Factors Affecting Students' Academic Performance: A review

By

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Abstract

Students' Academic Performance is vital for assessing a student's standing within a university. It makes it possible for academic staff, educational administrators, and decision-makers to precisely evaluate students taking various courses throughout a semester. Additionally, it served as a cautionary tale for the students to assess their performance level and make subsequent improvements. According to official statistics in Oman, the number of students who don't graduate on time and college dropouts rise dramatically yearly. These problems hindered Oman's higher education mission. All stakeholders in Oman's higher education system must pay attention to these statistics. The main objective of our paper is to identify what factors most influence students' academic performance. Systematic literature review is used as the technique to identify the factors. This paper presents a comprehensive review of the factors affecting student academic performance. The results revealed that low entry grades, family support, accommodation, student gender, previous assessment grade, student internal assessment grade, GPA, and students' e-learning activity are the most significant factors influencing students' academic performance. This finding would be helpful for other researchers interested in academic performance issues such as modeling the predicting students' academic performance.

Index Terms: Students' Academic Performance, Higher Education, Regression, Educational Data Mining

I. Introduction

Information plays key role in many areas in our life. Some of these areas are the management, planning and evaluation of an education systems. An education management information system is a centralized warehouse for the collecting the data, processing, reviewing, and reporting of educational information and data including the institute and relevant faculties, students, instructors, and employees. An information system must not only strive to gather, store, and process information, but must also assist in the formulation of the policies related to the education, and their management, and evaluation. There was greater interest in highly relevant parameters such as students' participation rates, students' attendance, rate of students' retention, the level of students' academic achievement and issues with discipline [1].

Higher Education Institution's (HEIs) has reached the era of big data [2]. It is one of the realms in which data volume, variety and velocity coexist. In HEIs, huge quantities of data

sets data are collected and generated on a daily from various sources and in different formats involving their students and the education operations [3]. HEIs are work in an extremely competitive and complex environments.

Academia and IT industry are workings with number of devices and systems, and these are generating and collecting massive information and data which rapidly exceeds the boundary range [3]. In addition, a huge volume of data is generated by student information systems (SIS) which involve student general data and students' academic records including different activities done by the students and teachers while using various educational technologies such as learning management system (LMS). Library records, admission files, financial statements, administrative processes, educational and quality development processes, learning activities, course information including course curriculum, course objectives, course materials, course examination results, course activities are all generate huge data as well [2],[3].

The rapid and exponential growth in educational data, as well as the problem of applying that data to improve the overall quality of the education system, is one of the key challenges that educational institutes are confronting these days. As a result, these issues faced by learners and students can be solved by good educational data analysis, which includes having insights or testing hypotheses or models on a dataset [4].

Oman as a society does suffer from low academic performance among its students because English is taught as a second language in the country. Oman's post-secondary and higher education institutions offer instruction in English as the primary language of instruction. In accordance with the findings of the studies on English Language Teaching in Oman, the vast majority of students who graduate from high school (grade 12) and go on to various public and private higher education institutions are unable to use language effectively and appropriately in order to meet their social, personal, academic, and professional needs. Considering that the majority of Omani high school graduates have a limited understanding of the higher education system's expectations, it is not surprising to see students who are uninterested in participating in classroom discussions, find the subject/course boring, are frequently absent, and obtain low grades in exams [5].

The Sultanate of Oman has been supporting higher education through scholarships in order to provide the industry with quality manpower. Over the last two decades, Oman has seen a significant increase in the number of higher educational institutions as well as student enrollment. However, this mission has run into an unanticipated problem: an increase in the number of students dropping out of institutions. In 2014-2015, more than 10,000 students dropped out of college, indicating that an average of 7,000 students leave higher education in Oman each year. According to official statistics, college dropout is a serious problem that has hampered the government's higher education mission in Oman. The statistics show how serious the problem is, and they demand special attention from all stakeholders in Oman's higher education system [5].

Based on that, it become an essential to investigate on the factors that affecting the students' academic performance. This paper is going to identify the factors that might influence on students' academic performance.

The following is a breakdown of the paper's structure. Section 2 delves the search methodology, while Section 3 delves into the factors that influence students' academic performance. Finally, Sections 4 and 5 outline the discussion and conclusion of this literature review.

I. Methodology

We used a standard systematic literature review (SLR) method in this paper, which follows the guidelines proposed by [7]. SLR has many advantages over unstructured and unreliable literature reviews, as it is more likely to be considered trustworthy and objective [8]. Furthermore, information gathered from SLRs is extremely trustworthy because it was derived from a variety of sources. SLR is divided into three phases: planning, conducting, and reporting [7]

A. Research Questions

Our objective in this paper is to answer the following question:

What are the factors affecting students' performance in higher education?

B. Search Strategy

The search source for manuscripts used in the research is English-language academic journals only. We searched several databases, including Science Direct, Scopus, IEEE Xplore, ACM Digital Library and Google Scholar. The search looked at research articles between 2014 to 2020. The search string ("student" AND "predict*" AND "Academic performance" AND "factors" AND "review" OR "survey") was used to search for articles. For reliable search results, the Boolean operator "AND", and "OR" was employed as above. About 3,810 results was found in the search. While exploring those papers, most of the papers were focused on prediction methods rather than the factors. Based on that, we have deeply explored and selected the papers focus on the factors to achieve our objective.

II. Factors Affecting the Students' Academic Performance

One of the most significant risk antecedents consistently identified across the literature is students' intellectual ability to cope with the academic demands of university study. Academic vulnerability is also strongly tied to psychological qualities such as academic self-efficacy and academic self-control, which are major predictors of long-term persistence in higher education [9].

The most research papers found in the literature, they revealed that the student's factors which affect the student academic performance are gender, high school grade, student's parental education, financial background, medium of teaching, student's family status, living location, students' previous semester marks, seminar performance class, test grade, assignment performance, attendance in class and lab work, general proficiency, Interest in particular course, Study behaviour, Engage Time and Family Support for study, previous schools marks, admission type, accommodation type, parent's occupation, parent's qualification. All of these attributes are divided into categories such as personal, family, academic, institutional, and social. The most significant personal attributes of the student are taken into account, such as gender, age, interest in the study, admission type, and study behavior [10],[11],[10],[12],[13],[14]. Family attributes such as parent's education, occupation, family income, family status, and study support are also considered important for academic prediction [11],[14],[15]. Previous school marks are taken into account for academic attributes such as high school grade, students' previous semester marks, class test grade, seminar performance, assignment performance, attendance in class and lab work [15],[11],

[10],[16],[13],[14],[17],[18], and institutional attributes such as medium of instruction, accommodation type, infrastructure, water and toilet facilities, teaching methodology, and transportation facilities [18],[11],[19], [16],[15],[13],[20],[21] .

According to [3], various studies in different countries show that several factors, including individual factors, interactions within colleges, and institutional factors, are associated with student dropout rates and poor academic performance in Higher Education Institutions (HEIs). In this study, [22] have been evaluated a variety of factors, including student gender, finance source (government or self-funded), and secondary school grades (first, second, or third). However, factors such as school scores and faculty subjects or program curriculums are the primary causes of poor student academic performance and dropout.

Reference [8] have examined the factors that affect the students' academic performance and students' dropout from HEIs. The results revealed that the students with the lowest entry grades and those who were farther away from family support (Living away from their families) are the two main factors that affect the students in academic performance and dropout [9] as well as family expenditure and income are affecting students' academic performance [23],[24],[25].

Institutional factors, internal factors, contextual factors, and student factors are all important factors that influence students' academic performance and dropout [5],[26],[27]. According to [27], the findings revealed that institutional factors such as student-staff ratio and the university's teaching quality plays a significant role in low academic performance and student dropout. Furthermore, the student-to-staff ratio has a positive effect on low-performing students' academic performance and dropout rates. In addition, there is a link between staff quality and dropout rates. Furthermore, the findings revealed the significance of contextual factors that contribute to student dropout rates, such as university accommodation.

Furthermore, [23] referred to the students' legacy data, based on their perspective and other research that the students' legacy data is a significant factor to track any student's performance, as these data could help to understand the background of the student in any course.
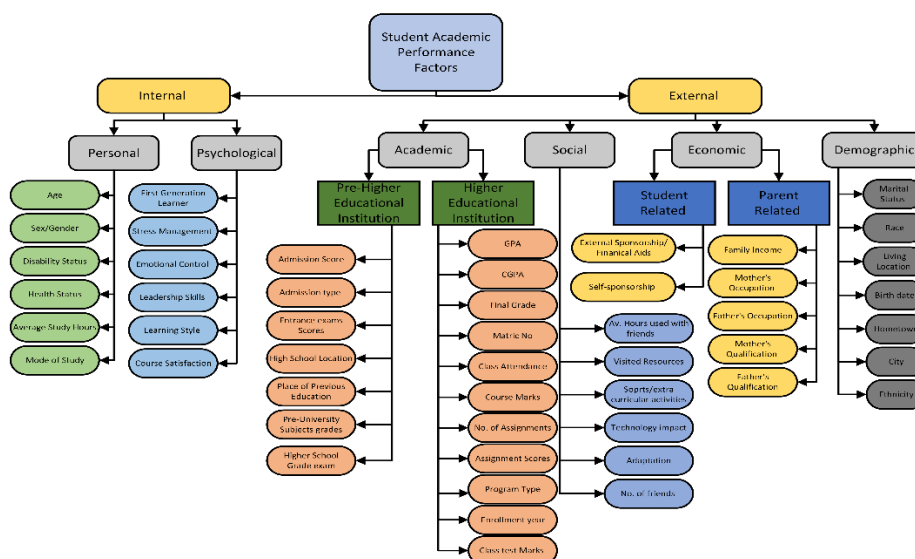

Figure I: *Student Academic Performance Factors*

Based on the above figure, we have classified the factors found in the literature in two

different categories. One is internal factors and the second is external factors. The internal factors include personal and psychological factors. While the external factors include academic, social, economic, and demographic. Accordingly, some factors have been selected and explained below.

A. Low Entry Grades

Based on [9], Students enrolled in HEIs with poor grades are more likely for poor academic performance and drop out than students with good entry grades. Students' entry grades cause the dropout through influence on university academic grades which leads to poor academic performance [9],[22]. As a result of their poor academic performance in university exams and activities, students with low entry grades are either voluntarily dropping out or are involuntarily withdrawn from their educational institution [9],[28].

One of the most significant factors in students' poor academic performance and dropout is their secondary school scores, according to [22] research. There is a lower dropout rate among students with higher grades than among students with lower grades.

According to [27] findings, there is a statistically significant negative relationship between low academic performance and student quality. Those who achieve a higher score in secondary education are less likely to suffer from poor academic performance and to drop out of colleges altogether. Therefore, students who are not oriented to their preferred higher institution as a result of their lower score have a higher likelihood of dropping out during their time at the college level.

B. Program Type

According to some HEIs enrolment rules all potential students may choose several programs during the application process. Students must indicate the priority for each program separately. The curricula of some programs contain such subject as physic, mathematic and chemistry. The students' face some difficulties in such courses which lead them to fail in the exams and activities. It means that although students had motivation to study, but the study process was not what they had expected. As a result, the poor academic performance leads the students to leave the universities and colleges [22].

C. Family Support

The assistance that students receive from their families is critical for a smooth transition into college life, especially in the first year. Both theoretical and empirical evidence point to the importance of the emotional and practical support that comes from having close friends and family members as a basic human need. In order for people to thrive and achieve their utmost psychological well-being, they need strong, supportive family relationships. As a result, people tend to put their trust in their families and close relationships when they need it the most. Family support has been linked to lower levels of emotional distress, self-esteem, and academic self-efficacy among university students. It was found that students who received social support from their families were more likely to be satisfied with their lives, have a positive mood, and have a negative mood than those who didn't [9]. As a result, the students should have a full support from their families and to be around them while they study as it has a positive impact in the students' academic performance.

Furthermore, [23], family factors, such as family expenditure and income, as well as individual student data, were used to determine the impact on student performance. They came

to the conclusion that excessive rental and health expenses had a negative impact on the overall environment, which in turn had an impact on student performance. A student's inherent characteristic of emotional stability was found to be a significant predictor of their academic performance.

D. Accommodation

According to [27] research, there is a negative and statistically significant relationship between university accommodation and student performance. According to the findings of several studies, students' social circumstances, particularly the issue of accommodation, have a significant impact on the student's ability to remain in college and succeed academically. Reference [29] finds that students who have some form of accommodation graduate on average more quickly than students who do not have any form of accommodation.

E. Student Gender

According to [27], they found that there is a significant relationship between student low academic performance and dropout with the gender. Males are more prone to drop out than females. As per this study, the findings revealed that gender has a strong relationship with student dropout.

Gender is the most important factor to consider when evaluating a student's performance. In recent years, debates about the impact of gender on academic performance have dominated research. Reference [30], have discovered that male and female study styles differ, with females preferring to study in a more systematic manner and males preferring to study at the last minute. In fact, the majority of female students have more positive behavior than male students [27]. In comparison to men, women are clearly capable of completing their tasks efficiently within the time allotted. The main reason why women work better than men is that women have better self-discipline and are more focused in their studies or work. Above all, research conducted by [31], supports this assertion. They proposed a model to predict whether or not PHD students will graduate. According to the results, a total of 79 students are expected to graduate on time. Additionally, female students are more likely to graduate on time than male students, with the number of female students predicted to graduate on time being 56 percent higher than male students. Gender is important factor because it has a significant impact on students' performance because male and female learners have different learning rates and behaviors. Aside from that, many articles analyzed student performance using age as a factor. Reference [32], explained that as we age, our brains undergo physical changes that make it more difficult to remember or learn effectively.

F. Past grade in previous assessments

It is also important to consider the impact of students' legacy data, such as the results of previous assessments, which has a significant impact on the students' academic performance [23],[33]. Previous grades and class performance were significant factors that could help in determining a student's academic success and are influencing students' academic performance. This finding could be explained by the fact that students' performance stays constant throughout their educational life. If a student gets into the habit of doing well in college early on, he or she will continue to do well throughout their education. For students who consistently struggle academically, this is also true; they may continue to exhibit the same behavior throughout their academic life, which could have an impact on their ability to do well in their current and future coursework. These findings could help higher education institutions focus on the specific areas

of weakness in students' academic lives and try to overcome these shortcomings by improving the students' educational outcomes [34],[16],[20].

G. Students Internal Assessment Grades

According to several studies in predicting students' academic performance, they have revealed that quizzes, tests, mid-term exams, and assignments are significant factors that influence students' academic performance. Accordingly, they have used those as attributes to predict the students' academic performance [35],[36],[23],[37],[38],[39].

H. GPA

GPA has a high influence on predicting students' academic performance, so many researchers have used it to analyze students' performance. If students have a low GPA in their first and second years of study, they will most likely be unable to complete their studies within the study plan. The reason for this is that they may have to carry any failed papers over to the next semester, extending their study time [40].

I. Students' e-Learning activity

Academic performance was found to be significantly impacted by students' participation in online learning. E-learning activities (such as accessing online material, solving online quizzes and uploading assignments into the e-Learning system) have a positive impact on students' grades and overall performance, according to this study. It is possible that these findings will assist educational institutions in their efforts to better support students' e-Learning and encourage the use of e-Learning systems in the classroom [20],[41],[42].

Table 1 below categorize the factors and describe each category.

Table I: *Description of factors' categories*

Category	Description
Students e-Learning activity	Student activity logs in e-Learning systems, such as the number of logins, assignments completed, quizzes completed, etc.
Students' previous grades and class performance	Students' grades or other indicators of performance from previous courses, semesters, or year such as High school grade, students' previous semester marks, class test grade, seminar performance, assignment performance, attendance in class, lab work, CGPA, GPA.
Students' environment	The student environment attributes such as: the type of school, the type of classroom, class period, high school grade, etc.
Students' demographics	Student's gender, age, nationality, ethnicity, and marital status, financial background, Living location
Instructor	Student's instructor's evaluation results, teaching methodology, etc.
Course	Course type, Interest in particular course, difficulty, etc.
Students' social information	Information about the student's social life, such as the number of friends, whether smokes or not, financial background, living location, etc.
Course evaluations	Data gathered from course evaluation surveys, such as questions about the course's clarity, satisfaction level, etc.
Students experience information	Student experience on the course, such as readiness and self-efficacy.
Family	Parent's education, occupation, family income, family status, and study support, etc.

III. Discussion

This study sought to identify the factors influencing students' academic performance. Actually, there is a severe scarcity of research that invests in and identifies students' academic performance. The majority of the papers concentrate on the prediction methods used in predicting students' academic performance. Anyhow, there are numerous factors that influence students' academic performance, and our paper has identified all of them while also taking into account the most important factors that influence their academic performance. According to our research, the most significant factors that influence student academic performance are low entry grades, family support, accommodation, student gender, previous grade in assessments, students' internal assessment grades, GPA, and students' e-Learning activity.

IV. Conclusion

This paper identified the factors influencing students' academic performance. Students who perform well in university are more likely to finish their studies and graduate, and vice versa. If the prediction turns out to be accurate, the administration of the university will be better able to identify the students who are not likely to continue on their current path and devise strategies to help those students improve their performance so that they can eventually graduate from the university. The factors were identified and discussed in this paper. The findings of this study, when taken together, academic assessment factors relating to students' previous and current academic performance were very important and might help in predicting their academic performance. Finally, the significance of this work is found in the intention to assist and help other researchers in identifying the factors. It will also assist lecturers, administration, and decision makers to understand the significant factors that may affect the students in their study. The results revealed that low entry grades, family support, accommodation, student gender, previous assessment grade, student internal assessment grade, GPA, and students' e-Learning activity are the most significant factors influencing students' academic performance.

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Nur Syufiza Ahmad Shukor is an associate professor of the Department of Computing at Universiti Selangor in Malaysia. She has industrial experiences in system development before joining as academic staff at Universiti Selangor in 2003 where she involved in several IT turn-key projects and played major roles (team leader and project managers) in application development projects. Her experience from industry together with her passion in academic lend her to several administrative post while serving at the university (among others, Head of Program, Head of Department and Deputy Dean of Academic). She obtained her PhD in Information Systems from Universiti Teknologi Malaysia. In teaching, she has been in-charged of classes of information systems and computer sciences. She is currently actively involved in the system development practice through her role as Business Architect for Total Campus Management System which is under development. Her research interests are inter-organizational knowledge sharing, digital citizenship, ageing nation, knowledge audit, knowledge management, e-governance, big data analytics and requirements elicitation.