an effort to introduce a standard framework for networking education portals.

Introduction

Widespread use of the internet has seen the number of education portals on the Web growing rapidly. There are quite a number of organizations hosting and providing education portals for various education levels. However, in this paper, we focus on the Malaysian secondary education level.

Looking at the existing education portals, there do not seem to be any common criteria of what constitute an education portal. To address this problem, the characteristics of web portals and its framework are identified and then applied to the education portals. There are six important elements that make up a portal. These elements form the heuristics for reviewing four existing education portals in Malaysia. The results of the review are used to derive the requirements for building EduPortal, a prototype with a generic framework for networking education portals.

Web Portals

The main task of a web portal is to unify content and services into one area easy access. There is no unique definition of a web portal as yet. However, based on some existing approaches in defining web portals, three salient characteristics of web portals are identified. They are

- Gateway to information
- User-centric and community based
- Multiple services

Based on these characteristics, a web portal may be defined as a gateway to searchable and personalized information on the web, which also functions as a communication centre for its target users. Additionally, a web portal provides personal and content-related services to support the community it serves.

The portal framework consists of three levels and each level can be mapped to the three salient characteristics of web portals as shown in Table 1.
Table 1: Relationship between Portal Framework and Characteristics

<table>
<thead>
<tr>
<th>Framework</th>
<th>Characteristic</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authentication</td>
<td>Portals as a gateway to information</td>
<td>Authentication is the doorway of the portal. Here users log in to access their desired information.</td>
</tr>
<tr>
<td>Authorization</td>
<td>Portals are community-based</td>
<td>This level helps the portal recognize the logged-in user and tailor the information and services provided according to that users predefined needs or rights.</td>
</tr>
<tr>
<td>Presentation</td>
<td>Portals offer multiple services</td>
<td>Many features are integrated in the portal to present information and services in a usable manner to the community it serves.</td>
</tr>
</tbody>
</table>

The authentication level includes features such as, login and security features. The authorization level incorporates customization features, such as role-based access to manage permissions and access rights to the content. The presentation level includes searching facilities, content personalization, community communication features and assistance.

There are two main types of web portals: horizontal and vertical portals. Horizontal portals are also known as consumer portals that offer a broad range of services to users. Vertical portals are very focused. They may be classified as enterprise information portals, knowledge portals and intranet portals. Education portal is a subset of knowledge portal.

**Education Web Portals**

Education portals, as knowledge portals, refer to portals that provide educational services to their users. Such portals consist of three main components: a community of practice, a body of knowledge, and services to maintain the body of knowledge [2].

There are three types of education portals [3]:

- **Networking Education Portal**
  This portal provides users a point of access to various educational tools and facilities. It functions as a center of communication for the different types of users, thus forming a network among them.

- **Organizational Education Portal**
  This portal is constructed for organizations whose core business is to deliver educational material. It contains background information about the organization, its philosophy, fund providers and members of the staff. Projects and research areas of the organization are also highlighted. Examples of such portals are university or campus portals.

- **Resource-based Education Portals**
  A resource-based portal provides access to various educational resources online. Generally, these types of portals contain adequate search facilities, links to other relevant organizations or institutions as well as subscription services. They usually offer three types of resources:
    - Generic resources that consist of teaching and learning tools for educators and learners, as well as managers and administrators around certain topics and themes.
    - Subject specific resources that are specifically suited to teachers and learners of a specific domain.
    - Links to other education related resources.
Networking Education Portals

In most networking education portal, the common sections available are:

- **References** – e.g. online dictionary, online thesaurus and atlas facility
- **Resources** – includes generic, subject-specific or grade-specific resources such as lesson plans, online books, library catalogues and educational software.
- **Links** – provides access to relevant websites.
- **Functional Navigation Menu** – the menu is dedicated for browsing educational content available in the portal. For example, it may have links to sections that provide online notes, subject discussion forums and other related information that deals with the main function of the portal.
- **Member Area** – this relates to the authentication and authorization features of web portals. In most education portals, these feature are implemented by providing a login system that differentiates its audience as students, teachers or parents. The users have to obtain membership, which may involve fees, before they are granted access to various services.

Elements of Education Portals

Our discussion about education portal centres on networking education portal since it is illustrative of the other two types of education portal. We propose six basic elements for an education portal, as follows:

1. **Portal Characteristics**
   An education portal has the three basic characteristics of a portal, i.e., gateway to information, community-based, and multiple services for its community. Access to the portal is a three-stage process: authentication, authorization, and presentation.

2. **Features of Education Portal**
   Common features of education portal are members section, functional navigation menus, resources, and references. With these features, it is much easier to recognize aa education portal.

3. **Presentation and Navigability of Information**
   An education portal is expected to serve demographically different groups of users in the education field, such as teachers, parents and students. Contents presented are suited to the various groups for effective interaction between users and the system. Special attention are given to the following aspects:
   - **Quantity of information presented**
     A well designed education portal use techniques like minimalist visual design, information customization and information personalization to ensure that the large quantity of information displayed is well-organized.
   - **Grouping and highlighting of information**
     Similar information need to be grouped in order to avoid clutter and confusion. Most portals accomplish this by having different channels of information such as news and sports. Grouping helps to improve readability and can highlight relationships between different sets of data.
   - **Screen display standardization**
A consistent format is used across the design of a portal. This allows familiarity, which reduces the time to reach the information needed. Important information that needs attention is usually displayed at a prominent place. Redundancy is kept to the minimum although at time it is needed for users’ convenience.

- **Usage of multimedia elements**
  Multimedia elements such as pictures, diagrams, video and sound complement any textual information available in a portal. However, usage of multimedia options must be carefully planned. Too many of such elements can deteriorate the speed of downloading pages of the portal.

- **Navigability**
  The navigation system in an education portal must be intuitive and easy to use. Most education portal have functional and standard menus. The former is related to the content and is usually placed at a prominent area. The latter includes general links like Home, Contact Us and About Us.

4. **Educational Effectiveness**

   Education portals usually dedicate a whole section to online instructional material for their target students. Below are some considerations for an effective delivery.

   - **Learning content**
     - Provide a detailed explanation in the form of overview, learning aims and outcomes for each topic covered.
     - Include summaries and revision exercises at frequent intervals.
     - Ensure that skills for learning are appropriate to the outcomes of the course and integrated into the materials.
     - Help in developing users’ ICT skills as required.

   - **Learning process**
     Learning occurs through activities that help to build knowledge in students. It proceeds through different media during involves many interactions[^2]. These are often determined by two other dimensions:
     - Support is based on codification, where information is stored and tools are provided for learners to learn, or personalization, where learning occurs at a more personal level.
     - Learning is objectivist and constructivist. In objectivist leaning, a learner studies concepts and needs to find ways to understand them. In the constructivist approach, the emphasis is on process or the best way to do things. Web-based systems that support the latter approach encourage free exploration of the learning material and enable greater interactivity.

   - **Language level**
     New concepts and terms must be explained simply and indicated clearly in the text. The language should be friendly, informal, welcoming and simple.

5. **Interaction and Feedback**

   Interaction in learning is a necessary and fundamental mechanism for knowledge acquisition and the development of both cognitive and physical skills. It goes hand in hand with feedback. Feedback is defined as the sending back of information to the user about what action has been done and what result has been accomplished. Examples of implementations are discussion forums and chat channels, menus and navigation and search facilities.

6. **Technical Aspects**
Some technical aspects that need to be considered are:

- **Speed, reliability, availability**
  Loading time for all pages must be fast. This is to save the valuable time in searching for learning material. Multimedia elements should be used sparingly.

- **Security**
  There are many types of users accessing the content using the single sign-on identification. In order to prevent misuse of access, it is important to implement some security features in the authentication and authorization processes.

**Review Of Existing Education Portals**

An Internet search on networking education portals in Malaysia returns a number of sites. However, only a handful of these qualify as education portals based on our definition. This leads to the main part of this research where selected education portals in Malaysia are reviewed against the six important elements.

The secondary level education is chosen as the focus area. However, due to the scarcity of existing education portals that focus solely on this education level, the samples are based on those closest to the secondary education level.

Four portals were selected as samples of Malaysian secondary education portals for our review against the six important elements of networking education portals. They are:

- **Cikgu.net**
  This portal caters mainly for teachers. However, it includes educational content on public examinations for students. This content is offered in two languages, Malay and English.

- **Kakak Tua**
  This portal is targeted at primary and secondary school students. It is equipped with revision questions and study materials. There is a paid member section where users get more valuable educational services. This portal is also offered in both Malay and English.

- **Tutor.com**
  This portal is targeted at all primary, secondary and pre-university students. Apart from providing educational content it also provides news and discussion forums.

- **Student.com**
  This portal is purely focused on communication tools. It does not target any specific group of students. It provide news, entertainment, and discussion forums. However, it does not have specific instructional material for examination purpose.

**Review Results**

The four portals above were reviewed against the six important elements of networking education portals described above. For each element that is found in the portal, the portal is given 1 point. From the total points gathered it is seen on whether the sample fits to be a networking education portal or not.

The results of the review in the form of percentage scored against the important elements of education portals are shown in Table 2 below:
### Table 2: Adherence to Portal Requirement

<table>
<thead>
<tr>
<th>Sample</th>
<th>Adherence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cikgu.net</td>
<td>73.08</td>
</tr>
<tr>
<td>Kakak Tua</td>
<td>90.38</td>
</tr>
<tr>
<td>Tutor.com</td>
<td>50.00</td>
</tr>
<tr>
<td>Student.com</td>
<td>50.00</td>
</tr>
</tbody>
</table>

**Review Analysis**

From the review, it is clearly seen that the samples have not reached the level where they can fulfill the criteria of a networking education portal. Only the *Kakak Tua* portal is closest to ideas forwarded in this research regarding networking education portals.

The low level of adherence among the other samples can be attributed to the lack of understanding about portals and its features among Malaysians. Many are still finding it difficult to differentiate a portal from a website.

In terms of portal characteristics, all four samples achieved good adherence points. They have large amounts of information in one location and are created for the student community. However, in terms of the portal framework, only *Kakak Tua* shows the three levels of the framework in its architecture.

Common features of education portals are seen in all samples but the important features such as membership management, customization and personalization are not included in most samples.

In terms of presentation, it was found that Tutor.com and Student.com do not have the required standard look and feel in their pages design. This makes it difficult to find specific information. On a positive note, it was found that all samples implemented some type of grouping and highlighting of information in their portals.

All samples have limited usage of multimedia content except for Tutor.com. This is an important consideration for secondary education communities as not many students may be privileged to have high-speed internet connections to access resources from such portals.

The element of navigation could be clearly seen in most samples except in Student.com which had five different groups of navigation menus. This is totally unnecessary for a specialized portals like education portals as it irritates users and makes information look cluttered. The other samples had two types of menus; content-related and provider-related.

As education portals, the *Kakak Tua* and Cikgu.net provide sections dedicated to learning materials. This is not seen in the other two samples. These two samples use the constructivist learning method that emphasizes on interactivity. In terms of language support and clarity of instructions and explanations, all four samples adhered to the review requirements satisfactorily.

All four portals provided some form of interaction and feedback features such as discussion forums, online assessments, online feedback and many more. Thus, in this area, all samples fulfilled the requirements of a networking education portal.

In terms of speed, all samples had a short loading time of their main pages (between 2 – 5 seconds) except for some pages in Tutor.com. As for content reliability and availability only the *Kakak Tua* portal had content that is always updated. The same was noted for login security features. It was only observed in the *Kakak Tua* sample. Thus, security can be considered as a major weakness across all samples.
Problems And Limitations
Below is a summary of the limitations of the existing education portals in Malaysia:

- Absence of the basic three-level portal framework in most samples.
- Non-standardized layout and screen design
- Online learning material not based on suitable learning processes
- Low content availability and maintenance

Some general problems in terms of the level of advancements for education portals were also noted, as follows:

- Portal solutions available only for Enterprise Information Portals type
- No education portal solely for the secondary education level
- Lack of internationalization

Eduportal - A Prototype

EduPortal is our prototype of a networking education portal for secondary education communities in Malaysia. The design and implementation of this prototype is based on the six important elements of education portals discussed above.

The features included in EduPortal in relations to the six important elements are as follows:

- Portal characteristics

The “gateway” to information in EduPortal is depicted by its login and registration features. Registered users are divided by types: students, or teachers. They can access contents, based on their privileges. Its target community is formed by students and teachers of the secondary education level. Services on offer to this community are online notes, discussion forums, membership management and many more. The login or sign-in is shown in Figure 1.

![Figure 1: Main Page of Eduportal](image-url)
The portal framework is clearly seen in this prototype. The authentication layer is at the login feature. The authorization layer is based on the membership type the user selects during registration: student or teacher. Based on this membership, the content users access in the discussion forums section and learning zone section is determined.

The presentation level is the final level the user sees after a successful login and contains the complete education portal features.

- Networking Education Portal Characteristics

EduPortal provides educational material through its Learning Zone and Knowledge Sharing features. It allows the secondary education communities to communicate with each other through the discussion forums. The features are shown in Figure 2.

![Common Features of EduPortal](image.png)

**Figure 2: Common Features of EduPortal**

- Presentation and Navigability of Information

In terms of quantity of information presented, EduPortal provides only the necessary information for its services. There is no additional promotional or irrelevant advertorial information. To keep the proper balance of the page layout, vital information is presented in the left, center and top of the pages. The complementary information is presented at the right and bottom of the pages. All pages follow a standard structure and color scheme. This creates an organized feel to the content-browsing.

There are three main navigation menus. The functional menu is the main point of access for educational tools and information is on the left of every page, considered the most prominent location. The standard links are on the top whereas the complementary information menu is on the right. Graphics are used sparingly.

- Educational Effectiveness

The Learning Zone section provides a personalized experience for users to access the online notes relevant to their level of privileges as specified during registration. The constructivist learning process is used with focus on interactivity to help facilitate a form of teaching and learning over the web.
Interaction and Feedback

Interaction and feedback features are implemented through the Discussion Forum. It includes search features that returns forum titles and posts based on the search criteria entered. The Learning Zone section displays online notes based on user’s selected education level.

The layout of the Welcome page is personalized according to the user’s input. Users are free to change the layout options. The feedback form is provided for users to submit valuable comments or to report relevant problems.

Technical Aspects

All pages of EduPortal can be accessed in less than about 4 seconds on a connection of 52.0 Kbps. Security-wise, non-members and non-authenticated users are not allowed to use the educational features and functions of the portal. This is controlled by the login feature and usage of session management in the portal. This is not meant as a hindrance to potential users from using the portal but merely to expose them to special portal features like customization and personalization through the layers of the portal framework.

Prototype Evaluation

An evaluation was performed on the prototype developed. This evaluation was conducted using a questionnaire with closed questions, concerning the six elements of education portals. Twelve experts from both the information and communications technology (ICT) field and the education field were chosen to participate in the evaluation.

The evaluators’ opinions were collected to determine if EduPortal indeed solved the problems highlighted in the review of existing portals and to see if it successfully fulfills the six elements of networking education portals which is the focus of this research.

The positive results of the evaluation when analyzed revealed that:

- EduPortal has fulfilled the definition of a web portal
- It has the three salient characteristics of web portals.
- The three layers of portal framework are clearly seen in it.
- The has included the common features and services of networking education portals.
- The portal has achieved the required standards outlined for its presentation and navigability.
- Interaction and feedback features are included in the portal.
- It is technically sound in ensuring good performance in servicing its users.

Based on the evaluation results, it is concluded that EduPortal is successful in achieving its objective as a generic education portal prototype.

Conclusion

This research has analyzed in great depth what are meant by portals and education portals in general, and more specifically networking education portals. It clarifies the differences between portals and websites, and identifies the various types of portals for education. It concludes that an education portal is a gateway to educational information
and services specifically targeted at a certain community, providing them with a virtual meeting place to interact, communicate and learn from each other.

By using networking education portals for secondary education communities as a focus point, this research managed to highlight the current level of education portal development in Malaysia and what is lacking in it.

Based on this information, a prototype of a networking education portal was developed in an attempt to introduce a generic template for an education portal as guideline for developing such portal in the future.

It is believed that this portal can help to eliminate much confusion regarding the concept education portal among internet users particularly in Malaysia.

References