

Education Quarterly Reviews

Aciro, Rosalba, Onen, David, Malinga, Geoffrey M., Ezati, Betty A., and Openjuru, George L. (2021), Entry Grades and the Academic Performance of University Students: A Review of Literature. In: Education Quarterly Reviews, Vol.4, No.1, 141-150.

ISSN 2621-5799

DOI: 10.31014/aior.1993.04.01.181

The online version of this article can be found at:
<https://www.asianinstituteofresearch.org/>

Published by:
The Asian Institute of Research

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Entry Grades and the Academic Performance of University Students: A Review of Literature

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Abstract

Universities world over mostly base their decisions to admit their new students on the applicant's pre-university academic results. However, there is yet no concrete evidence that the students' pre-university academic accolades determine their performances at university level. In this article, we explored the findings of earlier studies that examined the relationships between entry grades and the academic performance of university students. The study was undertaken to collate the literature on the relationships between the students' entry grades and their university academic performance in order to validate earlier assertions, if any, as well as to identify opportunities for further research in this field. During the study, we carried out a systematic review of 59 articles that we drew from different online electronic databases including, among others, the Free Scientific Publication, the Worldwide Science.org, and the Directory of Open Access Journals (DOAJ). The majority of these reviewed studies were drawn from America and Europe. Only a few of them were conducted in Asia, Latin America and Africa. Of the 59 reviewed articles, only 53 of them met our inclusion criteria and our key findings showed, among others, that out of the 53 reviewed articles, 26, 4 and 13 of them revealed the existence of positive, negative, and mixed correlations respectively between the entry grades and the academic performance of university students. The remaining 10 articles, however, did not reveal any significant correlations between the two variables; instead, they alluded to the existence of difference in these relationships between male and female students; thus, suggesting for the need for affirmative action schemes. Overall, the study revealed that there is yet no consensus over whether pre-university academic performances of students predict their performances at university level; thus, indicating the need for further research in this field.

Keywords: Entry Grades, Admission, Cumulative Grade Point Average, Academic Performance, University

1. Introduction

Globally, entry to higher education institutions - particularly universities - is predominantly based on prior attainment of good grades in pre-university educational institutions (Roşeanu & Drugaş, 2011; Mercer & Puddey, 2011; Lambe & Bristow, 2011; Kutty, Lee & Young, 2012; Sandow et al., 2002; Vidal Rodeiro & Zanini, 2015; Shehry & Youssif, 2017; Wikström & Wikström, 2017). As a result, candidates admitted to the university in

particular must have attained certain minimum requirements for specific academic programmes, but should have also favourably ranked among the applicants since everyone is admitted on the basis of his/her grades at pre-university institutions (Wambugu & Emeke, 2013; Aidoo-Buameh & Ayagre, 2013; Nshemereirwe, 2014; Chaturanga, 2016). In Uganda for instance, the minimum direct entry requirements for admission to a bachelor's degree programme are: (i) Uganda Certificate of Education (UCE); and (ii) at least two principal passes at Uganda Advanced Certificate of Education (UACE) obtained at the same sitting or its equivalent (Uganda Government, 2001). According to Richardson, Abraham and Bond (2012), universities often base their students' admission on pre-university academic performance because they strongly believe that it will determine how the students will academically perform while at the institution. Unfortunately, even though many countries have routinely used such an admission criterion to admit their students to universities, its use as the primary criterion for admission to undergraduate programmes has been a subject of criticism for many reasons. First, there is lack of sufficient understanding of its effectiveness in determining student academic performance while at university level (Danilowicz-Gösele et al., 2017); that is, not everyone agrees that a good pre-university grade for a student will automatically result into a better academic performance while at university. Second, many other scholars have reportedly advanced several other factors that affect student academic performance while at university other than their pre-university grades. Kyosha (2009) and Aspelmeier et al. (2012) for example reported that the academic performance of a student at university may be influenced by several different factors including the parents' educational background, family size, type of high school attended, and the socio-economic status of the student. Nonetheless, according to Richardson, Abraham, and Bond (2012), the use of high school grade still stands out as a strong predictor of intellectual ability of students at higher educational institutions - although the evidence for this is generally scattered in literature. This implies that there is a need to collate such information in order to provide opportunity for evidence-based university educational planning as well as to guide the admission of students to both public and private universities. Additionally, collating such information would help to identify whether there are gaps that call for further research in this field. The current situation in Uganda points to admission of university students basing on the minimum entry requirements as partly stated above, but there are still gaps in relating those entry grades of students with their university academic performance; thus, the need for this kind of investigation.

1.1. Research Questions

In this study, we sought to answer the following questions: (1) What relationships exist between entry grades and the academic performance of university undergraduate students; and (ii) Do these relationships differ between male and female students?

2. Theoretical Framework

This study was guided by the Input-Transformation-Output (ITO) model, which was initiated in a factory setting illustrating the role of operation in creating and delivering goods and services in an organisation (Henri, 2004). According to Melan (2002), the ITO model represents three components of operations: the input, transformation processes, and outputs. In this case, inputs represent entry grades of students; transformation processes represent the experiences students undergo while at the university including the teaching and learning practices, resources they are exposed to, and the type and quality of interactions students have with their lecturers, while output in this study represents the academic performance of the students. Finally, environment represents the broad university system where all these activities take place right from admission of students to their graduation when they exit out of the university with a given cumulative grade points average (CGPA) and various classes of diplomas and degrees. According to Shachar and Neumann (2010), things like infrastructural facilities, human, financial and information resources that are fed into the education system serve as inputs which are meant to shape or affect the outputs of the transformation process. The ITO model is illustrated in Figure 1 as a functional graph that identifies the inputs, outputs, and processing tasks required to transform inputs into outputs.

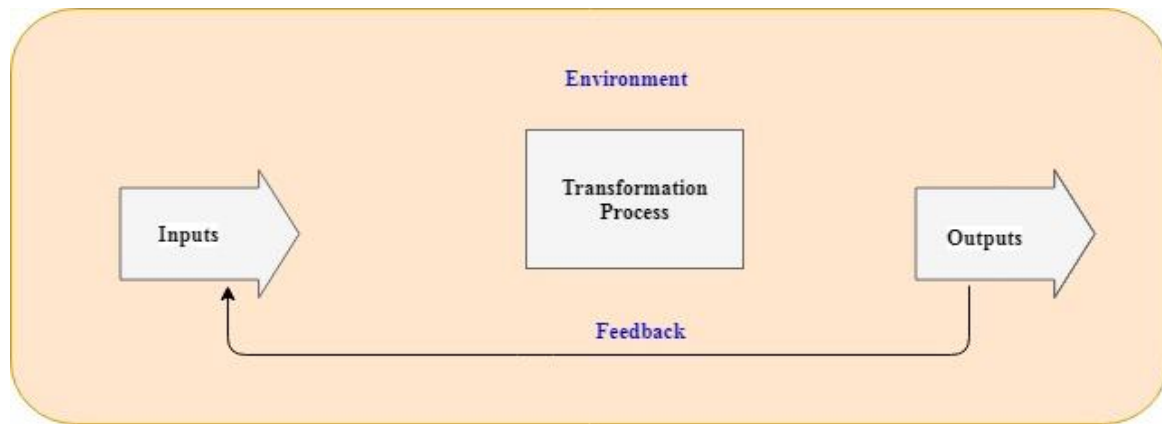


Figure 1: The input-transformation-output model

Source URL. <http://www.open.edu/openlearn/money-management/management/leadership-and-management/understanding-operations-management/content-section-0>

In the context of what is presented in Figure 1 and in congruence with Sahney and Thakker's (2016) viewpoint, entry grades of admitted students in the above model represent inputs whereas exit academic performance represents the outputs. Therefore, as shown in the ITO model, it is believed that better quality inputs (in terms of quality of students) will be transformed into better results in terms of learning outputs and achievements of students (Abdullah & Mirza, 2018); that is, if the university admits students with good entry grades, they will be taught and easily transformed into good academic performers who will exit the institution with high Cumulative Grade Point Averages (CGPAs).

3. Methodology

During the study, we systematically conducted an integrative literature search and a meta-analysis to assess the correlation between entry grades and the academic performance of students at university. We searched five main online databases, namely: Free Scientific Publication (www.freefullpdf.com), Worldwide Science.org (<https://worldwidescience.org>), Directory of Open Access journals (DOAJ) (<https://doaj.org/>), BookSC (<http://booksc.org>), and Login.Research4life.org (<http://login.research4life.org>). Our choice of these search engines was dictated by our earlier search, which had shown that there were several databases with relevant articles that we could access through these engines. We specifically searched studies published between 2000 and 2019 using the following string of search terms: admission OR grades performance and higher education* OR admission grades OR academic performance* OR entry grades to universities and academic performance* OR gender and academic performance*. However, as Peres (2017) would advise, it was not possible for us to analyse all the works published in this area within the prescribed time period; therefore, we had to apply different mechanisms of inclusion and exclusion of the articles collected from these databases in order to remain with a manageable number of articles to analyse. Figure 2 illustrates how we conducted the search for the different articles in order to arrive at the number we finally studied.

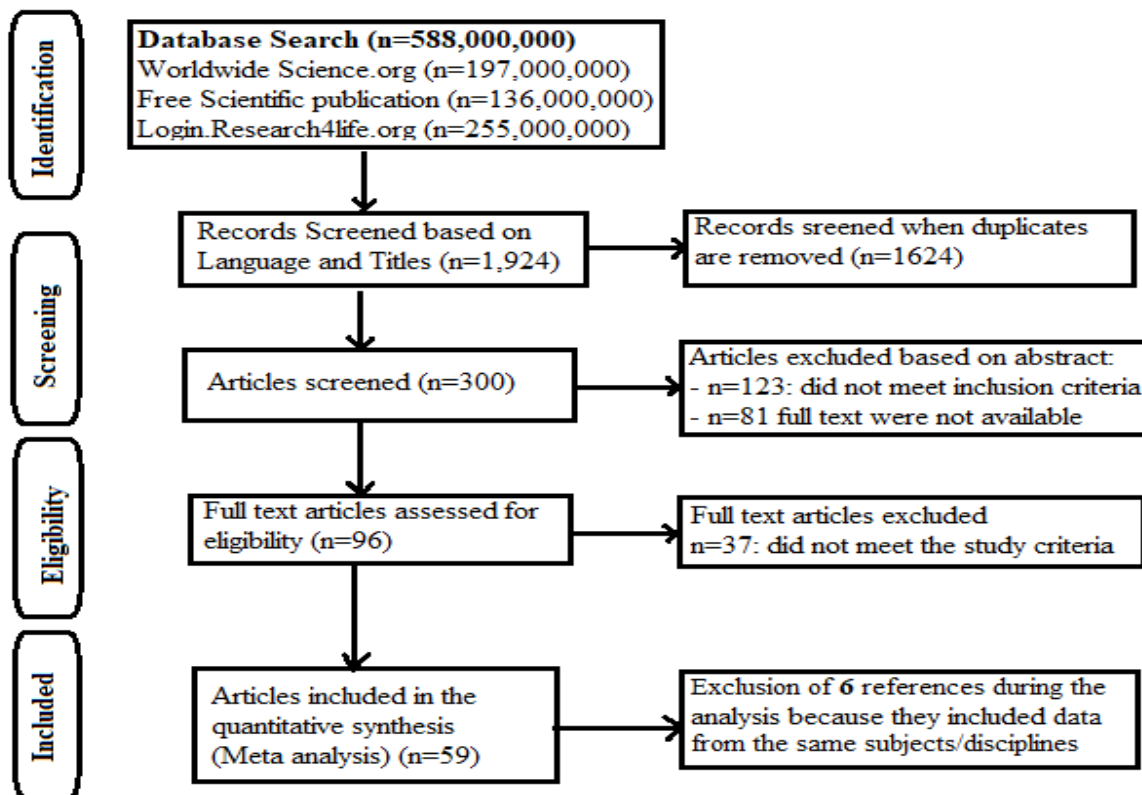


Figure 2: Database search for reviewed articles

While performing the article search as illustrated in Figure 2, we had to use evidence filters, for examples, language filters helped us to select only the articles written in English (the language well known by the researchers). The use of filters enabled us to identify only academic journals articles with online article availability, and while temporal filters guided us on how to get only publications done within the stipulated study period (2000 to 2019). This resulted in a list of 59 references, which were further filtered basing on the title of the study to get the most appropriate literature to review. After further analysis, only 53 out of the 59 articles eventually met our inclusion criteria and they were the only ones that finally contributed to our meta-analysis.

4. Results and Discussion

The 53 articles we analysed were distributed across five locations and in 25 countries. Generally, 26 of the articles reviewed reported the existence of significant relationships between entry grades and university academic performance, four reflected significant negative relationships, 13 had mixed correlations and 10 reported on the difference in the relationships between entry grades and the academic performance of university students based on gender.

4.1. Correlations between Entry Grades and Academic Performance

Several scholars have already looked at the correlation between entry grades and the academic performance of university students. However, the findings of these studies have never been conclusive because the researchers have always reported diverse; and sometimes, contradictory findings. This explains why universities across the United States of America (USA) continue to study admission criteria in order to improve their selection processes and determine how best to provide the support needed for the students (Stuenkel, 2006). According to Roşeanu and Drugaş (2011) and Zwick (2012), standardized admissions tests such as scholastic aptitude/assessment tests (SAT) administered in many institutions in USA were originally developed to identify candidates who would perform better in college as well as future career. In fact, several researchers such as McKenzie and Schweitzer (2001), Wamala (2013), Kurlaender, Kramer and Jackson (2018), Abdullah and Mirza (2018), Ferrão, and

Almeida (2019), and Myburgh (2019) identified academic performance at pre-university levels as the most significant predictor of university performance. They argued that a student who enters university with better grades is most likely to perform academically better than his/her counterpart who has not scored good grades in pre-university examinations. Several other scholars shared this view. Chaturanga (2016) and Hodara and Lewis (2017) for instance opined that high school grade point average was consistently predictive of university performance among recent high school graduates regardless of whether they were from rural or urban locations. This particular finding by Hodara and Lewis, however, contradicted that of other studies, which had reported that the correlation between entry grades and the academic performance in university differed between students of urban and rural high schools. In another study by Geiser and Santelices (2007), it was found out that high school results are consistently the best predictor not only of freshman grades in college, but predictive validity studies of four-year college outcomes as well. This finding was corroborated by the findings of Birch and Rienties (2014) as well as Vidal Rodeiro and Zanini (2015) which indicated that 'A' grades at A-level school increased the probability of attaining good university outcomes - a notion that was supported by Kurlaender, Kramer and Jackson (2018) - but had earlier on been alluded to by Saupe and Eimers (2010). Indeed, Kurlaender et al. pointed out that the primary predictors of college performance are high school grade point averages (HSGPA) which are stronger predictors than standardized test scores. This use of secondary school grades as predictors for college GPA is based on a simple philosophy which states that the best predictor of future behaviour is past behaviour (Roşeanu & Drugaş, 2011; Zwick, 2012; Shehry & Youssif, 2017). Unfortunately, different stakeholders - including university professors as well as education policy-makers - who have come to realize that this assertion is not necessarily true are now challenging the assertion that there is always a significant positive correlation between entry grades and the academic performance of university students. This scenario calls for further studies on this subject; thus, the need for the current research.

Meanwhile, some of the studies that produced results with significant positive correlations between entry grades and the academic performance of university students were focused on specific subjects or courses offered at either high school or university. For example, according to Eiselen, Jonck and Strauss (2007), passing mathematics in the final high school year in South Africa is an admission requirement for undergraduate students in science, engineering and technology (SET) and a predictive validity for good performance while at university. This view was supported by Wamala, Maswere and Mwanga (2013) who discovered that students' CGPA increases with their A-level mathematics scores; that is, the competence in A-level mathematics predicts success in the SET programmes while at university. This conclusion was grounded on the idea that mathematics language proficiency play a critical role in terms of performance in mathematics at tertiary level (Seelen, 2013; Niessen, Meijer & Tendeiro, 2016). This equally explains why scholars like Bush (2012) and Wambugu and Emeke (2013) opined that education institutions admit students based on their entry qualifications because they believe that such students would perform better while at school. These authors actually reiterate that given that learning is a cumulative process, it is often assumed that a student admitted with higher entry qualification is easier to be prepared to perform well in any course rather than one admitted with lower qualification. This assertion supports Kyoshiba's (2009) argument, which posits that there is always a significant positive relationship between admission points and the academic performance of university students.

Nonetheless, not all scholars agree with the assertion that there is a significant positive correlation between entry grades and the academic performance of students at university. According to Opoko, Alagbe, Aderonmu, Ezema and Oluwatayo (2014) who compared the results of direct entry students, unified tertiary matriculation examination students and remedial students at Covenant University in Nigeria, there was no significant difference between the cumulative grade point averages of the three groups of students. This was not any different with the work of Emaikwu (2012) who also reported that there is no significant statistical difference in the mean academic achievement of students who were admitted into the university through unified tertiary matriculation examination (UTME), remedial programme and direct entry. Therefore, students did not differ significantly in their academic achievement based on the mode of admission into the university or even their entry grades. However, these findings were contradicted by the work of Wamala, Kizito and Kakumba (2012) which revealed that the Graduate Management Admission Test (GMAT) has proven to be a good predictor of academic performance of students admitted to Makerere University for Master of Business Administration (MBA) programme in the 2011 and 2012 enrolment cohorts. Hence, the correlation between the performances of MBA students after passing the GMAT

proved to be positive. However, this Wamala et al.'s study was a case of admission on a master degree programme - unlike the current study that focused on the review of literature on the correlations between undergraduate students' entry grades and their exit academic performance at university.

On the other hand, several other scholars who have investigated the relationship between entry grades and the academic performance of university students have also reported the existence of a no significant correlations between the two variables. In a study by Salahdeen and Murtala (2005), for instance, about the relationship between admission grades and the performance of students at Lagos State University College of Medicine in Nigeria, the two researchers discovered that there was no significant correlation between the Senior Secondary School Certificate Examination (SSCE) results and the Joint Admissions and Matriculation Board organised Universities Matriculation Examination (JAMB-UME) scores. Besides, they also found no significant correlation between JAMB scores and the students' performance at pre-clinical science school. This finding was also similar with that Mlambo (2011) who conducted a survey study on a random sample of 66 registered students at the University of the West Indies and discovered that entry qualifications did not cause any significant variation in the academic performance of the students. In yet another study by Koretz, Yu, Mbekeani, Langi, Dhaliwal and Braslow (2016), it was reported that both college admissions and high school tests in mathematics and English had no significant effects on freshman grade point averages at college. These findings contradicted the earlier assertion that students who perform well academically at high school, would end up performing well at university. Nonetheless, the debate about whether there is a strong relationship between entry grades and the academic performance of students in university still rages on; thus, the need for this and further research.

In other circumstances, some researchers have reported the existence of both positive and negative correlations between entry grades to universities and student academic performance. These signified the existence of mixed correlations between the entry grades of university students and their academic performance. According to Kalowole, Orgini and Fayomi (2011), for instance, cognitive entry points in selected Nigerian universities are weak predictors of students' academic performance in Chemistry. The same study also revealed that all the cognitive entry points are poorly related to students' academic performance in chemistry and not even related to university performance in Physics. However, many of these studies were limited to only one or two programmes of study, and no effort to control for overall college performance (Green & Vignoles, 2012). In addition, the use of A-level achievement by higher education institutions as the primary criterion for admission to undergraduate degree programs has been subject to criticism and has been shown to vary substantially across faculties (Danilowicz-Gösele et al., 2017). Indeed, Danilowicz-Gösele et al. stated that in some fields of study, the probability of those with high entry grade graduating was rather low, while in others, weaker students had a greater chance of graduating. This explains why a scholar like Stegers-Jager (2018) advocated for weighting of academic as well as non-academic instruments when considering students for admission in universities. He opined that considering the combination of the two during admission would fit both the needs of validity and diversity at tertiary level of education.

In a two-nation study by Roşeanu and Drugaş (2011), it was discovered that the scholastic assessment test (SAT) in the United States and the baccalaureate examination or the college admission examinations in Romania which were originally seen as reliable indicators of academic achievement did not prove the same in all college results. This explains why Geiser and Santelices (2007) contended that the earlier belief was just a misperception. However, earlier studies as those ones reported above had already shown the fact that high school GPA was consistently the best indicator for first-year College students. The predictive weight associated with high school GPA increases after the first year, making this variable a good indicator for long-term college outcomes like graduation. Besides, in a study done by Lasselle, McDougall-Bagnall, and Smith (2014), there was an indication that students with three 'A' grades at A' Level from schools performing below the national average are more likely to graduate with a First or Upper Second-class degree than those with the same qualifications from an above-average school.

In addition, according to Garton, Dyer and King (2000), most criteria used for college admission of students are good predictors of academic performance but has limited power and value as a predictor of student retention and consistent performance. Bush (2012) meanwhile indicated that entry to higher education in the United Kingdom

(UK) was predominantly based on prior attainment of General Certificate of Education (GCE) and advanced level (A' Level) courses. However, he noted a dissonance between independent school and state-educated students' performance before and post-admission. In fact, he observed that independent school students took longer to complete their studies, and their superior performance prior to admission was not seen at the point of graduation. Wright and Bradley (2010) on the other hand opined that United Kingdom Clinical Aptitude Test (UKCAT) that was used for admitting medical students could only offer better prediction for examinations in first year than for those in second year, indicating that the predictive ability of the entry grades seems to decline over time. But while analysing the performance of students at undergraduate levels, Aidoo-Buameh and Ayagre (2013) discovered that both positive and negative relationships exist between pre-university and university academic performance. Their study revealed that there was a significant relationship between core mathematics and accounting at pre-university level and performance of undergraduate accounting students' performance, but no significant relationship was found between pre-university English and their university-level performance. According to Mutiso and Muthama (2019), academic performance of first-year university students is determined by the category of primary school attended and the university course taken by the students. This, therefore, does not give determinant factor to only entry grades but other factors as well.

4.2. Relationships between Entry Grades and Academic Performance of University Male and Female Students

Different scholars have investigated the linkage between gender, entry grades and the academic performance of students at university level in different countries. Some of these studies have recommended for the use of affirmative action schemes for admitting students in public universities. According to Onsongo (2009) and Ahikire (2013), for instance, affirmative action in university admission means giving priority to disadvantaged groups without ignoring the minimum entry requirements in the institutions. Such priorities can be given based on factors like gender, disability or any other minority groups. According to Ahikire (2013), in Uganda, the consideration of 1.5 extra points awarded to female students during admission started at Makerere University in 1990 and as a result, the admission of female students in the University steadily began to increase. In fact, according to Kwesiga and Ahikire (2006), the introduction of this scheme resulted into an increase in the percentage of female students enrolled at Makerere University from 23.9% in 1989/1990 to 45.8% in 2003/2004. However, the female students who were admitted on the affirmative action scheme at Makerere University in Uganda continued to perform well academically just like their male counterparts. For example in the same study of 2006, Kwesiga and Ahikire reported that in the 1999/2000 academic year, among the best 20 third-year Bachelor of Science with education programme students, 13 were female students who had been admitted on affirmative action scheme. This finding was in tandem with the works of many other scholars - including the work of Alfifi and Abed (2017) whose results showed that female students perform better than their male counterparts do. They argued that student's gender strongly affects performance at university with girls performing better than boys do. On the contrary, some studies have shown that male students obtain higher mean scores than females (Larose, Bernier, & Tarabulsy, 2005), while in other studies, it was discovered that gender is not a significant predictor of academic performance at universities (Aderi, Jdaitawi, Ishak, & Jdaitawi, 2013; Fernández, Araújo, Vacas & Almeida, 2017). According to Emaikwu (2012), the academic achievement of male students is usually higher than that of their female counterparts irrespective of the mode of admission into the university. This work affirms the earlier report by Wikström and Wikström (2017) who asserted that boys are academically ahead of girls, especially in sciences.

Scholars who have advocated for affirmative action scheme in admitting students to university based on gender such as Ceballo, McLoyd and Toyokawa (2004) and Alfifi and Abed (2017) have often argued that female students admitted under the same criteria often perform better than their male counter-parts. Therefore, even when female students with lower pre-university grades are admitted to university, they will perform as well as their male counter-parts. This argument has however been challenged by several other scholars who opined that male students generally perform better than their female counterparts do. In a study conducted by Emaikwu (2012) for instance, it was reported that the academic achievement of male students was higher than that of their female counterparts, especially in sciences irrespective of the entry grades to university. The above results showed that gender has some significant impact on student performance at university level.

Some other scholars, however, have had a neutral view about the relationship between gender, entry grades and the academic performance of university students. In studies conducted by Aderi, Jdaitawi, Ishak and Jdaitawi (2013) and Wikström and Wikström (2017), for examples, it was reported that gender is not a significant predictor of academic performance at universities. On the other hand, Birch and Rienties (2014) revealed that academic performance follows a positive trend from D-grade to A-grade, irrespective of gender. This argument was later supported by some aspects of a study done by Wikström and Wikström (2017) who also discovered that gender does not strongly influence university performance. In fact, the two authors argued that university academic performance of students differs due to several factors - some of these factors are institutional-related while other are student-related - but not necessarily the student's gender.

5. Implications of the Findings and Conclusions

The results of this review have revealed that there are positive, negative and mixed correlations between entry grades and the exit academic performance of students at university. It has also highlighted major gaps and weaknesses in the admission criteria of university students that need attention by university stakeholders, educational planners and policy-makers. On the issue of gender, this study brought forth some contradictions and different findings: some articles reported that student performances were based on gender, while others stated that gender does not influence academic performance. These dilemma and scenarios also call for more evidence-based studies in order to streamline the admission criteria for both undergraduate and graduate programmes at university level. Recommendations from such studies could inform and significantly improve admission policies in different universities across the world.

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