NOVA IMS Information Management School

MDSAA

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Determinants of academic achievement

Mariana Godinho Martins

Thesis

presented as partial requirement for obtaining the Master Degree in Data Science and Advanced Analytics

NOVA Information Management School
Instituto Superior de Estatística e Gestão de Informação

Universidade Nova de Lisboa

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DETERMINANTS OF ACADEMIC ACHIEVEMENT

by

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Thesis presented as partial requirement for obtaining the Master's degree in Advanced Analytics, with a Specialization in Business Analytics

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STATEMENT OF INTEGRITY

I hereby declare having conducted this academic work with integrity. I confirm that I have not used plagiarism or any form of undue use of information or falsification of results in the process of its elaboration. I further declare that I have fully acknowledged the Rules of Conduct and Code of Honor from the NOVA Information Management School.

Mariana Godinho Martins

Lisboa, January 18th 2023

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Now that I have completed one of the most incredible journeys of my life, I cannot help but feel extremely proud and accomplished.

To NOVA IMS, which has become a second home for me in latest years.

To Professor Carlos, who believed in me when it seemed impossible for me to overcome this challenge and encouraged me to work and pursue my aspirations.

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ABSTRACT

As the world evolves and changes faster than ever before, the ability to properly form and educate future generations has never been more important. Understanding what drives student performance and how it leads to success is a fantastic way to create a better, more understanding school environment. The 236 responses to an online questionnaire were used to empirically validate a developed conceptual model. The PLS-SEM approach was used to analyze the data, and the findings indicate that students who are less motivated and eager to succeed in school perform more poorly. Furthermore, students who are not close to learning resources also perform more poorly. Because program design has a significant impact on student success, implementing adjusted and updated learning techniques is an effective tool to help students in achieving better outcomes. Finally, we can say that feedback has a mediator effect on the impact of program design, and that feedback has a greater impact on those students who are in poorly designed programs.

KEYWORDS

Academic achievement; Determinants; Student performance; Education

Sustainable Development Goals (SGD):

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1. INTRODUCTION

The European Union's growth and employment plan, Europe 2020, reaffirms the notion that education is one of the most important pillars of our society and lists education and training as one of the essential policies that contribute to the Continent's economic growth and social inclusion. The "Youth on the Move" program, which seeks to improve the effectiveness and international allure of Europe's higher education institutions, is one of the proposals advanced to achieve this pillar's goals. One of the key factors influencing economic development is human capital. Especially considering globalization and technological advancements, investing in education has both personal and societal benefits (Velden, 2013). By investing in human capital, individuals can give their community access to critical talents or a competitive advantage. To increase the stock of human capital, a variety of stakeholders including the government, policymakers, higher education institutions, and their students, have made educational investments.

A seminal study on the causes of student attrition, published by Tinto (1993), has been widely cited. Student achievement is a topic on which Kuh et al. (2007) have written extensively. After a sharp rise in the number of students enrolling in tertiary-level education, the conversation shifted from attrition to success. Marginson (2016) highlights that between 1970 and 2013 the world number of tertiary students multiplied by 6.12 while the global population grew by 1.93, based on data from UNESCO. Late in the 1990s, the rate of participant-increases accelerated. A 1% annual rise translates to 20% after 20 years. This implies that within the following generation, global participation will reach 50%, a shocking shift. Now that demographic and prior learning factors are no longer the primary predictors of student performance, we are entering a new phase. In a culture where higher education is available to the majority, how individuals do in their academic endeavors is tremendously significant.

Most prior research has concentrated on the demographic or social factors like gender, age, economic status, number of courses attended, internet access, etc. correlate with academic achievement (Bernacki et al., 2020; Cruz-Jesus et al., 2020; Garcia & Skrita, 2019; Rebai et al., 2020; Rizvi et al., 2019). For instance, Mims (2003) examined the application of real learning in the classroom and its impact on student achievement, whereas Muola (2010) investigated the effects of the home environment. Alturki et al. (2022) conducted a study that synthesized and reviewed the trends in predicting students' performance in higher education and concluded that gender and GPA are the most common features, followed by age and language proficiency. For studies related to more exclusive school variables, from study approaches to participation or even motivation, we have studies focused on the digital traces of students such as browsing, lesson time, and percentage of participation (Fernandes et al., 2019; Rubin et al., 2010; Waheed et al., 2020; Xu et al., 2019), studies related to learning skills and study habits (Ahmad & Shahzadi, 2018), social support, motivation, and health (Costa-Mendes et al., 2021; Gök, 2017; Musso et al., 2020), and lastly homework, project, and quizzes (Kardaş & Güvenir, 2020).

Studies that combine these socioeconomic and demographic elements with those that are exclusive to the school, such as the program's design and teaching techniques that might have an impact on students' success, have been rare. Quantifying student accomplishment and its variables has received much attention in previous studies. Academic achievement still differs among students even when they have comparable talents, study in the same setting, and follow the same curriculum. Hence it is a difficult topic to address in the academic literature (Muola, 2010). Furthermore, these challenges are

often associated in the literature with minority groups. However, even if a set of students does not belong to a minority group, it should not be assumed that they will receive the same grades for an assignment. This is because elements other than academics, such as social, psychological, economic, environmental, and personal difficulties have an impact on students' academic performance (Driessen et al., 2005).

This research improves our knowledge of the hurdles that students face in real-world situations as well as the facilitators that support students in improving their performance. The results make it simpler to understand potential strategies for helping students to achieve better outcomes over the medium and long term, which will ultimately have a positive impact on socioeconomic development. The study's results are thus expected to contribute to our understanding of how to support educational leaders over the long term, optimize their contributions within educational systems and academic institutions, and assist policymakers in the framework of a European nation.

This work does indeed have three contributions. First, we develop a deeper comprehension of the elements that affect academic success and student performance. Extensive research has been conducted to gain a better understanding of the determinants that affect academic performance. Second, we provide strategies for helping students to improve their performance. Implementing these strategies could have a beneficial effect on socioeconomic development in the medium and long term. Finally, all this research could help us understand how to support educational leaders and policymakers to maximize their contributions to student success.

In Section 2 the notion of academic achievement is explained, along with the study's variables, model, and study hypotheses, all of which are based on a thorough literature review. Then, we put the hypotheses to the test using the data from the online survey, and we thoroughly explain the analysis, procedure, and results. The study's conclusions, its constraints, and potential research fields are all discussed in the last part.

2. LITERATURE REVIEW AND HYPOTHESES

The literature review is divided into two sections: defining the terms success, engagement, feedback, and low motivation—all of which will be researched and heavily used in our research—and locating actual studies examining the effects of these elements on individual performance. This research was conducted through Google Scholar and Web of Science using the following keywords: student performance, academic success, engagement, motivation, and feedback. The chosen studies and publications were examined in the context of the current study theme and contrasted with one another to determine whether they provided comparable concepts and outcomes.

2.1. INDIVIDUAL PERFORMANCE AND ACADEMIC SUCCESS

Academic achievement is a key component of higher education and is regarded by the National Commission for Academic Accreditation as a critical criterion for evaluating the caliber of educational institutions. In 'Success in Higher Education' Wood and Breyer (2016) defend that higher education is crucial for society since it improves peoples' well-being, not only mentally but also physically, and is the way to improve economic prosperity. Due to these significant consequences, literature is particularly interested in the link underlying education and individual student performance, which begs the question of how to define and measure individual student performance.

Academic achievement is defined by Steinmayr et al. (2014) as a gauge of how far a student has advanced in academic performance and how effectively (s)he has met specified learning objectives. It is crucial to consider academic accomplishment as a multidimensional construct that includes several aspects of learning. Practically speaking, this means that a person's past, present, and future experiences at home, in the community, and at school can be viewed as a cumulative function of their academic achievement (Hanushek et al., 2014). Academic achievement was described by Gajda et al. (2017) as the result of learning as determined by grades in the classroom, evaluations, and achievement tests. Academic achievement is simply the degree to which students have successfully learned course material (Ho & Hau, 2008). Academic achievement, which typically crosses many disciplines, is the advancement made toward the objective of obtaining educational skills, resources, and knowledge (Bolt, 2011). Instead of general knowledge acquisition in non-academic settings, it relates to accomplishment in academic settings. Academic performance is typically perceived without a clear endpoint, unlike other types of achievement. Instead, the idea is viewed as a spectrum along which one can "achieve" abilities and information, with the option to always improve those abilities and broaden, deepen, and specialize knowledge. The main objective of academic achievement is to increase pupils' knowledge of their subject matter.

To conceptualize performance, we must distinguish between the behavioral component that is concerned with what an individual does while at work, but only actions that are pertinent to the goals of the business are considered: "Performance is what the organization hires one to do and do effectively". On the other hand, performance from the perspective of results depends less on the activity itself and more on the judging and evaluating procedures that surround it (Sonnentag & Frese, 2005). Additionally, the calculation of performance will only consider actions that can be quantified and scaled (Campbell et al., 1993). Exam results on national examinations, test evaluations, and individual student grades are a few instances of quantified behaviors (Chowa et al., 2015).

Despite this, the concept of "academic achievement" is nevertheless one of the most frequently used definitions in educational research and assessment. Possibly due to its ambiguity, many definitions can be found in the literature, some of which are pertinent, such as those for academic and student achievement, widely employed as a parachute for many different student outcomes.

Many perceive the conclusion of the degree and the positive grades as the ultimate academic success. Despite that, in 'What matters to Student Success' (Kuh et al., 2006) student success is described as the achievement of academic results while engaging in educational activities, along with the acquisition of knowledge, skills, and abilities. They also consider post-graduate performance as student success in higher education. In 'Defining and Measuring Academic Success' (York et al., 2015) the authors go into this definition, and defined it into six pillars: academic achievement, satisfaction, acquisition of skills and competencies, persistence, attainment of learning objectives, and career success. Academic success is often defined by the knowledge learned, the skills developed, and the capacity to do a task to the best of one's ability (Affuso et al., 2023).

Morton (2012) contends that we must consider both elements that improve performance and those that inhibit it. The latter are factors that could improve someone's performance or ability to execute their assignment as successfully as is practical. Recent years have seen a variety of research on students' academic achievement. Mushtaq et al. (2012), for instance, distinguish between internal and external factors that affect students' performance. The first category includes aspects of the classroom that are internal, such as the performance of the teacher, the methods of instruction employed, the materials and settings available for learning, and the size and composition of the class. The second category covers external variables including household and personal constraints and financial problems.

Our proposed model, shown in Figure 1, illustrates the hypothetical relationship between poor motivation and expectation, lack of proximity to learning resources, program design, feedback, and student individual performance.

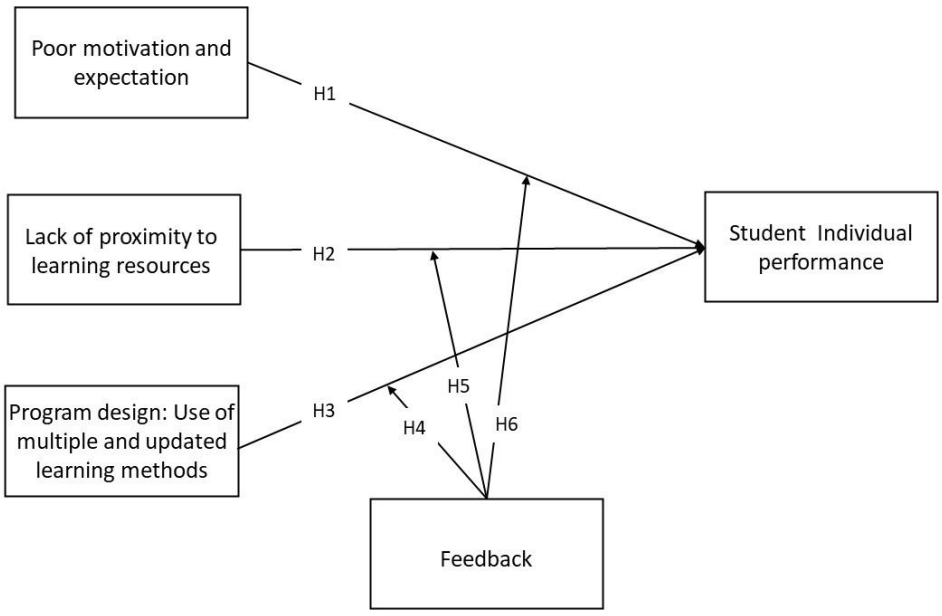

Figure 1- Research Model

2.2. POOR MOTIVATION AND EXPECTATION

There is a wealth of research on motivation that crosses many disciplines because it is important to a student's educational experience, but it has not received much attention in the context of an agenda for education reform that is primarily focused on accountability, standards and tests, teacher quality, and school management. (Usher et al., 2012).

According to Campbell and Pritchard (1976), the collection of psychological processes known as motivation are what lead to behavior's inception, direction, intensity, and persistence. Motivation describes the pursuit and achievement of goals. Pettinger (1996) defined motivation as being dependent on the environment. Denhardt et al. (2008) defined motivation as what causes people to behave the way they do, is the underlying state that drives people to act in particular ways to accomplish particular objectives and purposes. To reach certain objectives and purposes, people need to be motivated. In its broadest definition, motivation encompasses reasons for human conduct as well as the psychological processes that shape the intensity, direction, and persistence of human behavior (Middleton & Spanias, 1999; Wigfield et al., 2021). Satisfaction, on the other hand, is focused on the past while this internal condition, which occurs in people's minds and hearts and cannot be directly controlled, is focused on the future.

Learning motivation has a favorable impact on student accomplishment, influencing whether individuals attain low or notable levels of learning achievement, according to Wahyuni et al. (2007). When student performance and competence are evaluated against the standard of performance and excellence, learning and academic motivation are often described as the student's desire regarding their subjects. This enables students to engage in learning activities and maintain their learning status. On the other hand, a lack of learning motivation often has an impact on low student accomplishment. Aremu (1998) asserts that students' lack of interest in a subject influences how they respond to or pay attention to the teacher. According to psychologists, motivation is a crucial element of learning (Biehler & Snowmnan, 1986), and without an adequate drive to study, satisfactory academic learning is unlikely to take place (Fontana, 1995).

The desire to succeed in any endeavor, whether it is in school, the workplace, or athletic competitions, is known as achievement motivation. Hence, achievement behavior, such as task choice and the amount of effort put forth on achievement tasks, is influenced by success motivation.

According to Gesinde (2000) people differ in their motivation to succeed, with some having a strong desire while others have a weak one. As a byproduct, there are high achievers and poor achievers. The distinction may be explained by the idea that individual differences in socializing and learning experiences and individual differences in achievement motivation exist. Gesinde (2000) continues by stating that people who grow up with high achievers as role models are more likely to have a desire for success than people who grow up with low achievers.

Humans can be classed as having intrinsic or extrinsic motivation, preferably intrinsic. Extrinsic motivation is defined as an incentive or reward that a person can enjoy after completing his task, but intrinsic motivation is believed to emerge from within the job itself and is something that happens while a person is doing what (s)he appreciates and finds rewarding. Students are intrinsically motivated when they pursue pleasure, interest, curiosity satisfaction, self-expression, or a personal challenge in their work (Liu et al., 2020).

Numerous studies show that a lack of motivation for academic activities is one of the most serious academic issues confronting today's adolescents. As a result, there is a growing amount of study on emotions, which has inspired scholars to carry out meta-analyses on the relationship between emotions and academic success. Examples include the research on activity achievement emotions (Camacho-Morles et al., 2021; Higgins et al., 2019; Lazowski & Hulleman, 2016; Rosenzweig et al., 2022; Rosenzweig & Wigfield, 2016; Savelsbergh et al., 2016), emotions in technology-based educational experiences (Loderer et al., 2020), and single emotions such as boredom (Tze et al., 2016) or mathematics anxiety (Barroso et al., 2021). The investigation of many components of instruction in studies on emotions and motivation has drawn the attention of an increasing number of systematic reviews, meta-analyses, and overviews.

Desai (1979), Hirunval (1980), Krishnamurthy (2000), Thongsri et al. (2021), and Liu and Zainuddin (2021) also claim that academic motivation and success are positively and significantly related.

H1: Poor motivation and expectation negatively influence the student's individual performance.

2.3. LACK OF PROXIMITY TO LEARNING RESOURCES

There has been an ongoing and long-standing debate regarding whether increasing school financial resources will increase student accomplishment. This is because the relationship between school resources and student achievement calls into question several conventional policy approaches. Considering its policy significance, an enormous amount of research has been conducted on the relationship between school resources and student performance.

Many studies have been conducted to determine whether the level of resources influences the level of student learning. Some researchers report positive effects (Hedges & Greenwald, 1996; Krueger, 1999), while others detect negligible or even negative effects Hanushek (1996). The findings of these studies are mixed, which is not surprising given the differences in methodologies, level of analysis, and variables.

With the publication of the "Coleman Report," the investigation into the effects of school resources began in earnest (Coleman et al., 1966). The main finding of Coleman et al. (1966) was that factors linked to family context and community-level variables explained variation in student performance at the school level, whilst aspects related to school resources, such as pupil/teacher ratios, per-pupil spending, or teacher characteristics explained little to no variation. In other words, resources surprisingly had very little effect on achievement. Subsequent production function research, including reanalysis of Coleman et al.'s work, produced some results that supported Coleman et al.'s conclusions and others that challenged them.

Hanushek has published reviews of the literature (Hanushek, 1979, 1986, 1997) and he reached the conclusion that financial resources have no impact on academic performance. After examining the same set of empirical studies using various methods for integrating the findings, Hedges et al. (1994), Greenwald et al. (1996), and Hedges and Greenwald (1996) fetermined that there is a strong correlation between resources and academic success. They also concluded that variables intended to characterize teacher quality, as well as more general resources categories such as smaller schools and classes, are important. The interest sparked by this literature led to the development of study objectives in the areas of teacher characteristics (Hanushek et al., 2005), peer effects (Hanushek et al.,

2003), class size (Angrist & Lavy, 1999; Hoxby, 2000), and birth order and family size (Hanushek, 1992). The specificity of the production function has improved with the abundance of data sources, allowing researchers to focus on the function of certain traits.

According to Akande (1985), engagement with one's environment can lead to learning. The amenities that are accessible to support students' learning outcomes are referred to as the "environment." In a paper on the importance of facilities in teaching, Balogun (1982) claimed that no effective science education program can exist without teaching equipment. This is in order for children to acquire problem-solving skills and a scientific mindset. These amenities include the availability of desks, chairs, chalkboards, and shelves on which instruments for practical sessions are arranged, as well as the size of the classroom, sitting posture and layout, books, audio-visual equipment, software, and hardware of educational technology (Farombi, 1998; Farrant, 1991).

Students will not only have access to the reference materials given by the teacher but will also learn at their own pace when facilities are supplied to satisfy the relative needs of a school system, according to Ajayi and Ogunyemi (1990). All children's' overall academic performance has increased as a result. Facilities are one of the significant features that influence academic accomplishment in the educational system according to Hallack (1990), who makes this claim in the same year. Examples of what is included are school buildings, classrooms, accommodations, libraries, labs, furniture, recreational equipment, apparatuses, and other educational resources. He continued by saying that their accessibility, availability, appropriateness, and relevance are all factors in academic performance.

In a more recent study, Maxwell (2007) determined that the physical environment of a classroom influences preschool children's cognitive competencies. Students in classes with higher ratings on physical qualities related to attributes such as control, privacy, complexity, and so on outperformed counterparts in classrooms with lower ratings on a test of cognitive abilities. Bullock and Lemasters (2007) discovered that students fared better in newer or recently renovated institutions than in older ones and that student achievement was positively correlated to the general building condition, the structure's age, and the windows in the classrooms.

H2: Lack of proximity to learning resources negatively influences the student's individual performance.

2.4. PROGRAM DESIGN

In addition to personal characteristics such as motivation and initiative, structural elements including curriculum design and university faculty strategic actions also have an impact on student participation in research and other related activities (Agud & Ion, 2019). New research supports the premise that intentional curriculum design may foster students' well-being (Slavin et al., 2012, 2014; Tang & Ferguson, 2014). The curriculum has a significant impact on how well students perform in class, how they perceive themselves, and how well they are prepared for the future (Gouëdard et al., 2020). As a result, the curriculum serves as both a product and a process designed to enhance and deepen learning results. Therefore, the curriculum, procedures, and approaches employed in the classroom have received a great deal of attention in recent years.

According to Barnett (2009), what and how are the two key questions that should be addressed and responded by curriculum design, these two queries aid in tying instructional strategies to the

epistemological activity that is typical of knowledge construction. Similarly, Neary and Winn (2009) suggest an educational experience where professors and students may work together on research projects to democratize the process of knowledge generation at the society level.

Since it determines what to teach and learn in schools, curriculum reform to account for shifting social, cultural, and economic contexts has been a major driver in OECD countries and a source of concern in many other countries. This reform has been seen as a way to address certain issues, like subpar educational performance, high dropout rates, higher stress levels among students and teachers, or a dearth of labor-market skills. Its increasing importance is related to one of higher education's functions of transforming students through engagement with research and knowledge (Ashwin, 2014).

Curriculum design research is a challenging but necessary task (Young, 2014). However, different countries have different visions for curriculum change that are tailored to their unique context. The country's policies, objectives, missions, and educational vision are interpreted and transformed into general purposes, which school teachers can easily translate into instructional purposes and learning standards. Nonetheless, several significant global trends in curriculum design have arisen. Amongst the most recent is the switch from a content-based to a competence-based curriculum (Bergsmann et al., 2015; W. Pinar, 2013; Wesselink et al., 2010). The broad use of competency-based curricula implies an emphasis on the synthesis of knowledge, skills, and character traits that enable an individual to do a specific task in complex and unique situations (Wesselink et al., 2010).

Awang et al. (2017) demonstrated that students learn differently depending on the learning method used. Because teaching styles and strategies affect student motivation and engagement, which in turn affect student achievement, selecting a suitable learning method that will help students achieve better results should be prioritized (Ilçin et al., 2018).

According to Zubair et al. (2017), active learning preferences have a direct and significant impact on MBA students' performance at private institutions in Malaysia. This is because students in active learning classrooms are often more energized, enjoy participating in discussions and dialogue with other students and networking with lecturers, and spend more time in peer groups where they absorb and retain information that will help them achieve better results (Felder, 1988).

Another important aspect of curricula is the people in charge of their creation and implementation. Curriculum designers with design experience, subject-matter knowledge, and pedagogical knowledge are needed to create a high-quality curriculum (Huizinga et al., 2014).

H3: Program design positively influences the student's individual performance.

2.5. FEEDBACK

Feedback is often defined as information provided to students about their performance that directs future conduct (Ambrose et al., 2010). It can help students to focus on their areas for growth and progress and connect them to future learning opportunities. Feedback is viewed as facilitative since it entails giving students comments and recommendations so they may make their modifications. It also involves engaging students in conversation so they can learn new things without being told what they

should learn (Archer, 2010). Numerous studies have been conducted in the area of evaluation and feedback, especially in higher education (Iqbal & Shafi, 2019; Thakur et al., 2021).

In higher education settings, there is a sizable and expanding corpus of research on feedback and its significance for student learning. The ability to monitor, analyze, and manage one's learning is considered to be essential in helping students become independent learners who can continue learning beyond graduation into professional practice(Ferguson, 2011).

A co-constructivist perspective highlights the dynamic aspect of learning, emphasizing how the lecturer also gains knowledge from the student through conversation and involvement in shared experiences (Carless et al., 2011). Interactions among members of learning communities in these settings result in shared understandings as part of the development of communities of practice (Wenger et al., 2002), with the student taking on additional responsibility for seeking out and acting on feedback. Since online assessment and feedback are gradually replacing examination procedures in higher education, both the instructor and the students must adapt to new methods, styles, and materials of assessment and feedback. Some of the evaluations examine novel assessment and feedback techniques in the contemporary environment using methodologies such as qualitative, quantitative, and mixed method approaches (García-Peñalvo et al., 2021; Huber & Helm, 2020; Papamitsiou et al., 2021).

Peer evaluation is a significant student-to-student collaboration that goes beyond this interaction with teachers and staff. Much research on peer- and self-assessment has come to the realization that peer- and self-evaluation enhance student achievement, their involvement in class, and skills (Ibarra-Sáiz et al., 2020; Izgar & Akturk, 2018; Ndoye, 2017; Saralch et al., 2019), as well as having a beneficial effect on students' learning autonomy, self-skills, and self-motivation caused by peer assessment(Al-Khalifa & Devlin, 2020; Shen et al., 2020).

In a recent study, students received individualized feedback messages based on their participation and performance on formative tests. The feedback provided to students aids them in assessing their understanding of their learning achievements and offers suggestions on how to improve upon that outcome. According to the research, tailored feedback helps students understand the performance gap between their current level of achievement and their intended level (Lim et al., 2021).

According to the possible influence of feedback on future practice and the formation of students' identities as learners, the type of feedback students receive when they enroll in higher education will have a significant impact on how they study in the future, whether on purpose or by mistake. As a result, we must learn much more about how their learning and even their views of their professional identities are impacted by the type of feedback they receive, necessitating additional research on feedback.

Motivation can be achieved by implementing suitable assessment and feedback procedures and situations. Several research have shown that evaluation and feedback procedures have an impact on student motivation. Schunk (1983) showed that success-related ability feedback enhances self-efficacy and competence more than success-related effort feedback or ability-effort feedback alone. In 1986, he published a study in which learning-disabled children were either given feedback on their effort throughout the first or second portion of an instructional program, or they received no feedback at all. The author concludes that students who received feedback in either half of the program demonstrated greater drive, skill, and self-efficacy than subjects who did not receive feedback, and that feedback

given in the first half increased effort attributions and motivation during the first half of the program (Schunk et al.,1986). Nikou and Economides (2016) conducted a study that demonstrates the impact of evaluation on students' motivation and accomplishment during the learning process. Feedback is commonly discussed in the context of formative assessment, but it is now being explored in the context of self-regulated learning, self-evaluation, and peer assessment. Papamitsiou et al. (2021) discovered that students' motivation is highly associated with their self-assessment. They create a self-assessment dashboard that presents a list of activities that students must complete.

H4: Feedback moderates the relationship between poor motivation and expectation and student's individual performance.

Most research correlates socioeconomic status with a lack of resources in schools and academic settings, and it has been demonstrated time and again that low socioeconomic students require more structure and positive reinforcement from the teacher, as well as receiving the curriculum in smaller packages followed by rapid feedback (Ledoux & Overmaat, 2001), demonstrating a link between a lack of resources and feedback. Teachers are a crucial component of feedback, and institutions may vary in the way resources are provided and used, as well as in the culture of learning and intellectual atmosphere throughout the entire institution (Griffin et al., 2003). It is conceivable that teachers in certain universities obtained better training as a result of these difficulties, leading to a higher level of feedback activities (Gan, Hoi, et al., 2019; Gan, Leung, et al., 2019).

H5: Feedback moderates the relationship between lack of proximity to resources and student´s individual performance.

Feedback is a complex intervention that goes beyond the conventional notion of giving students constructive criticism of their work to encompass subjects that cannot be reduced to rules or even self-contained groups of activities. Feedback emphasizes the importance of viewing higher education through the prism of the curriculum, which is something that is often overlooked (Barnett & Coate, 2005). Only by adopting a more expansive curriculum perspective than a learning or assessment perspective will feedback be properly positioned, shifting from its presumptive position as a feature of how teachers interact with students to one in which it is seen as an attribute of the curriculum, positioning it as a key component of student engagement. Feedback has thus become a crucial component of the curriculum for acting, knowing, and speaking. It is not something that teachers or students perform; rather, it is a crucial element of any curriculum, the success of which serves as a significant predictor of the overall success of the study program (Boud & Molloy, 2013). Assessment analytics and feedback framework have both individually and together influenced students' accomplishment in higher education by influencing curriculum design, outline, design, content, interactive activities, and delivery (Hooda et al., 2022).

A curriculum or course that actively engages students via the use of a variety of exploratory and analytical strategies will make the learning process more dynamic and beneficial for student achievement. This is also because it is widely held that content is the most effective motivator. Curriculum and assessment work together cyclically and iteratively to provide students and teachers with direction and emphasis (Wijngaards-de Meij & Merx, 2018). A "Learning Design-Analytic" (LDA) model was created by Yan et al. (2021) to assist in providing recommendations to online instructors for course design techniques. The authors identify anomalies in the course's learning materials by using formative evaluation and providing difficult students with timely feedback.

H6: Feedback moderates the relationship between program design and student's individual performance.

3. METHODOLOGY

3.1. MEASUREMENT

A two-part questionnaire was developed for the model operationalization process. The model's constructs are evaluated in the first section using a seven-point numerical scale (1 = entirely disagree, 7 = completely agree). The second section deals with the sample's characterization. Age, gender, marital status, line of employment, and educational background are all addressed in the characterization. It concludes with two queries about the reader's level of familiarity with the subject and the Nova IMS institution.

We simply adapted our questionnaire's assessment items to the topic under investigation rather than make any significant adjustments. The items related to poor motivation and expectation (PME) are those mentioned by Wolf and Smith (1995); lack of proximity to learning resources (LPR) are those mentioned by Chavoshi and Hamidi (2019) and Sciarelli et al. (2020); program design (PDQ) are those mentioned by Sciarelli et al. (2020); feedback (FB) are those mentioned by Decius et al. (2019); and individual performance (IP) are those mentioned by Urbach et al. (2010). Appendix A shows the items for all constructs.

3.2. DATA

Portuguese internet users were sent the survey, through Facebook, WhatsApp, LinkedIn, and email. The questionnaire was produced in English and translated into Portuguese. A seven-point numerical scale, from strongly disagree (1) to strongly agree (7), is used to evaluate items.

We received 236 valid responses. Our data reveal that 53% of participants were female, 53% were between the ages of 23 and 25, 42% were under the age of 23, and only 5% were over the age of 25, and that 58% had a bachelor's degree as their highest level of education, 16% had a degree that was lower than a bachelor's, and 26% had a master's degree or a higher level of education. Additionally, 60% of participants were still students, meaning they were enrolled in school, 38% were employees, only 1% were self-employed and 1% were unemployed.

Table 1- Sample Characteristics

Distribution (n=236)					
Gender			Education		
Male	112	47%	Lower than bachelor’s degree	38	16%
Female	123	53%	Bachelor’s	137	58%
			Master’s degree or higher	61	26%
Age					
<23	99	42%	Occupation		
23-25	126	53%	Employee	90	38%
>25	11	5%	Self-employed	2	1%
			Student	141	60%
			Unemployed	3	1%

4. RESULTS

Structured equation modeling using partial least squares was used to analyze the data (PLS-SEM). The PLS approach is acceptable and appropriate for this study because this type of model is intended for prediction, none of the elements have a normal distribution, and the research model is thought to be thorough (Henseler et al., 2009). Using SmartPLS 3.2.7 (Ringle et al., 2015), we tested our proposed model. SEM hypotheses are evaluated twice: once with measurement models and again with structural models.

4.1. MEASUREMENT MODEL

In order to determine a measurement model's validity and utility, we adhere to the recommendations made by Matsuno et al. (2005). Internal consistency, convergent validity, and discriminant validity are analyzed for the measurement items.

4.1.1. Internal Consistency

Cronbach's alpha (CA) and composite reliability (CR), which both need to be above 0.7 for all latent variables, are the requirements to measure internal consistency. As can be seen in Table 3, this requirement has been met. As a result, and as seen in Table 3, where CA and CR coefficients are presented, we can check that both values are more than 0.8, and we may therefore infer that the model has good internal consistency.

4.1.2. The convergent validity

To guarantee that the latent constructs explain more than half of the variation of their indicators, the average variance extracted must be higher than 0.50. The AVE for each construct is more than 0.50, as shown in Table 3, indicating convergence.

4.1.3. The discriminant validity

The following three factors determine the discriminant validity: the square root of the AVE should, according to Fornell and Larcker (1981), be greater than its connection with any other construct. We can verify that the square root of AVE satisfies the requirement, as seen in Table 3.

Second, we must examine the cross-loadings requirement to demonstrate discriminant validity. The item loading must be greater than all cross-loadings, according to this test (Grégoire & Fisher, 2006); (Götz et al., 2010). The bold numbers in Table 2 indicate that the loadings are greater than the cross-loadings, indicating that the condition has been met.

Third, as indicated in Table 4, if the HTMT ratios have a value lower than 0.9, the HTMT criterion shows that there is discriminant validity between constructs (Henseler et al., 2015).

Table 2- PLS loadings and cross-loading

Constructs		Motivation	LearnResource	Program design	IndPerf
Poor motivation and expectation	PME1	**0.605**	0.259	-0.029	-0.123
	PME2	**0.618**	0.229	-0.076	-0.147
	PME3	**0.602**	0.208	-0.077	-0.086
	PME4	**0.852**	0.170	-0.150	-0.231
	PME5	**0.714**	0.142	-0.127	-0.174
	PME6	**0.803**	0.172	-0.171	-0.189
	PME7	**0.474**	0.194	-0.046	-0.056
	PME8	**0.751**	0.227	-0.182	-0.365
Lack of proximity to learning resources	LPR1	0.239	**0.656**	-0.012	-0.178
	LPR2	0.253	**0.895**	-0.209	-0.255
	LPR3	0.176	**0.822**	-0.177	-0.151
	LPR4	0.224	**0.847**	-0.196	-0.162
	LPR5	0.226	**0.858**	-0.264	-0.211
Program design	PDQ1	-0.156	-0.174	**0.889**	0.603
	PDQ2	-0.152	-0.240	**0.882**	0.573
	PDQ3	-0.179	-0.162	**0.912**	0.538
Individual Performance	IP1	-0.263	-0.144	0.606	**0.873**
	IP2	-0.288	-0.267	0.599	**0.891**
	IP3	-0.299	-0.230	0.592	**0.918**
	IP4	-0.252	-0.226	0.543	**0.898**
	IP5	-0.236	-0.213	0.526	**0.855**
	IP6	-0.268	-0.200	0.531	**0.874**

Table 3- Correlations, and reliability and validity measures (CR, CA) of latent variables

Constructs	CA	CR	Motivation	LearnRes	Progdesign	IndPerf
Poor motivation and expectation	0.851	0.941	**0.687**			
Lack of proximity to learning resources	0.875	0.903	0.276	**0.820**		
Program design	0.875	0.876	-0.181	-0.215	**0.894**	
Individual Performance	0.945	0.946	-0.303	-0.242	0.641	**0.885**

Table 4- Heterotrait-Monotrait Ratio of correlations (HTMT)

Constructs	Motivation	LearnRes	Progdesign	IndPerf
Poor motivation and expectation				
Lack of proximity to learning resources	0.329			
Program design	0.178	0.247		
Individual Performance	0.276	0.257	0.702	

4.2. STRUCTURAL MODEL

Figure 2 shows the path coefficients and t-statistic values derived from R^2 bootstrapping with 5,000 resamples. The estimations of the coefficients in a bootstrap distribution are comparable to the sample distribution and can be used to estimate the parameter's population standard error. T-values can be used to determine the significance of each indicator. To assess multicollinearity, the variance inflation factor was used (VIF). It is concluded that no multicollinearity exists because all constructs meet the condition with values less than 5 (Hair et al., 2016).

Therefore, we can assume that 51.7% of the variation in student individual performance can be explained by the model. The poor motivation and expectation ($\hat{\beta}$ = -0.163, p < 0.001), the lack of proximity to learning resources ($\hat{\beta}$ = -0.102, p < 0.001), program design ($\hat{\beta}$ = 0.513, p < 0.001), and feedback as a mediator in program design (β = -0.062, p < 0.1) are statistically significant, validating four hypotheses (H1, H2, H3, H4).

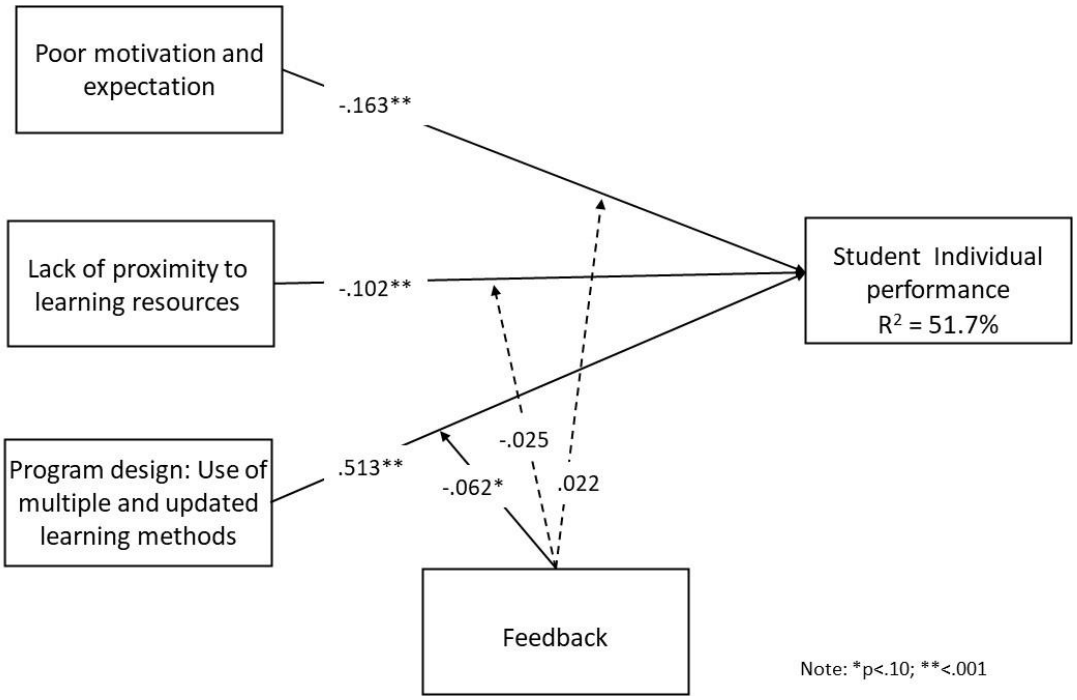

Figure 2- Estimated Research Model

5. DISCUSSION

5.1. THEORETICAL IMPLICATIONS

By using an all-encompassing, practical, and comprehensive methodology, we hope to contribute valuable information to educational literature. The main advantage of our study is that we combine all previously tested models into one with all the main possible factors – demographic and social factors as well as school factors that may be relevant when studying student achievement and success. Based on our findings, which mostly support previous research on related constructs, we can conclude that four of the six hypotheses are empirically supported.

Wahyuni et al. (2007) argued that learning motivation improves student achievement, and our findings support this. Hypothesis 1 (H1) is supported by a strong negative statistical relationship between low motivation and expectations and student individual performance ($\hat{\beta}$ = -0.163, p 0.001). According to the findings, motivation and expectations are important factors in academic development. According to Walkey et al. (2013), promoting low or even moderate academic achievement expectations and aspirations perpetuates lower academic achievement. Motivation, according to Patall et al. (2008), is associated with high levels of effort and task performance, as well as a preference for a challenge, all of which are desirable attributes to cultivate in students who will compete in the most educated workforce in history. Strong conceptual learning, enhanced memory, and high academic accomplishment are all more likely to occur in children who are more motivated than others (Gottfried, 1990).

Some contend that the two variables cannot be positively correlated because resources have increased over the past few decades, while achievement appears to have decreased. This claim must imply that all other factors affecting the price of education and the level of student success have remained the same. This presumption is false because social capital that families can employ to replace educational resources has undergone major changes (Greenwald et al., 1996b). Therefore, regarding Hypothesis 2 (H2), we conclude that students' performance is negatively impacted by their lack of proximity to resources ($\hat{\beta}$ = -0.102, p 0.001). Despite the controversy in the literature, our study supports those who argue that the availability of resources has an impact on academic success and performance. The research by Ehinola and Oyewole (2011) also found a significant correlation between the availability of resources and academic performance. However, this finding also suggests that without a substantial infusion of resources into the system, expectations of better and higher performance in the school system may be illusory.

Our third hypothesis (H3), that the use of multiple and updated learning methods improves student performance, was also supported ($\hat{\beta}$ = 0.513, p 0.001). This statement is supported by most studies. Good academic results can be obtained by tailoring learning methodologies to the needs of students (Slavin et al., 2012, 2014; Tang & Ferguson, 2014). Using different teaching methods and encouraging more hands-on learning (Newmann et al., 2001) appears to play a key role in students' academic success. Being able to put what they have learned into practice helps students reinforce their strengths while also allowing students and professors to recognize their difficulties and weaknesses. The curriculum molds students' university experiences by influencing what and how they learn, as well as shaping their attitudes, behaviors, and worldviews. The curriculum's success in fostering students' autonomous motivation and offering opportunities for learners to explore knowledge, autonomy,

interactions, and inclusion will either enhance or impede student well-being. As a result, the curriculum is both a product and a process designed to facilitate and deepen learning outcomes (Barnett, 2009).

Our fourth, fifth, and sixth hypotheses are based on feedback as a mediator of the last three determinants' influence. Our study supported only one of the three, hypothesis six (H6), which states that feedback has a mediator effect on the effect of program design. Low feedback varies more, as shown in Figure 3, and this is explained by the fact that the program design has a greater impact on someone who receives lower feedback. So, for a student who does not receive feedback, the program design has a greater impact, whereas someone who receives and requests more feedback to improve their performance is less influenced by the program design. Even though the two other hypotheses are supported by some literature, we found no evidence for that in our study.

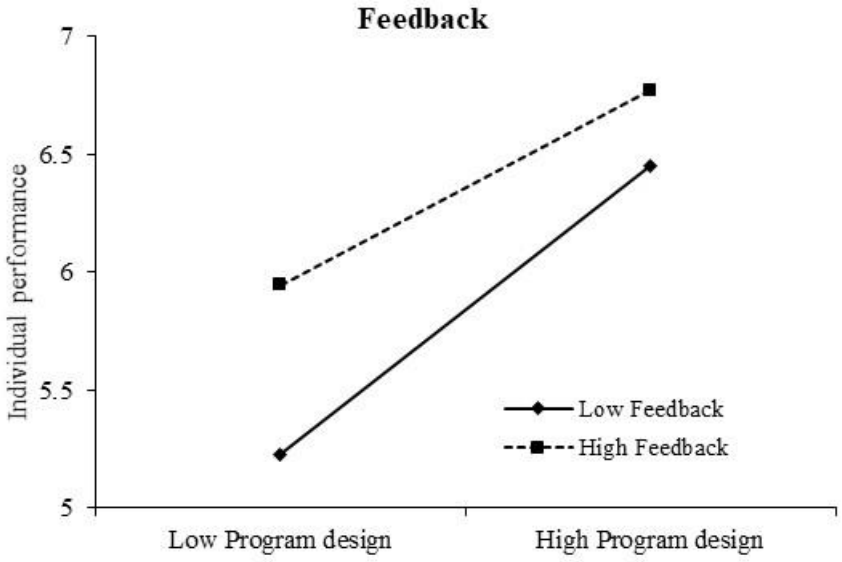

Figure 3- Moderator Effects

5.2. PRACTICAL IMPLICATIONS

As our research has shown, investing in greater motivation, better and more efficient resources, and updated programs improves student success. Being able to motivate and set grand expectations for students is one of the most effective ways to achieve this goal, but because we cannot directly motivate someone, we must implement methods that sow motivation. Positive reinforcers like praise have the power to increase both internal and external motivation. As a result, we should encourage school psychologists to place more emphasis on praise that fosters autonomy, such as summarizing the student's progress toward academic or interpersonal competency with enthusiasm, praising them for their zeal and perseverance, using smart tactics, or being expressive. Additional studies on parental autonomy support strategies that have the potential to increase intrinsic motivation to learn at both

home and school, might be performed by school psychologists (Froiland, 2012). The controlling parenting styles that have been associated with children's lower levels of intrinsic drive, perfectionism, and depression can be improved, according to school psychologists who work with parents (Froiland, 2011; Kenney-Benson & Pomerantz, 2005).

To combat the lack of proximity to resources and provide students with the necessary facilities for success, we must improve our education systems. This would provide schools and their staff with updated facilities to meet students' needs. Physical material resources for students should be adequate, relevant, and up to date. These are the duties of the Ministry of Education's educational planners and administrators, the government, and parents, who must see to it that the tools required for learning are made available in the classrooms.

As the world changes faster than ever before, keeping our programs up to date and employing various methods and techniques to teach students is more important than ever. We now understand that one size does not fit all in academia, so we are developing more tailored programs for individuals, based on feedback from all educational participants. Giving schools more authority to use their funds for special needs is one way to accomplish this. Students benefit greatly from feedback when it is given at the right time and by the right person, so we should provide students with detailed information about their performance as well as tools to help them minimize their weaknesses and promote their strengths. To keep programs current, we could send out questionnaires and surveys to school staff and students, encouraging active participation in all aspects of school life.

6. CONCLUSION

As the universe of academic achievement and performance continues to evolve, studies pertaining to and determining this will also be required and updated. However, even in today's environment there is still much that can be done to understand how both personal and academic factors determine success. Students who are less motivated and driven to learn, lack access to good and well-curated resources, and do not learn through good program design are less likely to succeed. All of these are urgent and pressing issues that must be addressed in our educational systems. Academic achievement is hampered by a lack of expectations and motivation to succeed. Academic success is influenced by school facilities, equipment, and materials, as well as their accessibility, relevance, and adequacy. We can now assert that a well-applied adjusted and updated learning method is a powerful tool for academic success. It can lead to increased student cooperation, collaboration, and engagement, all of which have been shown to be necessary for improved student individual performance.

7. LIMITATIONS AND RECOMMENDATIONS FOR FUTURE WORKS

The study has some limitations that need to be recognized. The first is connected to the sample's demographic breakdown and the constrained amount of time available for data gathering. The data were gathered in a single country and most of the respondents held a bachelor's degree or better. It will be intriguing to observe if our findings hold for samples from various demographic groupings, educational backgrounds, and other nations.

Our study gathered responses from students at a single moment at a single level of schooling, and the perception of our variables can influence academic results differently in different levels of schooling for the same person. A study of student performance over time, in which each student is "documented" throughout their academic career, would thus be undeniably beneficial.

Because the concepts of individual performance and academic success are both broad and specific, more determinants should be considered.

Finally, while it was not the goal of our study, we recommend additional research into each factor. While we sought to provide some answers during our discussion, it would be valuable to ensure their viability and demonstrate how to successfully implement them.

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9. APPENDIX

Appendix A - Items

Constructs		Items	Adapted from
Poor motivation and expectation	PME1	Obtaining good grades in the last semester/year was not important for me.	Wolf and Smith (1993)
	PME2	I am not worried about the grades that I received last semester/year.	
	PME3	This last semester/year was not very important to me.	
	PME4	I didn't give my very best effort in this last semester/year.	
	PME5	I could have worked harder in this last semester/year.	
	PME6	I did not give this last semester/year my full attention.	
	PME7	I wasn't/am not eager to find out the grades that I obtained last year/semester..	
	PME8	I wasn't/am not highly motivated for this semester/year.	
Lack of proximity to learning resources	LPR1	I don't have the necessary resource required to obtain good results at school.	(Amir Chavoshi, Hodjat Hamidi 2019)
	LPR2	My institution doesn't have the proper infrastructure for me to obtain the best results.	
	LPR3	My institution doesn't have modern facilities (e.g., laboratories, library, computers, Internet) to enhance the effectiveness of education.	(Mauro Sciarelli,Mohamed Hani Gheith, 2020)
	LPR4	In my institution facilities (e.g., classrooms, laboratories, computers, heating systems and air conditioners) are not maintained in good condition according to periodic maintenance plans.	
	LPR5	Efforts are not being taken by the institution to update the library, laboratory facilities, and courses following the recent updates/advances in science and technology.	
Program design: Use of multiple and updated learning methods	PDQ1	My institution often develops new teaching materials and methodologies.	(Mauro Sciarelli,Mohamed Hani Gheith, 2020)
	PDQ2	In my institution curriculum and academic programs are evaluated and updated every year.	
	PDQ3	My institution incorporates new techniques/inputs in producing programs/services.	
Feedback	FB1	I ask my teachers how well I worked in a project/ course.	(Julian Decius,Niclas Schaper,Andreas Seifert, 2019)
	FB2	I ask my teachers when I am not sure how well I worked in a project/course.	
	FB3	I ask my colleagues when I am not sure how well I worked in a project/course.	
	FB4	I ask my colleagues about their experience in a project/course.	
	FB5	I ask my colleagues about the methods and tricks they use in a project/course.	
	FB6	I obtain tips and hints about work from my colleagues.	
Individual Performance	IP1	The educational system of my institution enables me to accomplish tasks more quickly.	(Urbach et al., 2010)
	IP2	The educational system of my institution improves my academic performance.	
	IP3	The educational system of my institution increases my academic productivity.	
	IP4	The educational system of my institution enhances my work effectiveness.	
	IP5	The educational system of my institution makes it easier and helps me to accomplish tasks.	

IP6	The educational system of my institution is useful and influences my academic performance.

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