

Determinants for the Adoption of an Online Program Recommender System for High School Learners

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Abstract: Making a career choice is a defining phase in every learner's life because it plays a major role in defining their future. Therefore, they should make the best choice at the very beginning when selecting their study program. Learners have to consider several factors before arriving at a decision. Thus, the purpose of this research was to identify the factors that determine the adoption of an online program recommender system. This study employed a quantitative method, using open and close-ended questionnaires. A non-probability sampling was used select and distribute the questionnaires to the grade 11 and 12 learners. The results of the survey indicated that the education factor plays a big role in their choice of selection; however, the learners also make their decisions based on their interest and performance and most of all, job security.

Keywords: Factors, learners, decision, selection, program, study

1. Introduction

Tertiary institutions are commonly associated with higher levels of study, whereby they offer academic programs covering a range of courses, with the promise of obtaining a degree, diploma, or certificate at the end of the academic program. According to [1], selecting programs cannot be left solely at the choice of decision-makers in a university, students may have their interests, and may opt to choose their programs over others. Choosing the right program is not always an easy task, hence some universities use a recommender system as it is known to be beneficial in the education sector since the students will have difficulty in selecting their courses [2].

Consequently, career choice decision making is not an easy task, yet at one time or the other, individuals are faced with the task of making choices in career, preparing for it, starting it and making progress in it. This stage of making choices is undoubtedly the most critical stage. This is because making a wrong career decision can make one's happiness in life as this could result to career maladjustment. Inappropriate career decision made may spell doom not only for the individual but also the entire society [3]. Thus, one wrong decision can change the fate of an individual.

It is difficult for everyone to make a decision regarding their career. This individual action is manifested on a larger scale in the economic prosperity of a nation. Individuals who are misfits in their workplace tend to be less productive and efficient, and therefore are unable to achieve their goals. [3] In view of the foregoing, the need to equip learners with appropriate career decision skills becomes highly imperative through general orientation, seminars into the world of work through the curriculum. [4] Similarly indicated that educational needs vary from student to student based on their career goals and skills gap. Since there is no other reliable source generally available that can guide the student towards the most suitable direction, the recommender system has been

evolved to provide guidance in selecting the right course [5].

Above all, the researchers have observed that most of the learners are lacking confidence in their abilities and are unsure of their decisions in selecting programs in university, having a variety of factors that affects their choices. This prompted the researchers to conduct this study to investigate the factors that can determine the development of an online program recommender system.

2. Problem Statement

Finding information regarding higher education from a large number of websites is a challenge and a time-consuming process [6]. In the rural part of Namibia, learners are unable to get relevant information and advice on which field of studies to choose from and which make them to usually select blindly [4].

Furthermore, helping learners make the correct choices from numerous available programs to meet their individual needs is also a real challenge [6]. In Namibia, there are limited studies on recommender systems; other studies that touched on recommender systems concentrated on areas such as citation recommender systems (Lee, 2015) and multimedia recommender systems (Deldjoo, Schedl, Hidasi & Knees et al., 2018). This study departs from others to investigate the factors necessary for the adoption of an online program recommender system.

3. Objectives

The main objective of this study is to investigate the factors necessary for the adoption of an online program recommender system.

4. Literature Review

According to [7], decision-making plays a significant role in students' academic life. The decision the student takes about which program to major in, in his/her university studies, may determine their future. However, there are several factors, both individual and academic factors that may lead students to choose the programs they want to enrol in when joining institutions of higher education. [6] Further discussed that the recommender systems use both the course histories and experience of past students as the basis for assisting students in course decision-making. At the same time, it was noticed that the future career of students is an essential factor that can influence their decision to choose a particular course. A social navigation approach was employed to analyse the students' assessment of their career goals to provide recommendations for courses. The primary idea of this approach was to obtain the students' explicit feedback implicitly, as part of their natural interaction with the system. The factors are, future career goal, most students choose their study programs because it is the field they desire to work in; simplicity, some students may choose a program just because it is not difficult and so they can quickly get good grades without stress; personal interest, others choose programs related to topics which they want to learn; social status: some students prefer to select programs that their friends have chosen, for the purposes of doing assignments together and sharing ideas [7].

Although some learners may be successful in choosing their careers without guidance, it is also possible that others may end up making wrong choices because of following some of the mentioned factors. Due to a change in demand for skills in the job market and increased development in the social economy, it is very essential for graduates to begin their job search with enough skills and potential. However, to attain these excellent skills, is not a one-day simple task; it is a long process achieved from the student's study life. It is, therefore, essential which program the learners choose [7].

A 2015 research project by the Polytechnic University of Turin, proposed a recommender system that suggested courses that would improve a learner's chances of entering the workforce. This recommender system first identified the competency gaps between a learner's profile and a job listing posted by a company, and then proposed recommended courses to correct the deficiencies [4]. Whereas [8] of the University of Illinois Springfield proposed a recommender system that considered the sequence of courses students had previously taken when recommending courses for the upcoming semester. In an offline setting, course order tends to play a major role in discussions around course planning. For example, a faculty advisor might suggest taking a course in "data structures" before taking a course in "algorithms" or encourage students to take "algorithms" and "operating systems" in separate semesters because both courses are

time-intensive. [8] Aimed to capture these traditional course sequences in their recommender system.

Other studies by [9], proposed a recommender system that uses information retrieval techniques to select courses based on students' interests. Their system uses keywords to search the space of possible courses and tries to improve the quality of the query by finding synonyms and generating N-grams so that the search returns a higher number of courses. In this manner, the recommender system allows the interest of the students to be matched to the contents of the course.

[10] Took a different approach to finding preparatory courses by using recurrent neural networks to develop a goal-based course recommender. A student specifies a course that they wish to take, along with the grade that they desire to achieve, and the system uses their transcript to find personalized preparatory courses. Although this approach finds preparatory courses in a data-driven way, it does so at the expense of transparency, which makes a student's reflective decision-making process more difficult and provides no direct insight for academic advising.

5. Methodology

The quantitative research method was used in this study to gain understanding from the participants. The target population for the study was the grade 11 and 12 learners from Centaurus high school, Windhoek Namibia. The researcher used the simple random sampling technique to select learners that participated in the data collection. This is to give them an equal chance of being selected.

The study collected primary data by means of open and close-ended questionnaires which were distributed to the grade 11 and 12 learners. Survey questionnaires were developed in accordance with the research objectives.

Quantitative data was analysed and presented through frequency tables and charts using descriptive statistics to analyse numeric. All returned questionnaires were scrutinized to ensure that they were correctly completed. The data was further transformed into format acquiescence for analysis.

6. Data Analysis and Findings

The results provide the general data from the respondents.

6.1 Demographic information

A self-administered questionnaire survey recorded 37 responses out of 50, giving a 74% response rate. The response recorded that at least 21 female and 16 male learners from grades 11 and 12 participated in the research survey. Therefore, we believe that the response rate for this study was satisfactory. The demographic details are outlined in table below.

Table 1: Age, Grade, and Computer Literacy

Category	Percentage
Age	
16	5.4%
17	40.5%
18	48.6%
19	51.3%
Grade	
11	43.2%
12	56.7%
Computer Literacy	
Excellent	2.7%
Good	32.4%
Fair	43.2%
Poor	21.6%

Table 1 shows that majority of the learners are between the age of 16 – 19 years old and they are at the age where they prepare for the transition from secondary school to a tertiary institution. Nearly 56.7% of the participants are grade 12 learners, this is because most of them have reached a stage of commitment and decision making, compared to grade 11. A huge percentage of the learners indicated their ability to use the computer, which enhances their abilities to search for different study programs.

The table shows that the learners are between the age of 16 – 19 years old, and they are at the age where they prepare for the transition from secondary school to a tertiary institution. Nearly 60% of the participants are grade 12 learners, this is because most of them have reached a stage of commitment and decision making, compared to grade 11. Almost half of the population of the learners indicated their ability to use the computer, which enhances their abilities to search for different study programs.

6.2 Selection of study program

At total of 41% of the learners indicated that they would select the study programs of their choice which they wish to apply for, whereas 50% of the learners did not select study programs; 8% of the respondents indicated that they were not sure of the study programs to selected.

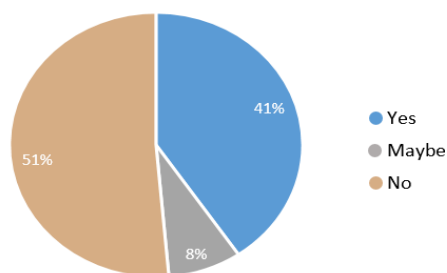


Figure 1: Selection of study program

6.3 Platforms used to search for study programs

A majority of the respondents which make up 78.4%, indicated that they make use of the tertiary institution's website and the internet, as illustrated in figure 2. The use of other platforms, such as newspapers, career fairs, word of mouth, and other options showed a low rate of less than 20%.

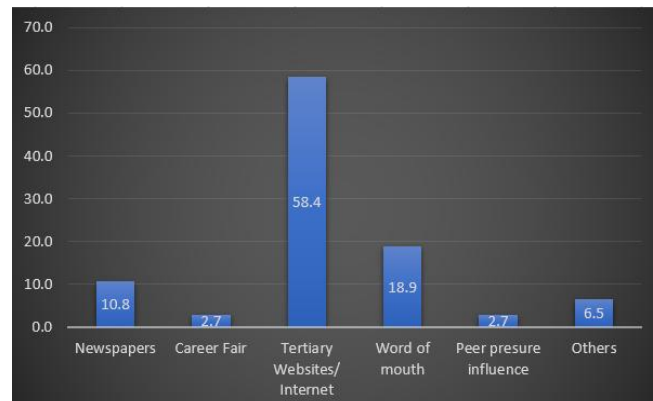


Figure 2: Platforms used to search for study programs

Most of the respondents noted that there are concerns when the various platforms are used. Below are the concerns indicated by the respondents:

Helpful responses:

- Was able to do more research on the tertiary institutions, see the global ratings, acceptance rate, and tuition fee
- Got the necessary information about various study options

Unhelpful responses:

- Not all the required information was available
- Not able to compare tertiary institutions in terms of performance
- Not getting corresponding, clear, and specific information
- Not able to search based on the field of study
- No feedback from tertiary institutions when enquiring about the available study programs
- Too much information
- Website information is accessible anywhere, with internet access

6.4 Factors influencing study program selection

Respondents were asked to indicate the factors would influence their choice of selection for study programs. The respondents were asked to select from the various options (illustrated in the graph), that are commonly known as major factors:

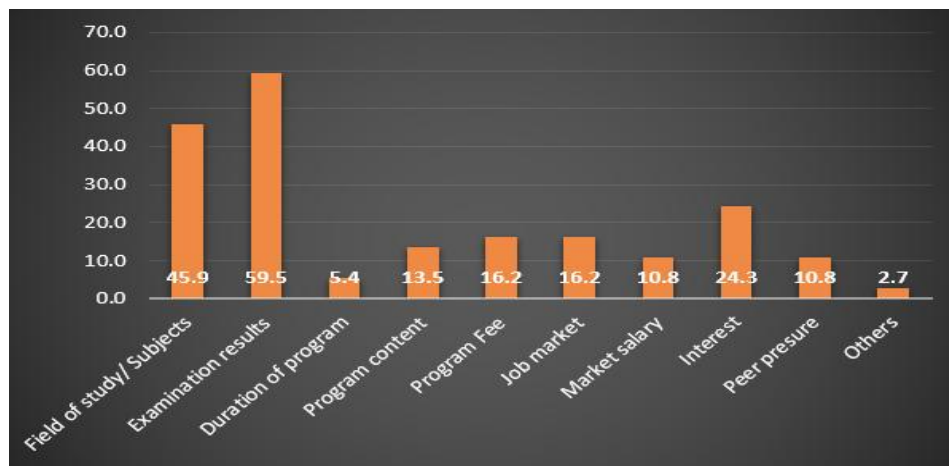


Figure 3: Factors influencing study program selection

The influencing factors are grouped based on the following categories: education factors, information factors, economic factors, and geographic factors. The examination results which fall under the education factor came out as the highest factor that influences most of the learner’s choice of selection (59.5%). The subjects/ field of study came out as the second highest factor that would influence their choice of selection (45.9). Other factors show that they have less influence.

6.5 Awareness of recommender systems

A total of 70% of learners are not familiar with recommender systems, even though about 30% indicated that they are familiar with the recommender systems, the study shows that they are not fully aware of what recommender systems are and they have indicated the need for a program recommender system. Only about 70% of learners have actively responded to this question, the rest of the respondents show that they do not understand what a recommender system is.

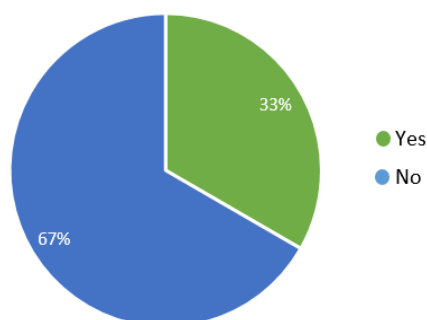


Figure 20: Awareness of recommender system

The follow-up question aimed to find out whether the learners that are not familiar with the recommender system would like to make use of the recommender system in the near future. The majority of the respondents indicated that yes, they would like to make use of an online program recommender system, and these are the reasons they provided:

- Broaden their search, and have various study options
- Uncertainty in decision-making when choosing study programs

- The ability to direct and specify the suitable study programs
- A need to have a platform that provides the necessary and required information, as some respondents from poor backgrounds are limited
- Know the various careers available for the study programs
- The concern of changing study programs due to under-performing
- Figure out suitable study programs, that fit their interests and personality’s
- Guidance when unable to decide which study programs to pursue
- Awareness of institutions that offer certain study programs, considering the results and field of study
- Assist learners that are not familiar with study programs
- A broader choice of study programs based on the field of studies

7. Findings and Conclusions

The key findings from this study reveal that some learners may not be able to select their study programs because they may not find suitable programs while some indicated that they have difficulties in finding the right program because the platforms available could not give them the exact information that will give them suitable options. The findings of the study also found that learners will likely choose a specific program of study because of perceived job opportunities, their interests, and the likely future developments.

The study further found several factors that influence the learner’s choice of selection and grouped them accordingly: education, economic, information, and geographical factors. Most of the learner’s decision may be driven by the education factor (their performance is subjects) which plays a big role in their choice of selection; other factors also partially play a role. Learners make their choice based on their performance and interest and most of all, job security. Based on the findings, it can be concluded that all of these factors affect the learner’s decision in choosing a program of study. Therefore, if a program recommender system is put in place. Learners will find it very easy to make their choices.

8. Recommendations

Given the limitations of the study, there is a need to establish a wide scale on further research on the factors that influences learner's choice of selection for study programs. The study recommends that tertiary institutions should organise career expos, provide career guidance and counselling for both learners in rural and urban areas, which will expose learners to the different careers and areas of specialization in each career. Furthermore, an online programme recommender system should be developed in order to assist learners in makes choices for university admission.

9. Conclusion

The conclusion drawn from the study was that the education factor was the most influential factor in the decision-making process. The grade 11 and 12 learners also encountered different factors that can influence their choice of selection which includes their interests, market salary, job market, study program content amongst others. These factors play a role in the learner's selection process; hence tertiary institutions should pay attention to these factors as they are essential.

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