

Tracing Students Performance by Intervention of the Academic Advisor

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Abstract

Data mining technique was used to track student's performance during years studying in college and determine the impact of GPA_SEC on the GPA student rates according to the current academic advising method used on student's status. The study utilized a sample of 5436 individuals were drawn from two colleges in Majmaah University, KSA during 2013-2018 period. The results showed that the student's completion status in terms of graduation, dropout, Stumbling or dismissed was classified according to the average grades of admission from secondary school GPA_SEC. The results show the effect of the current academic advising that most of students gain less grades comparing with GPA_SEC in addition that the higher GPA_SEC was the higher graduation, dropout and dismissed decreased when GPA_SEC was high. Therefore, the study recommends tracking students academically to evaluate their results of each semester to find out the causes of the deficiencies and addressing them within the departments.

Keywords: - Educational data mining, Academic Advising, Dropout, Stumbling, Performance.

I. Introduction

In Recently years several Universities and Institutes in higher education have been concerned about the quality education and use diverse methods to analyse and improve the understanding of students success and academic achievement[1]. The growth of academic data in higher education systems increases speedily [2]. Higher education institutions in the world store a large amount of student data from entering until graduation or leaving such as grades, stumbling, absences, dropouts or graduation. Academic failure, dropout and failure in higher education institutions is an international problem that has to be considered in many ways to contribute to its solution. This study was applied for Majmaah University in KSA, during 2013-2018 period for contribution to some treatment methods that reduce failure, decrease stumbling and dropout. This study dealt with the GPA from the secondary level to find out its effect on the student's progress considering the academic guidance system currently being

implemented in the university during the period in which he/she should be expected to graduate and linking this to the specialization of his choice.

The main objective of this study is to use academic data mining to follow the academic level of students to clarify the role of academic advisor during the period of university study and its contribution to improving the level of performance. In addition to seek for developing an academic advisor, model that starts early to increase success rates and reduce stumbling and dropouts. The model based on the results presented by results according to the current academic advisor system. The current academic advisor system used in the university, did not review the students' academic backgrounds and their GDP_SEC of enrollment from secondary level to university, and focused on advising students for deleting and adding courses in addition to problems facing them during the semester. In this study, we seek to find out the reasons for the low rates of students and how to advise them through each semester during their undergraduate studies.

The methodological framework of the current study involved three stages: First stage is Research Questions. The second is population and sample. Finally data collection.

A. Educational Data mining:

The domain of educational data mining has become very important tool used at all educational levels, especially in higher education [3]. Educational data mining is a method of developing unique ways to explore data types related to learning settings, using these methods to better understand students' problems [4] which provides many tasks that can be used to track the performance of academic students [5].

B. Academic advisor:

Academic advising at Majmaah University is based on the collaborative relationship between the academic advisor and the student. The field of academic guidance and other issues that the student needs to be appointed in his academic career, but the interaction

between the student and the academic advisor is limited in the process of deletion, addition, and selection of courses when the student cannot add them manually. The student needs an academic advisor in both sides of faculty advisor, and department advisor when he / she admitted to college to help him / her by providing information about rules, regulations and requirements governing specific degree programs; offering guidance on choosing majors and minors, registering for courses, planning your credit load, and upcoming deadlines; helping him manage his academic situation during periods of personal, financial, or medical difficulty; and serving as his direct link to other University resources. Guiding his course selections to make sure he meets the requirements of his major or minor; evaluating him requests for course equivalencies, recommending prior approval for inter-university transfer credits, or explaining the rationale for the design of academic programs; offering support and referrals in cases of academic or personal difficulty.

C. Drop out

Student who dropped out are defined as those students who did not complete at least one undergraduate degree within 6 calendar years of first enrollment [6], [7]. A model was constructed for students who completed eight semesters based on the secondary entry rate and the current two-year system of academic guidance in colleges. The strengths and weaknesses were identified, and this model could be adjusted to give results that are more positive by adding additional tasks or changing the guidance system to be an effective player in raising the student's efficiency.

D. Semester Grade Point Average (SGPA):

Sum total of the points a student achieves divided by the total credit hours for all the courses studied in every semester. Points are computed by multiplying the credit hours of a course by the grades a student achieves for each course.

E. Dismissal from the University:

The student shall be dismissed from the study in one of the following cases:

If he has got three consecutive probations, because of his decreasing SGPA to less than the fixed rate for graduation or he does not complete the requirements of graduation maximally within half the period for his graduation

2. Literature reviews

In this section, we discussed some of previous research that related to this problem. Some studies have shown that there are many factors affecting the student when transmitted from secondary level to university, including social factors, as well as the factors of transition from

stage to stage and the lack of essential preparation needed to cope with the demands for university study [8].

Ahmad, et al (2015) several tools were used to get the knowledge about student from a large data such as WEKA tool to predict students' academic performance, which proposes a framework of first year bachelor students taking into consecration previous academic records, family background information. Getting student information from large data helps to discover landmarks that contribute to students' success. Prospecting techniques have been applied to student data .An analytical study comparing three classification techniques; DT, NB and RB using the WEKA tool .The empirical results showed that the regional office had the best rating in comparison to the NB and DT resources .This model helped lecturers take early action towards low-income students to improve their results.

Aulck, et al (2016) reported that logistic regression was used as data mining tool for predicting student dropout. GPA in mathematics, English, chemistry, and psychology were among the strongest predictors for students' retention. In addition, baccalaureate transfers tends to lower graduation rates than their peers. The root mean squared error (RMSE) value of 5.03 quarters obtained when using data on all non-completions. When excluding the minimum 5% and 10% of least accurate predictions, RMSE was 4.14 and 3.74 quarters, respectively. On average, no completions enrolled in 7.35 (SD: 5.65) quarters before stopping their studies. The study concluded that university administrators are keen to know which factors lead to drop out.

Simpson (2018) explained the importance of academic advising is not limited to students who stumbled but can include outstanding students. Providing services to outstanding students online, shares a significant contribution to positive student experience with the university and supports student success in general. Through the development of the academic guidance system, the Department of Online Studies at the University of California pointed to the success of the online academic counseling experience for students and pointed out four main components to guide the comprehensive student service model: centralized communication with individual and relevant directories; the responsibility of the guide in problem solving and complaints ; Providing personal guidance to students; the responsibility of the guide in tracking issues to end them on time, which increases the probability of students' success at the university .It makes it easier to contact the academic advisor at any time, as well as to enable the student to put his issues without shame or fear.

Shahiri and Husain (2015) mentioned that amount of data in educational databases makes student performance more difficult. In Malaysia, there is no student performance monitoring system for basic two reasons: First, current prediction methods are insufficient to determine the most appropriate way to predict student performance in Malaysian universities. Second, there are no investigations into the factors that affect the achievements of students in certain courses within the Malaysian context. Therefore, a methodology was proposed on predicting student performance using data mining techniques to improve student achievement. The aim of the study was to provide an overview of data extraction techniques used to predict student performance. The study focused on how to use the prediction algorithm to identify the most important features in student data.

3. Methodology

In this study, the student's academic activity is monitored from his registration at the university until his graduation, in order to determine the stage in which the student needs the intervention of the academic advisor to provide the appropriate academic guidance for his situation. Therefore, the students were divided into three categories A, B, C according to their high school GPA in order to increase student performance, reduce dropout and reduce academic failure.

a. Research Questions:

The research question proposed in this study are:

Q1: What is the impact of GPA_SEC rate for secondary entry on the GPA student rates according to the current academic advising method of Majmaah University?

Q2: What is the effect of secondary GPA_SEC rate on student status in terms of graduation, academic dropout or stumbling?

b. Population and Sample:

Majmaah University student data was used, a sample of 5436 students was chosen from whom enrolled in 2013-2018 from two selected colleges was chosen for this study, which represents 18% of the total population. Table 1 show the distribution of the sample according to the college, specialization, gender, and GPA level.

Table1: Distribution of the sample according to college, specialist, gender and the level of GPA SEC

Dept.	Sex	Ghat College			Hawtah College		
		A	B	C	A	B	C
IT	male	36	84	18			
	female	11	23	10	105	73	40
ENG	male	72	131	19	122	239	61
	female	33	38	19	175	137	46
MGT	male	123	224	31	192	426	74
	female	110	238	71	261	283	62
Law	male	193	252	48			
	female						
ISLMIC	male				112	373	75
	female				73	245	189
MATH	male				89	116	32
	female				5	5	1
CHM	male						
	female				7	17	12
Total	male	424	691	116	515	1154	247
	female	154	299	100	626	760	350

c. Data Collection:

To understand the data trends, we follow educational data mining technique in classification objectives of data into two categories- educational objectives and administrative objectives[13], where educational objectives contribute to teaching and learning which contain students learning , risk and behavior, predicting right enrollment decision and cognitive learning . The administrative objectives involve the direct participation of higher authorities and senior management. Analysis of huge data help in future planning and decision making. For this study data gathered from, different reports taken from registry system of Majmaah University, these reports some in pdf format and other in excel format. The data was processed first by converting it to Excel and then it was merged into one database using MySQL, and then analyzed by SPSS.

4. Results and Discussions

Table 2 show the tracking of 776 students enrolled with GPA "A" through eight semesters, we note that 26.3% of them achieved grade A in all semesters, while only 10.8% of them failed, and the results showed that 52.8% had a B or C.

Table2: The progress of “A” students during eight semesters

No.	F	D	C	B	A
1	14.1%	9.7%	22.5%	26.4%	25.6%
2	14.6%	13.0%	25.0%	24.0%	23.4%
3	15.1%	8.3%	23.8%	27.8%	24.9%
4	10.9%	10.0%	24.5%	28.6%	25.9%
5	9.0%	9.9%	24.1%	28.3%	26.9%
6	9.3%	9.0%	24.4%	31.0%	26.2%
7	6.8%	10.1%	23.4%	32.5%	27.2%
8	6.4%	7.2%	21.6%	34.3%	30.5%
Mean	10.8%	10.0%	23.7%	29.1%	26.3%
SD	0.03	0.02	0.01	0.03	0.02

Fig. 1 show that students who enrolled with GPA “A” “had the highest A or B achievement during their eight semesters.

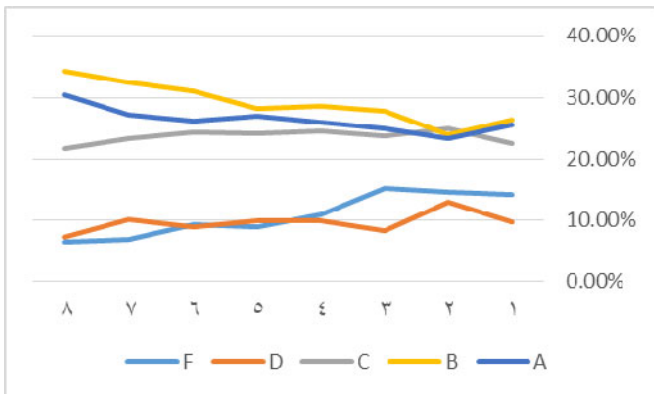


Fig. 1: The progress of A students during their eight semesters

Fig. 2 show the progress during eight semesters of 1411 students who receive B grades at secondary level. Only 18.9% of B students complete their study with B, 8.6% increase to A and the failure within GPA_SEC B students was 19.2%. In addition, the results show that 53.3% got C or D.

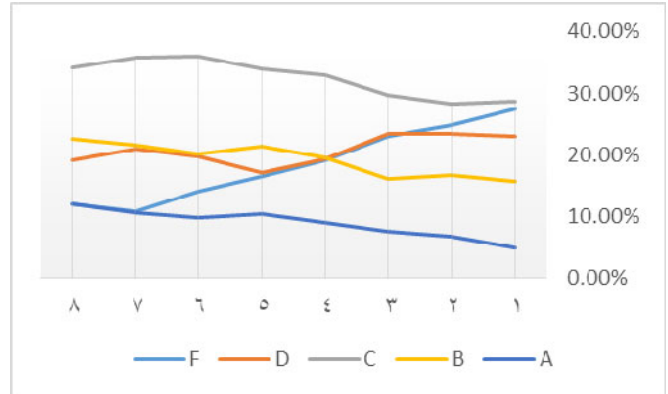


Figure 2: The progress of B students during their eight semesters

Fig. 3 show the progress during eight semesters of 573 students who receive C grades at secondary level. Only 26% of C students complete their study with C, 9% increase to B, 3% increase to A and the failure within GPA_SEC C students was 34.2%. . In addition, the results show that approximately 63% got D or F.

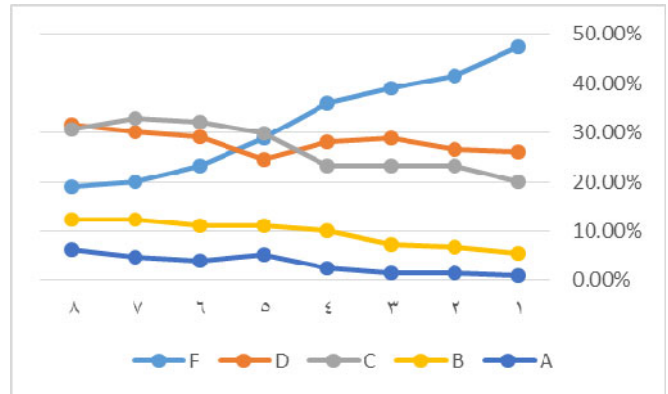


Fig. 3: The progress of C students during their eight semesters

Fig. 4 show the progress of students according to their GPA_SEC, the results showed that more than 73% of those who enrolled with grade “A” decreased their academic assessment during their university studies. While whom enrolled with grade “B”, approximately 9% increased their assessment and 82% decreased their assessment during their university studies, and those who enrolled with grade “C” approximately 12% increased and 62% decreased.

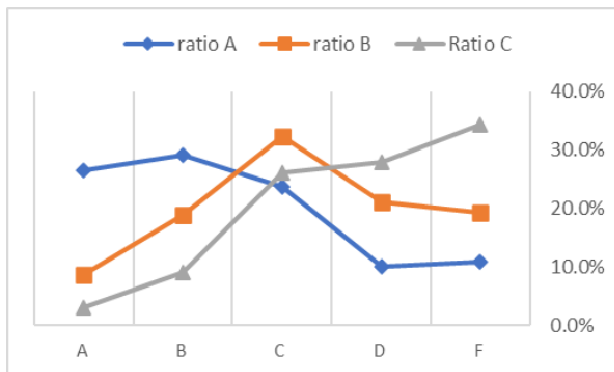


Fig. 4: The Progress of Students according to GPA_SEC of enrollment

Fig. 5 show the Classification of students status based on their GPA_Sec , as it becomes clear that those who entered with a grade A have the lowest failure rate, lowest dropout rate, and the highest graduation, followed by grade B, whereas students with grade C have the highest failure rate and least-graduated

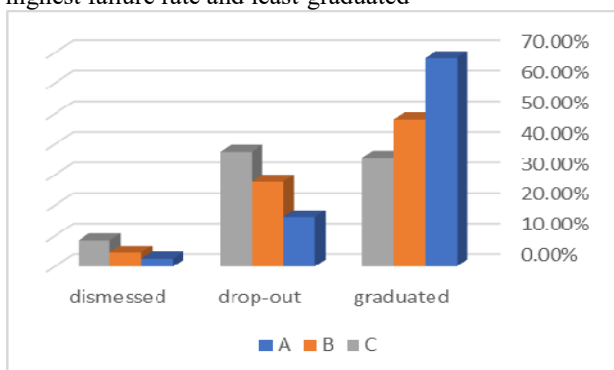


Fig. 5: Classification of student's status based on their GPA_Sec

5. Conclusions

In this study, it was taken into consideration to follow-up student's performance according to (GPA_SEC) to classify their situation by the end of each semester (graduated, dismissed, dropped out, or defaulted) in order to determine the suitable academic advising program for him. In this study, the results showed the effect of the current academic advising, as the majority of students obtained grades proportional to their GPA_SEC. So, we recommend the university authorities conduct a series of academic advising courses according to the student's academic performance by the end of each semester to raise the level of academic achievement, as well as advising programs should be reviewed periodically according to the student's status. Future studies should be conducted on samples with different Colleges in the University to see if similar findings will be held.

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