Applicability of Educational Data Mining in Afghanistan: Opportunities and Challenges

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ABSTRACT

The author's own experience as a student and later as an active lecturer in Afghanistan has shown that the methods used in the Afghan educational systems do not provide students with the minimum guidance needed to select the proper course of study before they enter the national university entrance exam (Kankor). The result is often high attrition rates and poor performance in higher education.

Based on the studies done in other countries, and by the author of this paper through online questionnaires distributed to university students and graduates in Herat, Afghanistan – it was found that proper procedures and specialized studies in high schools can help students in selecting their field of study more systematically. Additionally, there are large amounts of data available for mining purposes but the methods that the Ministry of Education and Ministry of Higher Education use to store and produce their data only enable them to achieve simple facts and figures. Furthermore, from the results it can be concluded that there are potential opportunities for educational data mining application in the domain of Afghanistan's education systems. For instance, predict proper field of study for high school graduates, or, identify first year university students who are at high risk of attrition.

Keywords

Educational data mining; major prediction; student placement; Kankor; Afghanistan education systems; value of information.

1. INTRODUCTION

General education in Afghanistan comprises K-12 (primary, secondary and high school), Islamic studies, Teacher Training, Technical and Vocational schools and institutes which are administered by the Ministry of Education (MoE). The Ministry of Higher Education (MoHE) supervises universities which provide Bachelor's, Master's, and PhD degree programs.

Since the establishment of the new democracy in Afghanistan in 2001, education systems have been going through a nationwide rebuilding process. Despite obstacles, numerous public and private educational institutions were established across the country [2]. The result is a substantial increase in the student enrollment rate, as reflected (see Figure 1).

Every year more than 200,000 students graduate from high schools and around 300,000 participate in Kankor across the country [3].

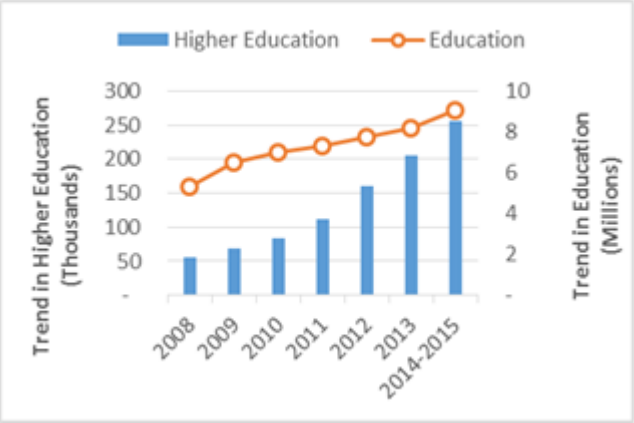

Figure 1. Education and Higher Education enrollment trends.

The MoE and MoHE as the main bodies of education systems in Afghanistan have been trying to standardize the quality of education in order to be able to meet the minimum international standards. In this extremely challenging process, one of the efforts of the MoE and MoHE has been to automate their information through Education Management Information System (EMIS) and Higher Education Management Information System (HEMIS) [6].

The EMIS and HEMIS are able to generate (only) basic statistics (e.g., total number of students and teachers based on gender, geographic location, schools and universities) which are not very helpful in decision making to improve the education systems effectively. For example, '10 million students in schools' is just a number and piece of data without a specific context and further useful information to describe the setting. Hence, these simple facts and figures do not help policy makers to improve the educational settings. For example, one cannot predict proper majors/fields of study (Major) for high school graduates, or, identify first year university students who are at high risk of attrition. This paper will be a new initiative in its kind. The objective is to study the opportunities and challenges of EDM applicability in the Afghanistan education context in order to help educational institutions to better prepare students for their studies in schools and universities.

2. MAJOR RECOMMENDATION

Presently in Afghanistan, school students are not divided into Majors. The author conducted one online survey to public and private university students and graduates, and another survey to computer science students and graduates. A total of 333 people participated in these surveys; 315 agreed that it is more useful if the students are offered specialized studies after grade 9 at school.

Additionally, due to general studies and insufficient orientation on Kankor at schools, the majority of students do not know what Major to choose in the Kankor. This was confirmed by the same online surveys. Besides, in the existing situation, it is found that there are no structural and specialized institutions to provide and guide students on career choices based on their skills and interests. This situation creates a vicious cycle for misappropriating human-capital as the most vital resource for development.

The outcome of these studies [4, 7] can be customized and used to recommend proper Majors to high school graduates prior attending the Kankor, and also while specialized studies are introduced at schools. The following approaches can be used. 1-Assess student performance for 10th, 11th and 12th grades to identify the strengths and weaknesses of the applicants in all the relevant Majors. 2-Since the results of high school grades could be misleading, this research proposes the design of a new standardized test in order to evaluate the interest and capabilities of the applicants through varied 'Yes' and 'No' intelligent questions. 3-Since there are no pre-collegiate courses prior to entering University, it is deemed efficient to evaluate the skills of applicants in the 12th grade through a number of Kankor practice tests. 4-Other simulator (self-assessment) tools as an all-encompassing medium to self-evaluate, capitalize on improving and minimize the identified gaps of candidates and to evaluate the interest and capabilities of the applicants. 5-Of course, social, economic, and literacy status of student's family and other pedagogical factors could be significant for better evaluation and assessment. 6-Divide more than 100 Majors into main major areas including Natural and Social Sciences, Health Sciences, Humanities and Literature, Islamic Education, Fine Arts and Technical Education. 7-Last but not least, consideration of previous Kankor results data during data mining process would lead to better accuracy rate.

3. SUPPORT AT RISK STUDENTS

Most of the students are at risk of dropping out or performing poorly during their higher education studies. One of the main reasons is that the participants randomly select Majors in the Kankor without much knowledge of the requirements and challenges ahead of them and the inventory of their existing knowledge in the relevant field of study. Also, lack of specialized studies at schools is another major reason for attrition and poor performance in higher education. According to the above mentioned online survey conducted by the author among Computer Science students in Herat province out of 227 respondents around 90% did not have the skills and knowledge of basic programming, database, and operating systems, as echoed in (see Figure 2). The result of the survey is showing that one of the major reasons for weak academic performance in higher education is lack of specialized studies in school.

An early counseling intervention solution would be a great support to identify the key factors to improve their academic performance and to decrease rates of attrition through academic counseling, tutorial classes and other supportive programs [1, 5]. This could be achieved with evaluation and comparison of fresh student's data with historical data of senior students. For example, school performance and grades for main prerequisite subjects relevant to their selected Major (i.e. the required score value for Journalism in mathematics might be 2 out of 5, while in Engineering it might be, 5 out of 5), if they attended supportive courses and classes besides school studies, family responsibilities, and other social and extracurricular activities.

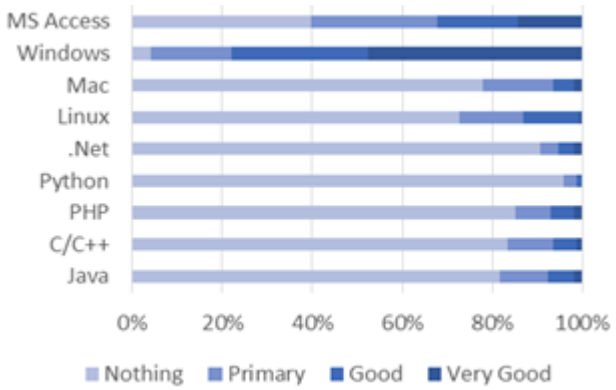

Figure 2. IT skill of computer science students prior Kankor.

4. CONCLUSION

Enrolment trends in Education and Higher Education generates vast amounts of data. With learning and tutoring management systems, the amount of data will be significantly increased either implicitly or explicitly. The main challenge preventing the applicability of EDM is lack of proper data storage and accessibility to data in electronic format. EMIS at MoE and HEMIS at MoHE together could be appointed to provide the raw data for EDM applications to help discern patterns of abilities and behaviors which could be used to help educational institutions.

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