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Research paper



The Influence of User Interface Component on University Website Towards Student Enrollment

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Abstract

Website interface can be a very effective communication medium between the university and the users such as potential students, current students and other authorities. The purpose of this study is to investigate interface components that represent important information in university website, which led to the enrollment of students. This study is motivated by the user frustration or thwarted by the frequent usability problems of university website and problem in representing important information into required by potential students. The interface component and the important information on university website are identified through a comprehensive literature review. There are several factors that influence the student's decision process such as tuition fees, scholarship, ratings / reputation, vicinity to home and the majors offered. The interface components that are used in this research are metaphor, navigation, mental model, interactions and appearance. This study will produce the interface design guideline based on the most frequent used of interface component. Analysis of 5 universities has been conducted to identify how the important information, which leads to student's enrollments is presented on the interface.

Keywords: *User Interface; Design criteria; University websites; Webpage; Student's decision*.

1. Introduction

Website is the main medium to spread information for university or colleges. There are some advantages when a university or college use a website as their main promotion tools such as introducing profiles and history of higher education, facilitating communication, bringing new students candidates, becoming a tool of official publications of higher education, gain branding, have a professional impact and finding partners of companies and other organizations [1].
In order to attract prospective students to visit the university website, the component of user interface should be taken into consideration. A user interface is a medium for user to interact with computer [2]. There are factors that effect on student's decision process such as tuition fees, scholarship, ranking/reputation [3], vicinity to home [4] and majors offered [5]. Besides that, user interface components also play major roles to represent the website. The user interface components used are metaphor, navigation, mental model, interaction and appearance [6].

2. Literature Review

2.1. The Important of University Website

Currently, university use their website as promotional tools [7] to introduce profiles of higher education, facilitating communication, bringing new students, official publications of higher education, gain branding, have a professional impact and finding partners. But, the designer of university website does not take any consideration on what are the user interface component needs to be used to design the website. The potential student will examine the university website before they visit the campus because they want to know the information that really need, and it will effect on their decision to enroll into the university.
Mostly, student will try to find the information regarding about the tuition fees for their favorite course. Then, they will try to look for the scholarship that related to their course. After that, they will do comparison on reputation or ranking of the university. Finally, they will look at the location of the university. The process of searching relevant information sometimes will make the student get confused and frustrated because it is not properly organized in the website.

2.2. How Student Choose a College

Every student in this world has a unique way to choose what college to attend. Students do not use a broad variety of internet-based resources in their college choice process, but use is not stagnant [8]. Most of students using Facebook as their social media platform to gather the information regarding the tuition fees, program, course and location of the university and it are followed by blogs.
In [3] states that students used varying amounts of specific college and university websites, but the majority of his study visited fewer than 10 websites. Specific college and university websites were used by almost all students at some point in their search process. There are so many types of websites that student can visit. Students from university of California use CollegeBoard.com as their first introduction to exploring colleges. There are some specific colleges and university websites were very influential for some students, and others said they never used it until they needed to do something that required them to visit the university website.
Students found traditional resources and external factors more influential than internet-based resources [9]. According to [9], he

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states that compared to internet-based resources, traditional resources were more frequently ranked as very influential such as campus tours and college admission counselor visits. Students also has a variety of external factors including parental approval or influence, family opinions or influences, proximity to home, academic reputation, majors offered, or financial aid and cost. In [22] found the most important factor towards student decision was academic reputation of schools or university.
The path to determine the right university is different for each student. Some students had a great deal of family support and influence. Another student made their choice because of a financial aid package. But, majority students spoke about their decision based on what they know, so it's made them choose their university. There are also taking a website as the main factor to enroll into a university. One of the famous website is CollegeBoard.com that used by prospective students to know the information for the higher education level in university. A university website should be maintained and refreshed regularly, so students and their parents who visit (and have a good deal of influence in their student's university choice) will build a positive perception of the campus.

2.3. Factor and Influence of College Selection Decision

There are some factors and influences taken by many prospective students that will affect to their decision to enroll into a university. The public and private institution will examine by prospective students on academic program as number one reason for selecting a university [10]. It's followed by the curriculum, academic support services, location and their friends' opinions of the institution.
In [10] explains that there is some level of agreement college selection that reliable for the purpose of study. There are three factors that indicated significant agreement levels such as international/study abroad is encouraged as part of the academic program, the availability of scholarship and grants, and the location of the college is near from home. The college or university should have a strong reputation for academic program and the availability information of tuition, financial aid and housing are manageable by university [11]. All the information that required by prospective student should be considered by university to avoid misunderstanding towards students enroll through university website that may not effective for prospective student to decide their final decision.

2.4. Student Timeline and Decision Factors

High school students in Croatia tend to start thinking more seriously about, where they will continue their education in the third or last grade of high school. They are usually not proactively searching for options, but they will choose on what they think they know and what they think they will be good at [12]. In additional, there is lack of support and advice from the high schools, so students are making their own decision without any related information from the high schools.
In [12] states that there are two types of how the students decide to enroll into a university. Firstly, the timeline of the process of choosing college such as early consideration, making the shortlist of colleges to apply for, role of parents, role of the high school teachers and administrative staff, role of friends, role of professional career and college counselors, gathering information about colleges, family, friends and other students, official college website, official state exam website, online forums, Facebook, google, visit to college, presentations of colleges in high schools and looking for related information on college fairs.
Secondly, there are decision factors that will effect on how students making their final decisions to enroll into a university of choice. The decision factors are field of study, which is the students will decide to choose the program that are interested in a particular field of study. After that, the employment option and future earnings, the location of the college, also the quality and the reputation of the college.

2.5. Usability Issues in University Website

Students have to make decision on what university to attend. The decision will have a significant impact on their career, earnings, and professional development [13]. The decision of the students is equally important for the university that depends upon students' tuition revenue to operate.
In [13] states that it emphasizes the need for universities to have attractive and clearly understood webpages with readily navigable information such as programs, course offerings, location, and relevant accreditations. This information should all be accessible on the first page of the website. This is critically important for the potential student as visiting the website before they visit the campus. It also because the webpage is the gateway to all other forms of communication and a primary medium through, which students choose their institution. The university website is extremely important for new student to attract their first impression because visiting the website first is found to be a precursor to visiting the campus.
Based on [13], there are reasons why the prospective student is not interested to visit university website such as lack of attractive design of the interface and not clearly understand webpages, lack of navigation information and different features for age level. It's affecting on how the website will be used towards student decision on which university they would attend.

2.6. The Impact of User Interface Component in University Website

The role of website is not only as a promotional tool and the information provider regarding the prospective student needs, but the designer should take consideration on how to make the prospective students feel comfortable and stay longer on the website. Infographic is combination elements of data visualization with design and have become an increasingly popular in this 21st century era. In [15] states that there are three ways on how infographics have significant impact towards user first impression such as people form a reliable first impression of the appeal of an infographic based on a mere exposure effect. Second, first impression is largely based on colorfulness and visual complexity. Third, age, gender and education level influence the preferred level of colorfulness and complexity.
The infographics and data visualizations are the most aesthetically appealing that have positive effects on engagement and memorability [14]. The result from [15] show that there are five categories of designing for the first impression such as consistency, variance in aesthetics impressions, infographics and effect of colorfulness, complexity, and demographics. They found that the colorfulness and complexity reach 34% of the variance in participant's choice. It is because colorfulness and complexity are computational metrics [16]. These metrics can be attributed to an action taken by designer including adding images, icons, changing the size/color of text, and manipulating white space and layout.

2.7. The Characteristic of User Interface Component

The interface component is the object used inside the interface to deliver information, facilitating navigation and as an element of interaction between the user and the computer. In [6] divide the user interface component into five categories namely navigation, mental models, appearance, metaphors and interaction.

2.7.1. Metaphors

Among the interface components that involves, the use of representations and symbols in computer applications. Metaphors are used to represent elements and help users understand complex technical operations by turning them into an easier context [17]. In the form of intermediate faces, metaphors and graphic icons are

always used [18]. Icons are expressions of visual metaphor that may be something concrete or abstract. A large number of texts in digital exposure may be subtracted by the use of appropriate icons and may convey the meaning of the text [19].

2.7.2. Navigation

Navigation involving the structure of menu arrays in the inter face. It is a movement through the mind model. Interface designer need to facilitate this movement through the use of menus, dialog boxes, control panels, corresponding palette icons and tools [20]. A bad user interface design has significant impact on user satisfaction. User are often frustrated or thwarted by the frequent usability problems on university websites [21]. The users who have problems during the search process of the required information will leave the site even if the site is crowded with information.

2.7.3. Mental Model

Mental model involves how users respond to component layouts in the interface and it becomes a concept picture that is in one's mind. All the mind models have similarities in terms of:

- Mental models contain what one thought that something was true, not necessarily it was right.
- Mental models have similarity in terms of the concepts represented by something.
- Mental models allow anyone to forecast the outcome of his actions.
- Mental models become easier than any represented matter or concept. Only information to allow accurate predictions is required.

There are several models that result from mental models, user model, task model, business model and cognitive model [22]. The user model as an example is a reflection of their understanding of a product. The task model also divides tasks into sections and explains how this part is related to each other. The business model describes configuration architecture for transaction components designed to exploit business opportunities [23].

2.7.4. Interactions

Interactions involve how the application provides feedback to user requests. Direct interaction involves dialogue with feedback and controls throughout the assignment [24]. Interactions indirectly involve group processing where some unrelated information or tasks will be processed and collected first in order to be given one-way [25].

2.7.5. Appearances

Appearance components that involve the use of images, icons, colors and beauty elements. According to [26], appearance is a visual information element, image and symbol consisting of logos, images, graphics, photography, video, animation and simulation. This includes colors, shapes and fonts. Colors give different meanings according to culture. For example, red is a symbol of excitement for China but as a warning of danger to the United States of America.

3. Methodology

In conducting the research, there are five main methods has been conducted to produce the interface guidelines for university website. The main five methods are:

1. Identify the most important information that the user needs from university website
2. Identify the category of user interface component
3. Identify the university website for content analysis
4. Compare the user interface component used for the information
5. Produce the guidelines

3.1. Data Collection Process

This study will be conducted in five main phases. First phase is information identification, second phase is identifying user interface category, third phase is identifying university website, and fourth phase is comparing university website interface and producing guidelines. Each of the main phases contains the processes to be conducted and the descriptions in each phase are as follow:

- Phase 1 is identifying information phase. Literature studies involve analytics for information on student preferences and their decision. The most information required by many prospective students are tuition fees, majors offered, scholarship, location and university ranking.
- Phase 2 is identifying user interface category. This phase also involves literature review from previous works to determine the category of user interface for university website. The suitable categories for university website are metaphor, navigation, mental model, interaction and appearance.
- Phase 3 is identifying university website. This phase involves five private universities in Malaysia. The universities chosen in the same rank position based on SETARA RANKING 2017. The universities chosen are APU, Taylor's university, INCEIF, UCSI and MSU.
- Phase 4 is comparing the selected of university website interface. This phase involves the user interface categories and the information that required by prospective student. This phase will determine the information regarding the usage of interface component.
- Phase 5 is producing the guidelines for university website. Overall, the research process can be illustrated in Figure 1.

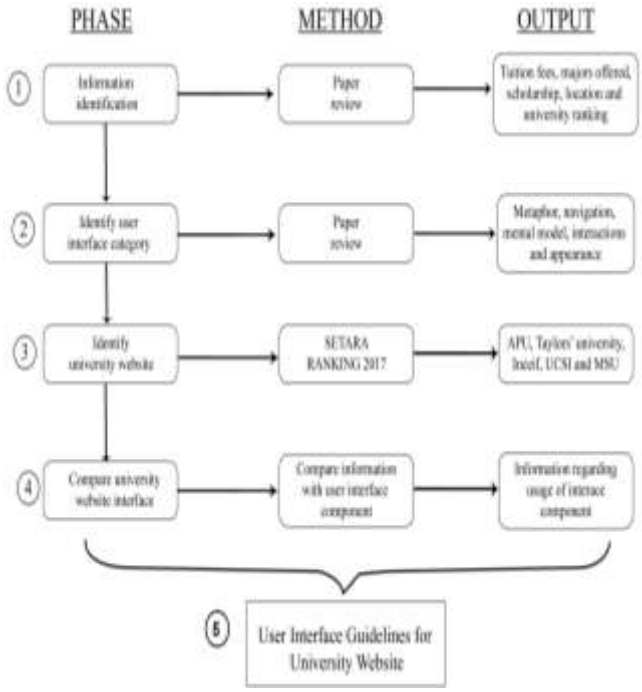

Fig. 1: Research phase

4. Results and Discussion

This section will discuss the results of university website interface comparison. The researcher will use five categories of information to determine, whether the university website presented information that prospective student needed. The categories are tuition

fees, scholarship, ranking/reputation, vicinity to home and majors offered.
From the information that student really need from the website, the researcher will examine the information that required by prospective student with user interface components such as the metaphor, navigation, mental model, interactions and appearance. The results for the comparison study are:

4.1. UCSI University

4.1.1. Tuition Fees

The information regarding the tuition fees on the website will be examined based on the navigation, appearance, mental model, metaphor and the interaction. The tuition fees on the navigation of UCSI's website located on the admission menu and it provides the list of tuition fees from 1st year until 4th year. For the appearance, it uses Arial and the colors are black and red. The designer also illustrated the mental model of the user on the bottom side of the website. The website does not use any kind of metaphor to illustrate the tuition fees. The website requires two times click to get information regarding to tuition fees.



Fig. 2: The screenshot for tuition fees at UCSI University

4.1.2. Majors Offered

The majors offered on the navigation of UCSI's website located on academic dropdown menu and its text-based and use text link with two menus. For the appearance, it uses Arial and the color is black. The designer also illustrated the mental model of the user on the top and middle side of the website. The website use pen as the metaphor to illustrate the majors offered. The website requires two times move to get information regarding to majors offered.

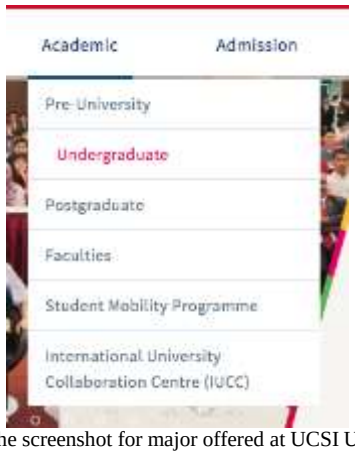

Fig. 3: The screenshot for major offered at UCSI University

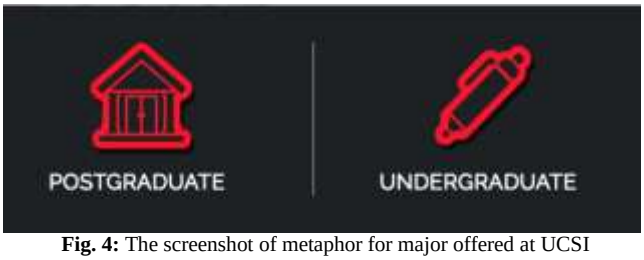

Fig. 4: The screenshot of metaphor for major offered at UCSI

4.1.3. Scholarship

The scholarship on the navigation of UCSI's website located on admission menu and its text-based with two menus. For the appearance, it uses Arial and the color is black. The designer also illustrated the mental model of the user on the top, middle and bottom side of the website. The designer use graduation hat as the metaphor to illustrate the scholarship. The website requires three times move on text based and two times click on the picture to get information regarding to scholarship.



Fig. 5: The screenshot for scholarship at UCSI University



Fig. 6: The screenshot of metaphor for scholarship at UCSI

4.1.4. Location

The location on the navigation of UCSI's website located on dropdown menu and its text-based with three menus. For the appearance, it uses Arial and the colors are black. The designer also illustrated the mental model of the user on the top side of the website. The designer does not use any kind of metaphor to illustrate the location. The website requires three times move to get information regarding to location.

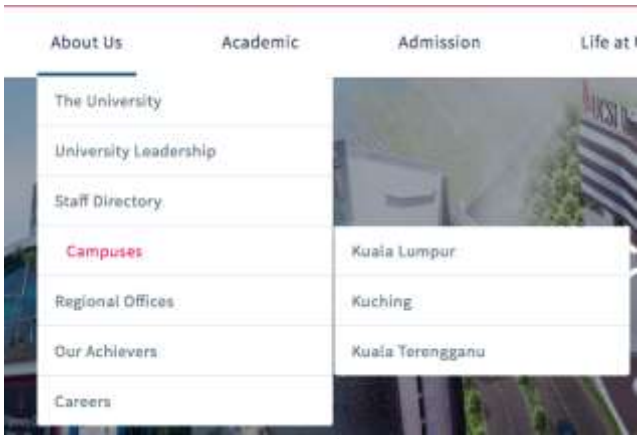

Fig. 7: The screenshot for location at UCSI

4.1.5. University Ranking

The university ranking on the navigation of UCSI's website shown as picture. For the appearance, the picture looks colorful. The designer also illustrated the mental model of the user on the top and bottom side of the website. The designer use picture as the metaphor to illustrate the university ranking. The website requires one time click to get information regarding to university ranking.



Fig. 8: The screenshot for university ranking at UCSI

4.2. Asia Pacific University

4.2.1. Tuition Fees

The information regarding the tuition fees on the website will be examined based on the navigation, appearance, mental model, metaphor and the interaction. The tuition fees on the navigation of APU's website located on our courses menu and it's provide the list of tuition fees from 1st year until 4th year. For the appearance, it uses Arial and the colors are black and pink. The designer also illustrated the mental model of the user on the bottom side of the website. The website does not use any kind of metaphor to illustrate the tuition fees. The website requires four times move to get information regarding to tuition fees.

Malaysian Students	International Students
Year 1: RM 26,700 + £190	Year 1: RM 26,700 (USD 6,940) + £190
Year 2: RM 27,800 + £190	Year 2: RM 28,200 (USD 7,330) + £190
Year 3: RM 28,700 + £190	Year 3: RM 28,900 (USD 7,510) + £190
Total: RM 83,200 + £570	**Total: RM 83,200 (USD 21,780) + £570**

Fig. 9: The screenshot for tuition fees at APU

4.2.2. Majors Offered

The majors offered on the navigation of APU's website located on dropdown menu and its text-based and use text link with three menus. For the appearance, it uses Arial and the color is black. The designer also illustrated the mental model of the user on the top and bottom side of the website. The website use computer and books as the metaphor to illustrate the majors offered. The website requires four times move to get information regarding to majors offered.



Fig. 10: The screenshot for tuition fees at APU



Fig. 11: The screenshot of metaphor for major offered at APU

4.2.3. Scholarship

There is no link at all and no information regarding the scholarship on the navigation of APU's website.

4.2.4. Location

The location on the navigation of APU's website use text without link. For the appearance, it uses Arial and the color is black. The designer also illustrated the mental model of the user on the bottom of the website. The designer does not use any kind of metaphor to illustrate the location. There is no requires interaction to know the location of the campus on the website.



Fig. 12: The screenshot for location of APU

4.2.5. University Ranking

The university ranking on the navigation of APU's website shown as picture and located in main menu. For the appearance, the picture looks colorful. The designer also illustrated the mental model of the user on the top and bottom side of the website. The designer use picture as the metaphor to illustrate the university ranking. The website requires two times click to get information regarding to university ranking.



Fig. 13: The screenshot for university ranking of APU

4.2. INCEIF University

4.2.1. Tuition Fees

The information regarding the tuition fees on the website will be examined based on the navigation, appearance, mental model, metaphor and the interaction. The tuition fees on the navigation of INCEIF's website located on the academic programmes menu and it's provide the list of tuition fees from 1st year until 4th year. For the appearance, it uses Arial and the color is black. The designer also illustrated the mental model of the user on the top, bottom and right side of the website. The website does not use any kind of metaphor to illustrate the tuition fees. The website requires three times click to get information regarding to tuition fees.

1) MIFP Fee Structure (Online) Malaysian Student:

	FEE (RM)
REGISTRATION (PER COURSE)	RM210
STUDENT SERVICES FEE (per regular semester i.e. Long Semesters)	RM525
EXAMINATION (PER COURSE)	RM550
TUTORIAL (Available only on campus in Kuala Lumpur)	RM500
INTENSIVE REVIEW COURSE (IRC)	RM800
PROCESSING FEE	RM70
PRACTICE PAPER (continuing fee of RM1,800 for an extension to the next semester)	RM1,900
REGISTRATION + EXAM + PROCESSING FEE	RM12,610
REGISTRATION + EXAM + TUTORIAL + PROCESSING FEE	RM19,610
REGISTRATION + EXAM + TUTORIAL + INTENSIVE REVIEW COURSE (IRC) + PROCESSING FEE	RM28,010

*INCEIF reserves the right to change the fees without prior notice

Fig. 14: The screenshot for tuition fees at INCEIF

4.2.2. Majors Offered

The majors offered on the navigation of INCEIF's website located on dropdown menu and its text-based and use text link with two menus. For the appearance, it uses Arial and the colors are black and white. The designer also illustrated the mental model of the user on the top and middle side of the website. The website does not have any kind of metaphor to illustrate the majors offered. The website requires two times click to get information regarding to majors offered.



Fig. 15: The screenshot for major offered at INCEIF

4.2.3. Scholarship

There is no link at all and no information regarding the scholarship on the navigation of INCEIF's website.

4.2.4. Location

The location on the navigation of INCEIF's website use text link. For the appearance, it uses Arial and the color is black. The designer also illustrated the mental model of the user on the top and bottom side of the website. The designer does not use any kind of metaphor to illustrate the location. The website requires two times click to get information regarding to location.

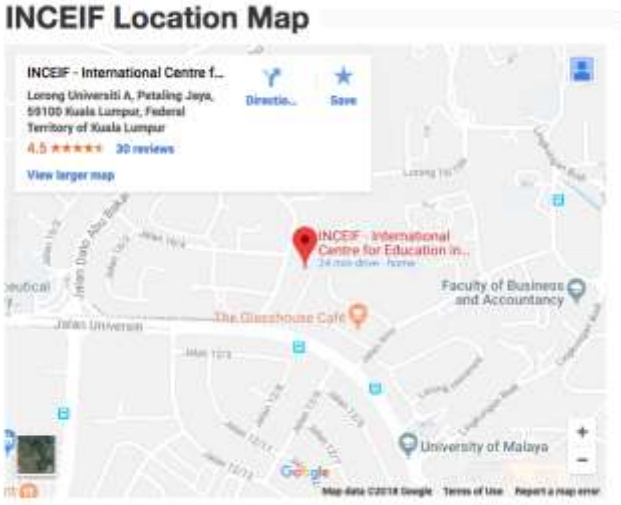

Fig. 16: The screenshot for location of INCEIF

4.2.5. University Ranking

There is no link at all and no information regarding the university ranking on the navigation of INCEIF's website.

4.3. Taylor's University

4.3.1. Tuition Fees

There is no link at all and no information regarding the tuition fees on the navigation of Taylor's website.

4.3.2. Majors Offered

The majors offered on the navigation of Taylor's website use text link. For the appearance, it uses Arial and the color is black. The designer also illustrated the mental model of the user on the top and bottom side of the website. The designer use graphics as metaphor to illustrate the majors offered. The website requires two times click to get information regarding to majors offered.



Fig. 17: The screenshot for major offered at Taylor's

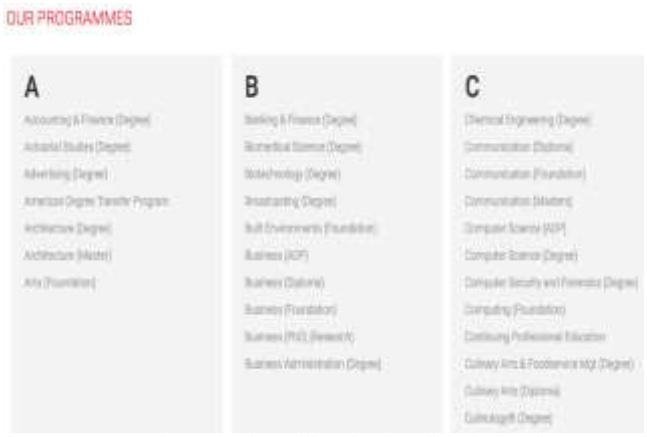

Fig. 18: The screenshot of list of major offered at Taylor's

4.3.3. Scholarship

The scholarship on the navigation of Taylor's website located on dropdown menu and its text-based with two menus. For the appearance, it uses Arial and the color is black. The designer also illustrated the mental model of the user on the top and bottom of the website. The website does not have any kind of metaphor to illustrate the majors offered. The website requires two times movement to get information regarding to scholarship.

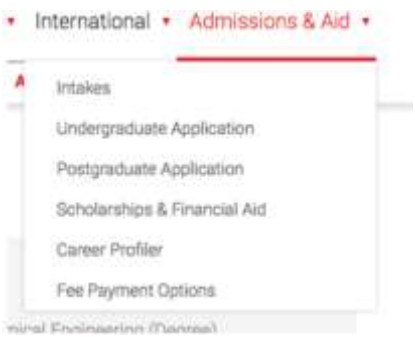

Fig. 19: The screenshot for scholarship information at Taylor's

4.3.4. Location

The location on the navigation of Taylor's website use text link. There is no appearance, mental model, metaphor. The website requires one time click to get information regarding to location.



Fig. 20: The screenshot for university ranking of Taylor's

4.4. Management and Science University

4.4.1. Tuition Fees

There is just link in course menu, but there is no information regarding the tuition fees on the navigation of MSU's website. There is no appearance and metaphor. The mental model for the tuition fees on the first page of the website is on top. The website requires filling in the registration form to know the tuition fees.

4.4.2. Majors Offered

The majors offered on the navigation of MSU's website use graphic link and text link. For the appearance, it uses Arial, capital letter and the color is white. The designer also illustrated the mental model of the user on the middle side of the website. The designer uses a search tool icon as metaphor to illustrate the majors offered. The website requires one time click to get information regarding to majors offered.



Fig. 21: The screenshot for major offered at MSU



Fig. 22: The screenshot for major offered at MSU

4.4.3. Scholarship

There is no link at all and no information regarding the scholarship on the navigation of MSU's website.

4.4.4. Location

The location on the navigation of MSU's website use text based and text with link. There is no appearance, mental model, metaphor. The website requires one time click to get information regarding to location.



Fig. 23: The screenshot for location of MSU



Fig. 24: The screenshot for location of MSU

4.4.5. University Ranking

The university ranking on the navigation of MSU's website shown as pictures. For the appearance, the infographic looks colorful. The designer also illustrated the mental model of the user on the bottom side of the website. The designer use pictures as the metaphor to illustrate the university ranking and there is no interaction component on the pictures.



Fig. 25: The screenshot for university ranking of MSU

4.5. User Interface Guidelines for University Website

This section is a guideline for designer and developer when designing a website. The guidelines produced based on comprehensive literature review that is done for Management and Science University, APU, INCEIF, UCSI and Taylor's University.

Table 1: User interface guideline

Information	Interface Design Component
Tuition Fees	1. Navigation - Dropdown menu - Text link - Course and program 2. Appearance - Arial black 3. Metaphor - Nil 4. Mental model - Bottom 5. Interaction - Two times click
Majors Offered	1. Navigation - Text link - Two menus 2. Appearance - Arial black 3. Metaphor - Graphic 4. Mental model - Top and middle 5. Interaction - Two times click
Scholarship	1. Navigation - Dropdown menu - Admission 2. Appearance - Arial black 3. Metaphor - Graphic 4. Mental model - Top and bottom 5. Interaction - Two times click
Location	1. Navigation - Dropdown menu - Text link 2. Appearance - Arial black 3. Metaphor - Graphic 4. Mental model - Top and bottom 5. Interaction - One time click
University Ranking	1. Navigation - Dropdown menu - Picture 2. Appearance - Colorful 3. Metaphor - Graphic 4. Mental model - Top and bottom 5. Interaction - One time click

5. Conclusion

Interface becomes very important in building a university website. The user interface on the university website has a significant influence on student decisions to apply for university. The factors that influence student's decision process are tuition fees, scholarship, ratings/reputation, location and the majors offered. In addition, the user interface component also plays a major role to support in representing this information on the website. The most important components of the user interface are metaphors, navigation, mental models, interaction and appearance.

To produce a good user interface, the designer should start in the design process from the beginning. The design of the right user interface can make a significant difference in many aspects including performance speed, error rate, user satisfaction, and user knowledge retention over time. Also, poor user interface design has a significant impact on user satisfaction. Users are often frustrated by frequent usability issues on university websites. To solve the problem of its imbalance between the website designer and the prospective student, a guideline is needed to help the designer in designing the interface of website.

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