PATTERNS AS METHOD FOR UNIVERSITY PORTALS DESIGN

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ABSTRACT:

In the field of designing universities portals website the designers need effective methods in designing usable and successful portals. In this paper, we examine the contribution that pattern languages could make to target audience participation in the design of interactive portal.

The patterns take the website target audience perspective which leads to a format where usability is the essential design quality. The patterns constructed after capturing knowledge about the successful design of usable websites and also the patterns have emerged as a possible solution to some of the problems from which guidelines suffer. Patterns focus on the context of a problem and solution thereby guiding the designer in using the design knowledge.

KEYWORDS:

Pattern Languages, Web design, Interaction Design, University portal.

INTODUCTION AND MOTIVATION:

James G. Lengel [01] he said "…Building a website is a lot like preparing a meal. When you're planning a meal, you start by deciding what you'll serve, in what order, and to whom. Then you gather the ingredients from the cupboard, the garden, or the supermarket. With all the parts ready, you begin assembling each dish. The dishes you're preparing are like the pages in a web site… "

So, most universities have a website where people (students, lecturers, interested people…ext.) can find information. Usually these are large websites with a lot of information and it is not always obvious for a visitor to find the information he is looking for. When we compare university websites, we see differences from university to university on how the information is organized but most of the type of information is the same, because most universities have the same aims, offers the same kind of services and are organized in the same way. Therefore, the information and the services that are available or can be offered on their websites may also be similar.

The organization of the website depends on the experience and preference of the designer and also possible on the university administration hierarchy-organization hierarchy.

Previous and related research done in this issue, Bernard W. Gleason [02] from Boston College, he talks about the Portal Technology Opportunities and Options a View from Boston College; Richard N. Katz [03] from California State University, he talks about the portals in higher education, in there research they try to explain the problems in designing university portals and websites and then they try to solve the problems.

In recent years, there has been a growing interest in the use of patterns to support web applications design. Much of this work has been inspired by perceived success of patterns in software engineering. So, Sven Casteleyn, Irene Gerrigos and Peter Plessers try to solve small problems using pattern technology [04]. Andy Dearden, Janet Finlay, Elizabeth Allgar and Barbara McManus they try to construct patterns for HCI [05].

The common problems appear in university websites and portals, such solutions for the problems can be described as design patterns. The aim is to collect good and consistent solutions for well known problems. Therefore, using the patterns in designing, it will help to improve the usability and the accessibility of the websites and portals.

In this paper, we report our experiences of developing and evaluating web applications. From our studies we have identified a number of important patterns can used in designing any university website and portal in any design phase levels.

PATTERNS FOR UNIVERSITY WEB APPLICATION:

Pattern language concepts are derived from architecture and were first proposed by Alexander, Ishikawa and Silverstein (1977). Salingaros (2000) identifies pattern languages as useful because they are: "a way of understanding, and possibly controlling, a

complex system … [they are] necessary design tools with which to build something that is functionally and structurally coherent".

Patterns explicitly focus on context and tell the designer when, how and why the solution can be applied. Patterns for different purposes usually do not exactly have the same template and for each purpose an adaptation is needed. The main fields are:

- **Name:** A meaningful "conceptual handle" for discussion.

- **Problem:** Statement of the problem / intent of the solution

- **Solution:** Tells how to generate the solution.

- **Context:** Tells how the problem occurs / when the solution works.

UNIVERSITY WEBSITE AND PORTAL PATTERNS:

1. HOME PAGE:
Problem: The visitors need to know the structure of the website to determine the direction they want to take.

Use when: Typically when the visitor visit the main page -home page- of the university website and he want to know where he can go in the website. Users know that a site is organized but they don't know how. Users want to see where they can go. Users want to see where they are.

Solution: Create a homepage that introduces the site to users and that helps them to get on their way on the site.

The homepage is the important page in the website, because the visitor needs to find out where they can go from this page. The home page should also contain an introduction to identify the site. In the navigation bar, the visitor should have a clear overview the different parts of the website and the different target audience pages. These will serve as the keys in the navigation. The homepage is also the place to communicate what is new, what is going on, new activities and so on.

Why: The homepage making a first impression and let the visitor understand the website.

2. FACULTIES PAGE:
Problem: The visitors –users- need to know the faculties in the university.

Use when: The visitor needs to know the different faculties in the university, the hierarchy of the faculties and the different departments.

Solution: Create a page for all the faculties in the university together with their departments. Any layout is suitable to present all faculties in the university with their departments. Link every faculty to its faculty homepage, and every department to its department homepage.

Why: Showing all faculties alongside its related departments in one page to allow the visitor to know the academic structure of the university; allows the visitor go directly to department or faculty which he wants it.

3. DEPARTMENT PAGE:
Problem: The visitors need information about a specific department in a faculty.

Use when: A visitor needs information about a specific department.

Solution: Create a department page with its own all information and details.

Any layout is suitable to present department information, with navigation to indicate where the visitor is (e.g. by means of the path he has followed). The page contains important information about the department as the date of foundation, contact information to the department secretary; last news related to the department...etc.

Also provide the programs provide by the department (e.g. undergraduate, postgraduate, diploma … ext.) Link every program to its homepage or more details page. The admission rules to the department programs should also be given. The faculty staff member's names can be given sorted by the education position or a link to staff member's page. Further on, the aim of the department or the goals should be included.

Why: All information in one page to let the visitors know all details about the department.

4. STUDY PLAN:
Problem: The visitors need study plan of a specific program supervises by a department.

Use when: Needs to present the courses of the programs in the university. Visitors need to know the courses in a specific program. The students need to know their courses.

Solution: Show the course name, number, points and course identification number.

Any layout is suitable to present the courses of a specific study program (course name, course number, and course points, the semester(s), the type of the course – university courses, faculty courses, department courses - , mandatory or elective courses…etc.).

Link every course to their specific home page to let the visitor get more information about the course he selected.

If the visitor is register student and he need to know his study plane, mark the courses he finished with a color different of the other courses.

Why: Categorizing the courses make easy to the visitor to understand the type of courses. Registering users can see their remaining courses and the marks already obtained.

5. COURSE:

Problem: The visitors –users- need to see specific details about a course.

Use when: The visitor need to know details about a course.

Solution: Provide full details about every course separately.

Provide all details about the course (course name at the middle of the page; the code of the course; course points -if that's depending on the student's program mention this e.g. computer science: 7 points, mathematics: 8 points…ext.-; the semester; if the course have practical beside the lectures or practical only, also mention this; description of the content of the course). Then provide details about the lecturer of the course: lecturer name, email, office number, office hours. If the course is teached by more than one lecturer, provide this, and if the teaching is done in groups also indicate this and mention who is responsible/teaching which group. If the visitor is a register student then he should be able to see more details of the course.

If the visitor is staff member and if he teaches the course in the present semester, he can change the details of the course. But if the course will be teaches by more than one lecture in the same semester, the teacher can change only his own data for his group only. The shared details as course name, description…etc should be modified by the responsible of the course.

Why: Present these detailed information grouped to increase the learnability. Restrict the material and information specific course for registered students to increase the privacy.

6. RESEARCH UNITES:

Problem: The visitors –users- need to know the topics of research in group.

Use when: The visitor needs to know the publications previous and present research topics and projects, the members, and the contact information of the research unit.

Solution: Present page with all the details of the research unit.

At the header of the Research group page provide description about the unit, and if there is logo of the unit show it clearly. Also last news of the Research group can be included.

Present all information in one page. Gather and group the information of the research group into blocks (e.g. research topic, run projects, old projects involved, cooperation, sponsors, publications, research members…ext.).

If the information large for one page, just include the title of the topics, then Link every title to its description specific page. In the research topic list provide a link from every topic to a detail topic page; on this page provide all details about the research topic (e.g. name, description, publication, materials, members involved, contact person for details).

Why: The visitor will be able to see all the information with one click. Some of search engines on the internet save the titles inside the page in their database search engine.

7. Members:

Problem: The visitors need information about specific member or group.

Use when: In any area (e.g. faculty, research unit…etc.) There are members and the visitors may need to know them. The visitors need details about a specific member.

Solution: Present page of all members involved or work in some area.

In the page of the members, all members' information (as cards) sorted by the education degree or position work appears. The card of the member is: name, position, picture, and contact information. Link the picture of the member or (More information) title, to the Home page or the specific page of the member.

The page of the member contains all the details about him, (e.g. description and personal information, picture of the member, contact information, research topics involved, project involved, courses he/she

teaches or assistant, …ext.). Present this information as blocks.

If the member is a member from the academic staff, then also mention the faculty, department, and/or research group he is member from.

The member can change his own information.

Why: Giving an overview of all members working in a group in one page provides a clear overview to the user. A picture is more appealing. Allows change information because this personal page and he is the only one responsible to update the information.

8.   UNDERGRADUATE:

Problem: The undergraduate visitors need information about programs related to them.

Use when: New student-candidate- need to see details about the undergraduate programs and other issues related. Enrolled student need to know information about programs and the courses in it. To show Undergraduate programs available in the university.

Solution: All undergraduate programs available in the university provided in one page.

Provide all programs available grouped by the faculty they related to. General information about studying in the university, university rules, a list of all programs (program name, program outline, duration of the program). Provide links to the courses teaches in the program. Provide links to the director and/or the secretary contact address. Candidate students need to see the application form to enrolled into the program (if applicable), this application from must be downloadable, or an online.

Why: By provide all programs in one page, the new student will see every thing at once. The online form let the student to react with the website.

9.   POSTGRADUATE –MASTER- OR –PhD-:

Problem: The postgraduate visitors need information about available programs.

Use when: A new student -candidate- need to see details about the (Master or PhD) postgraduate programs and other issues related to that. Enrolled students need to know information about master programs and more information about the courses of it or research in that program.

To show postgraduate (Master or PhD) programs available in the university.

Solution: Provide all postgraduate (Master or PhD) programs available in the university in one page grouped by the faculty responsible for the program.

Provide all postgraduate (Master or PhD) programs in one page grouped by the faculty responsible for the program.

General information about studying in the university, university rules, a list of all programs (program name, program outline, duration of the program).

Provide links to the courses teaches in the program. Provide link to the director and/or secretary's contact address. Candidate students need to see an application form to enroll into the program. This application form must be downloadable, or an online forms application. Links to research group related to the master program should be given.

Links to the research groups related to the PhD program must be given. Last news about the PhD programs should be mentioned as well as if there are any new positions or scholarships.

Why: By provide all programs in one page, the new student will see every thing at once. The online form let the student react with the website. Responsible for the program give the new student a clear overview of the program.

10.   VISITORS PAGE:

Problem: The new students –visitor- need information about the university.

Use when: Any one need information or to know about the university.

Solution: Provide Page with all information titles as welcome page for all kinds of visitors –target audience- interesting to know; as grate to all website.

The first page for the visitor is the important page in the website, because the page makes impression about the university. So when designing the page a lot of issue, such as flexibility, effectiveness, learnability…ext should be taken into consideration.

This page is as a summary of all the pages in the website, the visitor can be interesting in (research at the university, teaching, learning, finding a job, visiting the university, finding out about the university…ext.), So in this page need to support every thing you expect a visitor to be interesting to know.

Provide description about the university, faculties, departments, research, centres, type of study,

quality of study…etc., and then link every previous title to its page or its own full details description.

Also provide a FAQ page to provide answers to questions raised by visitors. Provide contact information. The target audiences of the website (e.g. postgraduate, undergraduate, staff...ext.) should be included with short details and links to their pages.

Why: Homepage making a first impression and lets the visitor understand the website.

11.   STAFF PAGE:

Problem: Academic staff members need to manage their information and check email.

Use when: The staff needs to manage and change his information; manage the courses he teaches; need to maintain his e-mail account; upload student's course marks; manage his calendar and telephone note.

Solution: Present page(s) of all information needed by the staff.

The staff page is not a normal page; it is a portal to the staff, because it contains a lot of services. Every staff member has his own personal page -portal-; he can enter the portal by using a login, and then the system will build the page.

The header of the page consist of the staff's name, his employee number, and a picture if found.

The staff can manage his Email, personal details, manage courses, upload marks…ext.

Personal details changed by the staff member in the portal will automatic change in the contact card and members details in all the pages of the website. The staff can upload marks immediately to registration unit for the courses he is responsible for. Also provide a FAQ page. Provide contact information to the administration of the website.

Why: Staff members need an easy way to manage all the information belonging to him. The portal gives a feeling of control to the staff members; every one has its own home page and can modify and control everything. A login is needed for security reasons.

12.   REGISTERED STUDENT PAGE:

Problem: A registered student needs to manage their academic information.

Use when: The student needs to manage and change his information. A student needs to see the marks of the courses he finished. Any where a student needs to do some thing.

Solution: Display all the information and functionality needed by the student.

Registered student page is not a normal page; it is a portal for the enrolled student, because it is contains a lot of services.

Every registered student has his own personal page -portal-, he can enter the portal by using a login, and then the system will build the page, and when he finishes he should log out.

The header of the page consist of the student's name, his student number, the name of his faculty, the name of his department and picture if found. At the middle, there is a welcome message. New messages and important notes are inside the square in the middle of the page. Also last news can be included. A link to the study plane for the student appears on it with the finished courses and the remaining courses. Also the marks for previous semester courses should be given (e.g. including the details of these previous courses: course code, course name, course points, course mark, notes…etc.).

Also provide a FAQ page and contact information to the administration of the website.

Portal: the student can connect to the library (e.g. do search in the library, reserved books, renew books borrowed…ext.). May be the student can register for the next semester from the portal.

The table of the semester exams can be found (e.g. course name, course code, date of exam, time of exam, number of the room …etc.).

Why: Registered students need an easy way to manage all their information, activities and services. The portal gives the student a feeling of control; he has his own home page and he can modify and control every thing. A login should be used for security reasons.

13.   PROSPECTIVE STUDENT PAGE:

Problem: The candidate students need to know about the university, and programs.

Use when: The future student needs special information about the university.

Solution: Page with all Prospective interesting to know.

The page of prospective students should be clear in the data and keys (information titles) inside this page, because the page makes impression about the university.

In this page the prospective students can be (undergraduate student, or postgraduate, or diploma, or international student), so be clear in data presentation to every one separate, link every one to there page for more information.

Prospective students need to know the nice issues about the university so provide useful links (e.g. campus tours, postgraduate prospectus, undergraduate prospectus, continuing education, international students, new students, for parents and guardians, for teachers and careers advisors … ext.). Present the resources in the university (e.g. schools and departments index, opportunities to visit the University, admissions liaison service, guild of students, student tutoring … ext.)

Also provide a FAQ page and contact information page.

Why: Information about fees, scholarships, student accommodation and student support services to help in decision-making.

CONCLUSTION:

This paper attempts to share directions rather than list a set of issues and possible alternatives in design. However, sharing ideas is the key to building consensus within campus business and technical units, within the greater higher education community.

The goal of this paper was to find a way to support designers of universities websites and portals; we constructing patterns to use in designing in conceptual and implementation levels. In patterns construction and educational portal, the students important in all phases in the design the website, where the developer should take them into account while developing a website since they may, if ignored in one-way or another.

The patterns represent proven design knowledge in a much richer context.

REFERENCES:
[01] James G. Lengel : "The web wizard's guide to web design", person education, 2002

[02] Bernard W. Gleason, Web Portals and Higher Education, Jossey-Bass, A Wiley Company, 2002, pp. 86-108.

[03] Steven L. Daigle and Patricia M. Cuocco, Portal Technology Opportunities, Obstacles, and Options: A View from the California State University, Jossey-Bass, A Wiley Company, 2002, pp. 109-124.

[04] Casteleyn, S., Garrigós, I., Plessers, P., Pattern Definition to Refine Navigation Structure in Hypermedia/Web Applications, *In Proceedings of the IADIS International Conference WWW/Internet 2004 (ICWI2004)*, Volume II, pp. 1199-1203.

[05] Andy Dearden, Janet Finlay, Liz Allgar, Barbara McManus. Evaluating pattern languages in participatory design. CHI 2002, Minneapolis, MN. USA, 2002

[06] James Landay, Jason Hong: "Web Design Patterns for eCommerce", University of California at Berkeley, 2002.

[07] A. Seffah, H. Javahery:"On the Usability of Usability Patterns",Department of Computer Science, Concordia University, Canada, 2002

[08] IBM Global Education Industry. "Higher Education Portals: Presenting Your Institution to the World," Sept. 2000.

[09] Looney, M., and Lyman, P. "Portals in Higher Education." EDUCAUSE Review, 2000, 35(4), 28–37.