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EFFECTIVE WAYS OF MANAGING WEBSITES FOR ACADEMIC INSTITUTIONS

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Abstract

The paper describes the process of building and developing a proper website for academic institutions. Development needs to follow certain guidelines like planning a good structure and writing quality content in order to be able to convey the information that needs to be delivered to the target audience. The study surveyed existing higher education institutions websites from the current best top 100 list by QS World University Rankings. Although the scale is different the audience is the same and the structure of the websites does not differ. We found that educational websites keep a similar structure, but some manage to present the information in a much subtle manner to their audience. One of the most important features of an academic website is to make information accessible to all. The authors used a documentation review as a means of surveying to gather information about university websites. The purpose being to make informed recommendations about the best practices used in higher education website development. In

conclusion we found that information needs to be displayed clearly, we recommend contact information to be placed on the front page as well as relevant information about the institution.

Keywords

Academic Website Development, Educational Website Structure, Higher Education Online Presence, Website Survey

1. Introduction

According to (Bedord, 2008) web presence plays an important social role. All businesses are represented online via a showcase website. They may also manage accounts on multiple social media platforms where their clients may be present. In order to improve quality (Valter, Enache, & Duca, 2019) argued that higher education institutions should use websites as tools for the education process and adopt them as a teaching aid for students. For example, University POLITEHNICA of Bucharest manages several webpages used as tools for student teaching.

For some academic institutions like the graphics scientific societies, the communication of the work being done is easier. This can be done when effective web development is implemented as described by the present paper.

Linked papers help research when cited authors are notified and may read the improved work. The scientific journals that empower this type of collaboration need to have technology implemented that facilitates interlinking. For example, research databases like Scopus and Web of Science. Scientific journals have moved from human managed information to content management systems that can organize information better due to the large scale. The interlinking of such content management systems together in databases makes research easier and development of such systems should be a priority for every scientific journal manager.

Open source software as seen in (Sudhanshu & Nutan, 2015) plays an important role in the development of academic websites as well. Developers make software and make the code available to anybody to use and modify it for free. This is different to closed source software where users are not allowed to modify the code. The Open Journal System aids publishers in managing their online publication all through the platform and without the need to code.

Some web applications have merged with outside sensors (Martin, 2017) and contribute to improving life in campus with the ongoing technology evolution. Smart campuses are implemented more and more across the world and automation improves living and education conditions. One example is using a counting system to monitor library seats availability. A device

is installed and counts how many desks are available and displays the information online. Students know if they can go to the library right away or wait for a desk to be made available.

2. Key Components of an Academic Web Development Strategy

Website building must begin with developing a plan of the full structure. It needs a base structure that consists of relationships between web pages and elements inside them. We surveyed university sites and found that out of 100 websites 47% used links and buttons which is a best practice, 50% used menus and 3% had menus with submenus inside. As seen in figure 1, we discovered a tendency to move towards a neat interface with information in hand and buttons and links.

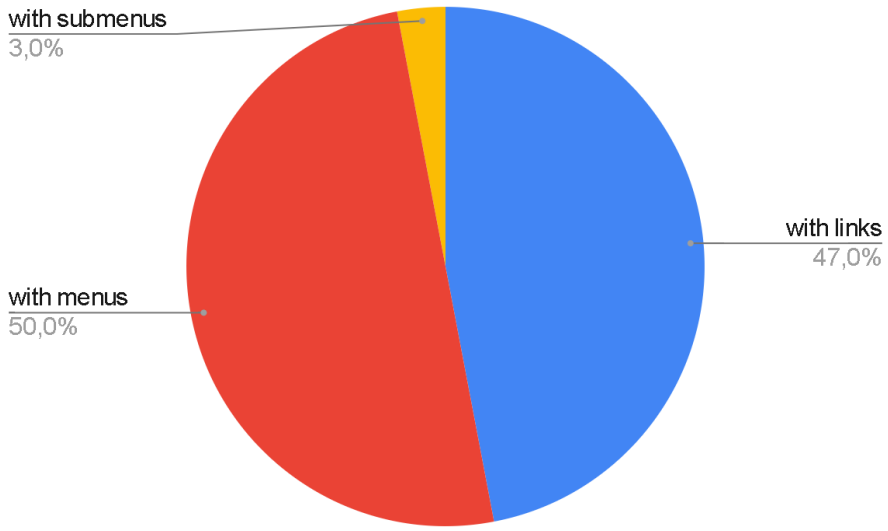

Figure 1: *Page Navigation Methods used by top 100 Universities on their Websites as Ranked by QS Top University Ranking*

2.1 Establishing the Base Structure

Structure is very important in a website. Educational Institutions need to have a sound structure for their web application in order to allow information to be found quickly and easily. Usually in website development a profile is established for users of a certain website in order to cater the presentation of information to the user in need of it. A website might have several profiles built up for users of different interests may surf the website with ease.

Most websites from the top 100 list use navigation bars. While this approach is neat it can get very cluttered. We propose a split approach where the information is split into several menus across the website with no dropdown menus and only buttons and links to drive the user to the

desired information faster, without the need to hover over menus. Also, contextual menus are another solution.

For academic website structures we considered the profiles described below. We surveyed the (Writer, 2019) and found, as seen in figure 2 below, that 58% do not have a phone number present on the front page of the website.

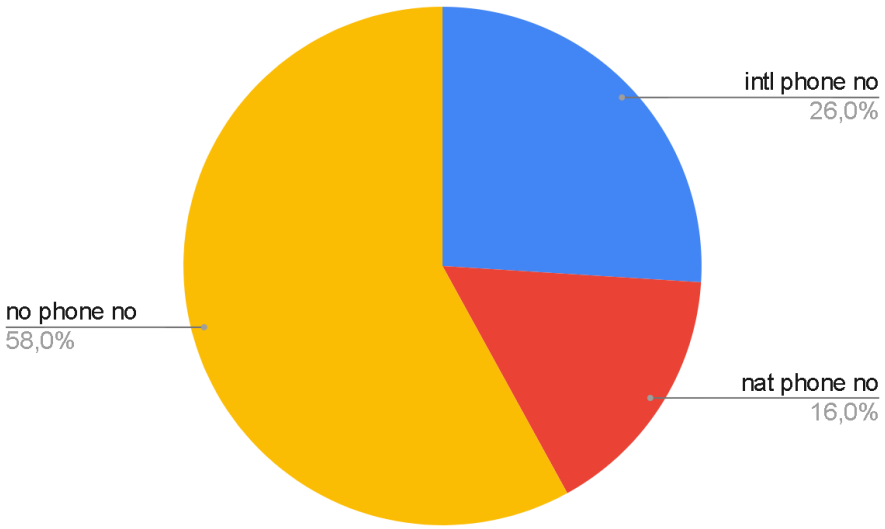

Figure 2: *Presence of Institution Phone Number on top 100 Universities Front Page*

Web platforms allow modularity and according to (Frost, 2016) the component design is the best way to think about web development. The internet runs on content management systems (CMS) with 34% of all sites running WordPress says (Low, 2018) 2.9% run Joomla and only 1.9% run on Drupal due to its more complex nature and with high security features. More than 71% of the top 100 universities run on Drupal software according to a study done by (Drupal, 2019) . Open Journal System is an academic publication content management system, the phpBB bulletin board system can be a great asset for students, teachers and MediaWiki is a wiki platform that has an extension for educational use and may be integrated in an institution's website.

The 2 most common profiles are those for users looking to get in contact and to see a short presentation of the institution's background, latest events and services offered. The next profiles are as follows:

- The department website case has 3 more profiles: profile 3d helps inform users of the institution's accreditation, admissions, calendar and provides an archive while profiles 4d and 5d refer the user to the different types of degrees offered and to student related activities

- The scientific society case has one additional profile, profile 3s, useful for highlighting its members, scientific journal and conference. This type of website has a lot of content but of the same type; it can be news about the members or recent conferences.
- The scientific journal case has 2 additional profiles, profile 3j and profile 4j which encompass information about latest journal issues, the editorial board and review process, it also provides links to an archive of previous issues.
- The scientific conference case has 3 additional profiles, profile 3c, 4c and 5c which reference items like the author guidelines, the conference venue and fees applied.

We found common profiles on all academic websites and we selected the following:

- Profile 1: street address, phone number, email address, social media and contact
- Profile 2: presentation, events, news, services

For department websites structures need to include:

- Profile 3d: Accreditation, Admissions, Calendar and Archive
- Profile 4d: Undergraduate degrees, master's degrees, PhD degrees and Lifelong learning
- Profile 5d: Login, Library, Scholarships, Labs, Accommodation, Camps, Internships, Discounts, Jobs, Fees, Achievements, Medic, Timetable, Volunteering, Guide, Competitions, Exams and Allocation

For academic society we propose only one profile 3s and 2 more for academic journals:

- Profile 3s: Home, Members, Scientific journal, Conference and Contact
- Profile 3j: Home, Editorial board, Scientific society, Archive and Contact
- Profile 4j: Aim and scope, Indexing, Author guidelines, Submit paper, Review process and Fees.

For the conference site structure, we propose 3 more profiles:

- Profile 3c: Home, Scientific committee, Organizers, Contact, Topics, Call for papers and Ethics policy
- Profile 4c: Registration, Author guidelines, Publishing, Accepted papers, Accommodation, Visa and FAQs
- Profile 5c: Agenda, Venue, Fees, Scholarships, Keynote speakers, Workshops, Previous editions and Gallery.

2.2 Ergonomics, Quality and Appeal

Academic institutions must strive to develop a website with ergonomics in mind. Web pages may not have small text or complicated image arrays. Sometimes web pages tend to display

more information than necessary. Access to information and awareness of localization on the site is important. We do this using “bread crumbs” which are small links that show the path from the home page to our current location on the site.

Quality content maintains the user engaged. When developing a website for an academic institution we must always keep in mind the general public that visits the website.

Google trends allows the comparison between keywords you may want to use in your website and provides valuable information about what people are looking for. The important keyword ranking can help boost the websites performance in terms of Search Engine Optimization (SEO). The website shows more frequently in search if it has the keywords.

In figure 3 below we compared 3 keywords. We can establish that we may want to use movies as a keyword more than we would use tutorial. This is because that's what people are searching for online. In order to be able to appear in search results, we should use this keyword instead when possible.

As an example, for an engineering university, a post about the mechanisms inside a carriage for movie equipment may have higher reach than a tutorial on kinematic mechanical mechanism theory.

For a better engagement using video instead of text provides better outcomes. We have surveyed the top university sites and found that only 13% of universities had a video on their front page while the rest, 87% had no videos as seen in figure 4.

Security for websites is very important and we checked for a secure connection on top university sites. We found that 82% of the websites use a secure https connection while 18% are still using an unsecure HTTP connection as seen in figure 5.

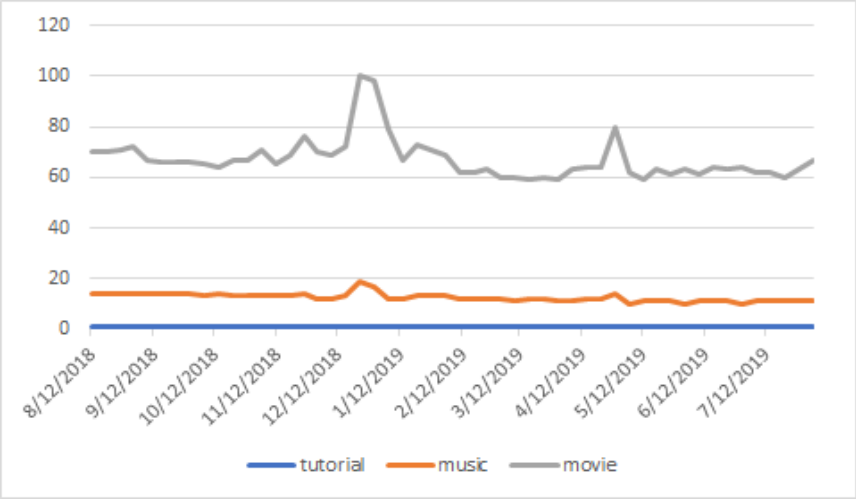

Figure 3: *Comparison of 3 Keywords as Seen in Google Trends*

3. Website Integration of Smart Campus Infrastructure Data Gathering for Research and Educational Purposes

The Smart Campus initiatives incorporate sensor data into algorithms to enhance campus life, improve student experience and lower expenditure. The work of (Sergio Fortes, 2019) describes the management of Malaga University infrastructure for achieving efficiency using the Internet of Things. Going a bit further with this concept and developing it we get to display processed data on educational institutions website and improve the quality of life in a microsystem.

Web data scraping requires fluency in reading HTML code and a basic understanding of how the Python programming language operates. Basically, using these 2 web technologies we can gather information from multiple sites and store it onto our own for reference. This also helps present information in a much more organized manor.

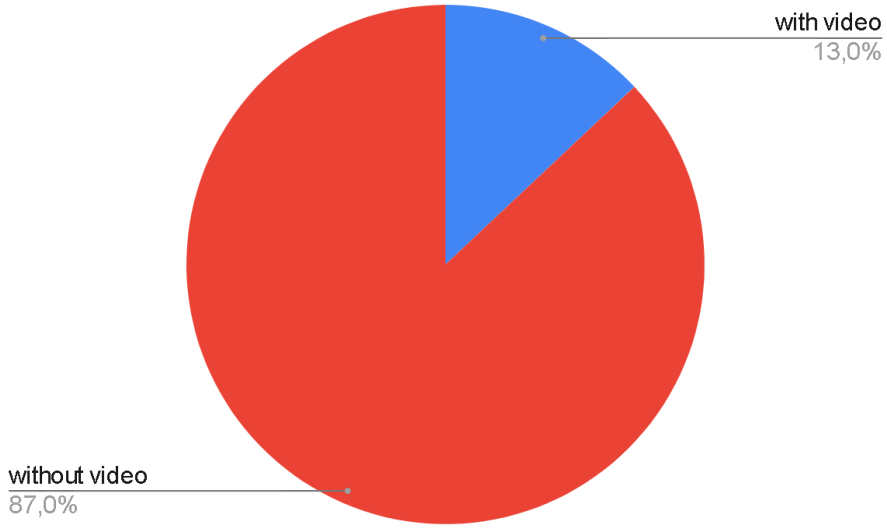

Figure 4: *University Sites that use Videos on their Front Page for Engagement*

Instead of having multiple external site references, the data from those sites can be gather with the help of Python and stored onto the internal site. It can also dynamically change. If for example a new item is added to the external site, the internal site gets updated as well.

Parsing documents is also useful to manage large amounts of data. This can be done for example when extracting the abstract of an article from the first page of a scientific paper and place it on the website, so people interested in reading the article know what to expect before downloading the entire piece.

These 3 methods of managing big data are very useful in education but may cause problems if not used properly. Some website prefers not to have their webpages scanned and they will

provide notice not to do so. Information gathered through parsing may cause problems if the work is not cited properly. Given the advantages the tools and methodology are useful for educational purposes and should be integrated in academic websites with proper care.

Programming the parser is one method but another is finding one already build online. Services that provide crawling, scraping and parsing are now online and may be used with a few restrictions and the remark that they may not cater to the desired application exactly.

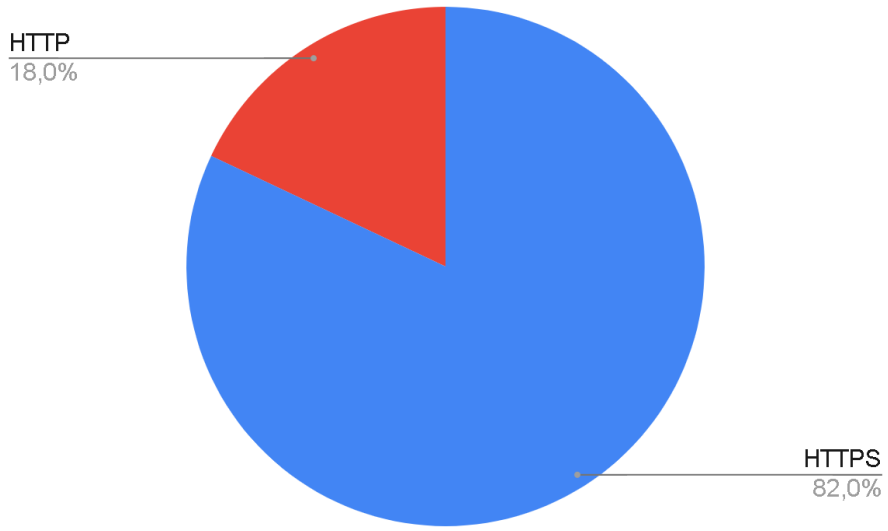

Figure 5: *University Sites that Use Secure Connections https versus unsecure http*

We found that the easiest way is to employ the help of a software service. Octoparse worked best compared to ScrapeSimple and ScrapeStorm. The first being a paid online service and the other a subscription based online service. Octoparse is free, offers scaping templates and has an advanced mode to work with. Upgradability to a premium plan with more features is also available.

4. Discussion and Conclusion

Our survey results show that 58% of universities don't have a phone number on their front page and this is an important structural element to have in order to establish good communication.

A minimal structure was defined and proposed for different academic websites. The structure has a common part that needn't be absent from any website and we followed with profiles that only certain academic institutions should use like department, scientific journal and scholarly conference websites.

We proposed a new way of thinking about keywords for educational institutional website growth and we concluded that keyword research is important as we have demonstrated in section 2 of the work.

The others found that navigation menus are starting to disappear from website navigation with 47% of sites surveyed having link navigation and 53% using menus and submenus for their site navigation.

We recommend using a secure HTTPS connection as 82% of the universities we surveyed currently do even though there are no financial transactions on the website the connection needs to be secure.

In section 3 we compared parsing software and found that Octoparse is the best solution for education. It's a free service and it can be used by downloading an application. After logging in the software allows website scraping.

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