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Research Paper

Role of engineering on students' academic achievement at university level

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ABSTRACT

Background: The way engineering education affects students academic achievement in the university setting is kinda complex, it works in more than one direction, like, it can boost academic progress but also create hurdles for educational growth. With technology moving so fast and getting more and more blended into higher education institutions this has become a real focus, it needs careful, systematic attention, for both male and female students at the tertiary level.
Objective: This study aims to look at the direct plus indirect influences of engineering linked factors on students academic achievement at the university level, and then check these influences using hypotheses that were set beforehand, with special attention given to gender based comparisons among higher education students.
Method: A qualitative research approach was used, and it included measures tied to motivation and perception. Data collection centered on ideas such as individualized learning and competency based learning, also on how well students use local resources in a smarter way. The hypotheses were built from the objectives and then tested, so we could see how engineering related factors connect with academic performance.
Result: The results show that engineering related factors have a significant effect, but it's dual natured, meaning they can help students, and they can also hold them back in terms of academic achievement and broader educational development. Factors linked to quality-like what comes from engineering practice-showed up as important drivers of learning outcomes. Individualized learning and competency based learning, plus improved use of local resources, were found to meaningfully shape student performance for both male and female groups.
Conclusion: Engineering actually plays a pretty substantial role in steering academic achievement at the university level, though the influence is kind of context dependent and it changes depending on how resources are used and which learning approach is chosen. Universities are encouraged to lean on technology driven and competency based strategies, but also to reduce the possible negative effects, so they can optimize student learning results and overall educational growth across genders.

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1. INTRODUCTION

1.1. Overview

Engineering is a field that has been growing rapidly in recent years [1]. With the rise of technological advancement, it's no surprise that engineering graduates are highly sought after in various industries. However, there's another aspect to this discipline that deserves attention-its impact on students' academic achievement at university level. In this blog post, we'll explore the crucial role played by engineering courses and programs in shaping student success and why it should be considered as an essential component for any aspiring student looking to excel academically [2]. So, grab your pens and get ready to dive into the fascinating world of engineering education. Engineering is one of the most dynamic and diverse fields that have a significant impact on society. It plays a vital role in advancing technological innovation, social progress, and economic growth [3]. But did you know that engineering also has a substantial influence on student's academic achievement at university level? Yes, that's right! The role of engineering in shaping students' academic excellence goes beyond traditional learning methods, providing them with practical knowledge and skills to succeed in their careers [4], [5], [6]. In this blog post, we will explore the fascinating ways engineering shapes students' academic outcomes and why it is essential for universities to prioritize this field of study [7], [8], [9]. So, fasten your seatbelts as we embark on an exciting journey into understanding how engineering can be the key to unlock success for university-level students!

1.2. Role of Engineering Factors

There are many factors that contribute to a student's academic achievement at university level, and engineering is just one of them. While it is certainly important for students to have a strong foundation in engineering principles, there are other factors that can play a role in their success. For example, students who are well- organized and can effectively manage their time will likely do better than those who struggle in these areas. Additionally, students who are able to work well in teams and communicate effectively will also be more successful [10], [11], [12]. Ultimately, each student's individual strengths and weaknesses will play a role in their academic achievement, but having a strong engineering background will certainly give them a solid foundation on which to build.

1.3. Learner in Engineering

As a learner in engineering, you will be expected to complete a rigorous academic program that will prepare you for a successful career in the field [13], [14], [15]. Engineering students must be able to apply theoretical concepts to real-world problems, and they must be able to communicate effectively with other engineers and technical personnel. You will also be expected to participate in hands-on projects and laboratory work as part of your engineering education.

1.4. University Learner Engineering

The role of engineering on students' academic achievement at university level is significant. Engineering is the process of designing, creating, testing and maintaining systems or products. It is a vital

part of many industries, including healthcare, communications, transportation and manufacturing [16], [17], [18]. As such, it is an important field of study for anyone interested in pursuing a career in one of these industries.

Engineering programs at universities typically include coursework in math, science and technology. This combination provides students with the skills and knowledge they need to be successful in their chosen field. In addition to coursework, many engineering programs also require students to complete internships or cooperative education experiences [19], [20]. These experiences give students the opportunity to apply what they have learned in the classroom to real-world settings.

The skills and knowledge gained through an engineering program can help students succeed in a variety of careers. Many engineers go on to work in the traditional fields of engineering, such as designing and building bridges or developing new medical devices [21], [22], [23], [24]. Others use their engineering skills to pursue careers in business or law. No matter what career path they choose, graduates of engineering programs have a solid foundation on which to build their future success [25], [26], [27], [28].

1.5. Motivational Findings

Real, actual projects would significantly improve engineering students' learning and decrease retention, according to numerous studies [29], [30]. Consequently, giving kids the chance to design, create, and construct like real engineers would motivate them significantly.

Either individualized learning or learning based on competencies. The application of technology in education [31].

New and different ways to help and finance students. Improved utilization of local resources.

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Author Contributions Statement

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Muzamil Hussain ALHussaini	✓	✓	✓	✓		✓		✓	✓	✓	✓			✓
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C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

Conflict of Interest Statement

The authors declare that there are no conflicts of interest regarding the publication of this paper.

Informed Consent

All participants were informed about the purpose of the study, and their voluntary consent was obtained prior to data collection.

Ethical Approval

Not Applicable.

Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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