



Effect of Self-Paced Learning on Students' Academic Achievement at University Level

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Abstract:

This research is an investigation on the interactions among self-paced learning, self-efficacy, and academic achievement within a self-paced learning program. The initial objective of the study was to learn the effects of these factors on the academic performance of students and to find the relevance of the relationships. The sampling technique was simple random sampling and sample size was 180 students. Students were chosen from undergraduate level from IIUI and NUML, and both the descriptive and inferential statistics were used to analyze the data. Regression analysis showed that there was a positive and statistically significant association between self-paced learning and self-efficacy as well as academic achievement. To be more exact, a rise in self-paced learning has been observed to trigger the rise of academic performance. Equally, the better the academic performance, the higher the level of self-efficacy. It was found that self-paced learning and self-efficacy are related to academic performance, as they explained 10.6% of the variance in the academic achievement, which implies that other variables might also be involved in the academic performance of students. The research is very helpful to teachers and learning institutions where encouragement of self-efficacy and facilitation of self-paced learning are emphasized to improve the outcomes among students. The implications of these findings in practice are that they could be used to improve self-paced learning conditions, especially in terms of motivating students and boosting their academic performance. The limitations of the study, including sample size and cross-sectional research design, indicate that more studies should be conducted to understand other variables that influence learning outcomes and determine the long-term effect of self-paced learning on school performance.

Keywords: *Self-Paced Learning, Self-Efficacy, Academic Achievement, Educational Implications, Learning Environments, Student Performance*

INTRODUCTION

Education has been one of the cornerstones of social growth, individuals, social mobility, and economic growth. As the world economy and technology keep changing, the educational systems are being requested to keep afloat to meet the various needs of learners. The educational environment has undergone an absolute transformation over the last several decades when it became more focused on a personalized learning process due to the technological progress, especially the introduction of online learning tools and their common usage. Classroom learning has been traditionally teacher-centered, where curricular instructions are structured in paces that are fixed and rigid for learners. Nevertheless, with the rising social consciousness of the different learning needs of students, the orthodox approaches to learning are often being observed as not being enough to support different approaches and preferences of the learners. The emergence of self-paced learning as a model of teaching provides a more suitable model that is more suited to meet the individual learner with his/her own pace of learning and preference.

The conventional classroom setting is also full of rather strict setups where students are supposed to follow the learning course content at a steady flow irrespective of how much they actually understand the content. Particularly, in big classes that involve lectures, this standardization can be difficult since students are not given a chance to communicate with an instructor one-on-one. Students who are unable to maintain the course speed tend to develop frustration and disengagement due to research, which may adversely affect student academic performance (Grigorkevich et al., 2022). Conversely, the students with high aptitudes and capabilities to acquire knowledge rapidly may be disinterested or bored because of the absence of challenges available in the traditional, instructor-driven learning environments. It is therefore evident that conventional classroom-based pedagogic approaches might not be the best way to address the needs of a diverse student population, especially in courses with high conceptual demands.

The market has failed in these challenges; hence, self-paced learning has been introduced as a viable option. Self-paced learning is defined as a type of education in which the learner is given the freedom to determine their own education timelines, learning at their own pace, and re-running material in case mastery needs to be attained. Digital learning platforms frequently support this strategy and enable students to learn and communicate with their instructors, do homework, and track their progress without the supervision of a teaching assistant. Balaskas et al. (2025) explain that self-paced learning presupposes fewer cognitive burdens, as it allows the learners to study at their pace, which corresponds to their personal cognitive requirements. Self-paced learning can potentially improve academic performance by making students have greater chances of engaging more by being at their own pace to absorb the learning content.

The emergence of digital technology has contributed largely to the embracement of self-paced learning. Learning management systems (LMS) and other tools used in online learning allow students to consume course materials in areas, which provide a great level of flexibility due to the ability to use them asynchronously. The impact of the COVID-19 pandemic on the world turning to online and hybrid learning models demonstrated the possibilities of the self-delivered learning environment in achieving academic continuity and supporting student success. According to Yu et al. (2022), small groups through digital learning receive the ability to regulate the timing and the manner in which access to course materials occurs and are the most likely to motivate and instill the feeling of autonomy. Additionally, the sites allow teachers to provide real-time feedback,

monitor student progress, and offer each student specific assistance, which is critical to student engagement and success in self-paced environments.

Interest in self-paced learning is increasing, especially in Internet-based education, it is still deficient in empirical proof about its effectiveness, that is, in the context of higher-level education. It has been a commanding practice in K-12 teaching and in the self-directed learning of professionals, yet little has been explored about the implementation of self-paced learning in higher education, particularly in the specialized learning of complex topics such as social science. Self-paced learning can be used in particular courses or modules in many university settings, and its effects on academic achievement are not acutely researched. Study on self-paced learning in higher education has significantly considered the level of satisfaction and engagement of students, yet not much has been discussed in terms of its impact on learning activities and academic outcomes (Siregar and Winarsih, 2025).

Such a gap in the literature is important, as social science courses are usually faced with particular difficulties when it comes to learning, as there is so much complexity in the content of such courses. Such subject areas as Education, Sociology, Psychology do not just demand an acquisition of the basic knowledge but also train the skills of critical thinking and the ability to handle some problems. In that regard, self-paced learning would give students a chance to learn at their own pace, giving them the chance to spend more time on the challenging material and quickly go through the already grasped content. Nevertheless, it is also hard to have a say on whether higher education institutions should apply self-paced learning without a thorough notion of its impact on academic performance.

Self-paced learning has been proved to enhance motivation and retention in some cases, it does not prove to be effective in all students. The most important challenge with self-paced learning is that to attain self-paced learning, students have to be very self-regulated since they primarily have to manage their time, establish goals, and track their improvements. According to the research by Siregar and Winarsih (2025), students with a low level of self-regulation skills can perform poorly in a self-paced setting, thereby resulting in procrastination, loss of motivation, and poor academic results. Moreover, the students that are not accustomed to using online learning platforms or who do not have good access to technology might experience further obstacles to success. Such difficulties imply that the self-paced learning is not equally effective for all students and that its delivery within the university curricula must be carefully considered in terms of the support systems that need to be in place to guarantee fair access and achievement.

The effectiveness of teaching strategies plays a critical role in determining students' academic success, particularly in core subjects. Traditional classroom instruction often fails to accommodate students' individual learning speeds and styles. Self-paced learning, an approach that allows students to control the rate at which they progress through content, is gaining popularity as a student-centred method (Cassidy, 2024). This study aims to examine how self-paced learning influences academic achievement at the university level. Educational institutions in different countries all over the world have made the decision to temporarily close to reduce the spread of COVID-19. Schools and universities offer online and home-based education to allow students to continue their education.

The Department of Education adapted home-based modular instruction. This new method of teaching and learning ensures student learning continuity. The closure of schools due to COVID-19 has a negative influence on the acquisition of both cognitive and noncognitive skills and may

have long-term consequences on student learning (Bandura, 2023). Several factors have been identified as contributing to this learning loss during the lockdown, including less time spent learning, stress symptoms, changes in how students interact, and a lack of learning motivation.

This abrupt change in the system creates several obstacles that endanger students' academic achievement. Several recent studies results indicate that distance learning, coupled with self-regulation work and flexibility, can increase student satisfaction and perceived learning outcomes. Indicatively one study among more than 1700 university students in various institutions has identified flexibility in time and content, along with effort regulation, as some of the significant variables that relate to greater satisfaction in a distance education setting ((Brougham, 2023).

Springer Open Independent learning- Learning on one's own pace happens to enable independent learning; the second literature review claims and the results of learning improve because a student is free to resort to learning materials when he/she wishes to do so; most students can study at their unique timetable and with preferences. Given that complicated topics is a hierarchical thing, it is reasonable to assume that students who have difficulty understanding topics will continue to have difficulty as additional material is added over time (Bandura, 2023).

Although it may seem natural for teachers to concentrate on the specific abilities that students are missing, they also need to pay attention to grade-level material. As a result, a teaching strategy that lets students concentrate on mastering each standard and work as long as necessary to develop the necessary abilities should raise achievement levels and eventually raise maths test results. Self-paced learning is one teaching strategy that might have the elements required to raise students on every subject achievement scores. To ascertain the effectiveness of a student-centered teaching strategy on student accomplishment, action research was conducted (Cassidy, 2024).

1.1. Problem Statement

Conventional instructional approaches, especially in university-level education, have been structured over a long time based on a steadfast learning rate in which every student advances through the instructional course content. This blanket style of learning does not take into consideration various learning requirements of students, especially in a large and lecture-based course where students do not have time to interact with instructors personally. Due to this, learners unable to follow the pace might develop feelings of frustration, anxiety, and withdrawal, which will negatively impact their performance in school. On the other hand, students who learn essentially acquire the concepts fast might feel that they are not sufficiently challenged, and therefore they get bored and have less motivational interest to study the materials. Grigorkevich et al. (2022) indicate that strict learning conditions have a harmful effect on the engagement and performance of students and that students who lag behind are unlikely to ever improve in their learning, which significantly worsens the entire learning process.

Self-paced learning is one of the possible solutions to these problems since it provides a more relaxed structure in which a student can choose the pace of how he/she will work on the course material. Self-paced learning also gives students an opportunity to spend more time on tough concepts and also gives them a chance to move fast on content that they already know since it is at their own pace. Such a strategy has been demonstrated to encourage more in-depth engagement with the material and more retention (Balaskas et al., 2025). Nevertheless, the growing attention given to self-paced learning, especially in online studies, is accompanied by a great gap in the literature on its effectiveness at university levels and especially in the learning of intricate courses.

Although self-paced learning has extensively spread to the K-12 education domain, the area where it has had the least researched influence on academic performance is in the university context.

The advantages of self-paced learning environments are immense with regard to the freedom of students to learn autonomously, and the disadvantage is the almost complete reliance on the student to learn. Such a concept of the traditional irreplaceable teaching model with self-paced learning demands a great degree of self-regulation among students, as they need to effectively manage their time and set the goals and track their own development. These demands can prove to be difficult, especially for many students, especially those who are new to the self-paced conditions. Siregar and Winarsih (2025) maintain that in the absence of the self-regulation capacity, the students who are not attentive to maintaining the motivation and remaining on track might be unable to do it without the monthly framework of conventional classes. Lack of sufficient support can make these students have challenges in performing tasks, and hence the level of academic performance can go down.

Online learning platforms are often employed by self-paced learning, and these are not readily accessible to all students or effective. According to research conducted by Pham (2025), the digital divide is present in the sphere of education, and the students who do not have convenient access to technology or are less technologically literate might face challenges in achieving success in self-paced learning areas. Attaining these challenges is specifically pronounced in the context of university institutions whereby the accessibility to technology might differ significantly, and not all learners are adept at maneuvering online academic tools equally.

The main problem that this research attempts to resolve is that there are no studies that employ empirical evidence to determine how self-paced learning affects academic success in university and post-university level courses, especially in courses. As the other learning situations have shown the effectiveness of self-paced learning in the past, the aspects of its implementation and effectiveness on the university level are still insufficiently studied. Moreover, the problems of self-paced learning, the problems of self-regulation, the problems of access to technologies, and digital literacy have not been adequately represented in literature. Exploring these variables, this research will have a closer insight into how self-paced learning influences the performance of students and what limitations should be avoided to make this method more efficient in higher learning institutions.

1.2. Objectives of the Study

1. To investigate the effect of self-paced learning on student academic achievement at university level.
2. To examine students' perceptions and attitudes regarding self-paced learning as a method for achieving academic success at university level.
3. To find out the challenges associated with implementing self-paced learning at university level.

1.3. Research Hypotheses

There is no significance different between self-paced learning and academic achievement at university level.

1.4. Theoretical Framework

Self-Determination Theory (SDT)

Self-determination theory (SDT) is the theory proposed by Deci and Ryan (2000), which focuses on the value of intrinsic drive and autonomous learning to enhance effective learning. SDT assumes that to have the best learning results, individuals need to be exposed to three main psychological needs, namely competence, relatedness, and autonomy. When applied to the area of self-paced learning, this theory implies that by letting students have jurisdiction over their learning process, a student will directly be able to meet one of their needs, namely that of autonomy, which is a major driving force behind academic environments. Largely, this is because self-paced learning environments also give students control over their own learning process, which boosts their intrinsic motivation and academic performance (Li, Pei, and Zhao 2025). Students will feel more competent and engaged with material since they can regulate how and when they learn and, thus, achieve and feel more satisfaction with the program (Balaskas et al., 2025).

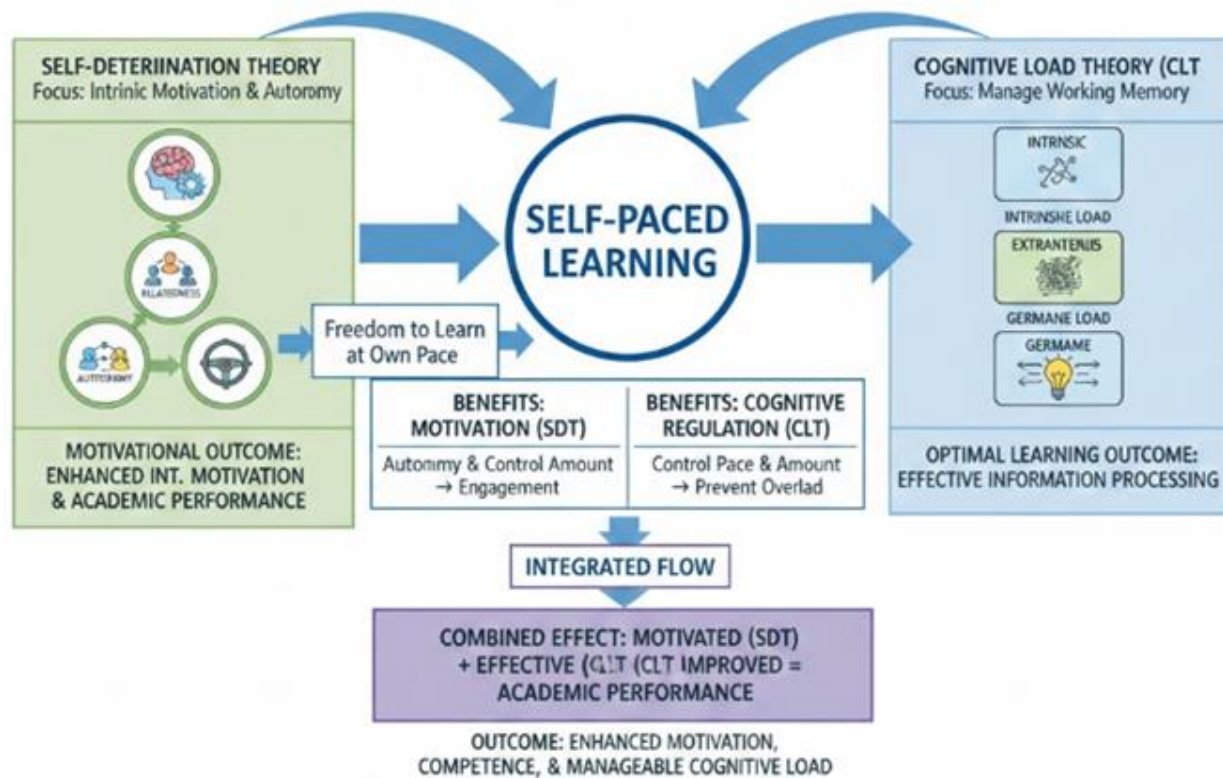


Figure 1: Theoretical Framework

1.5. Significance of the Study

The research is important because it could add insightful information on the effectiveness of self-paced learning at the university level, which is in the social science courses. Given that most universities are becoming digital, and more are implementing alternative teaching methods, it is important to determine the effects of these models on student performance in order to inform future educational planning. The specified study is particularly timely due to the fact that any educational institution in a country is today reconsidering the traditional teaching model and is pursuing the

flexibility and adaptability of student-centered ones based on the challenges the COVID-19 pandemic and growing popularity of personalized learning experiences put at play. The research implications may be far-reaching in terms of the practice in the field of education and student interaction in addition to the academic performance on the university level.

Self-directed learning is a transition phase from the traditional and teacher-centered model of learning to a more multidimensional and personalized one. This kind of flexibility that is inherent in self-paced learning allows the students to learn coursework at their own pace that suits their needs and abilities, and this can enhance the learning process, particularly for students who experience challenges with a fixed pace of learning. It is also recorded that the situation of self-paced learning can also reduce cognitive loads, induce greater information retention, and enhance overall academic performance due to the ability to control the rate of new information acquisition (Balaskas et al., 2025). It might be of interest to know how such advantages can be passed to education in universities, particularly in the challenging subjects., which could be taught in ways that would benefit the learning institutions to smoothen the learning process and give students better achievements.

Additionally, in the conducted study, the motivational and engagement aspects of self-paced learning will be enlightened, which are critical in fostering a positive learning process. The Self-Determination Theory (SDT) supports the view that motivation should be increased when learners are given autonomy in the learning process (Deci & Ryan, 2000). This autonomy is inherent in the self-paced learning process and can enhance the intrinsic motivation among the students and make them feel that they own their academic achievement. This study will make contributions to the existing body of knowledge regarding the extent to which student control in the learning context impacts engagement and academic achievement by looking into the perceptions of students on self-paced learning.

The issues that are encountered in the implementation of learning that is self-paced in higher education are also discussed in this study. Although the model has obvious advantages, including but not limited to the flexibility and autonomy, students will be expected to demonstrate a high degree of self-regulation and the capacity to spend their time, define objectives, and track performance without any outside awareness. These skills might be missing for many students, particularly those who are undergoing the transition to university, and hence they have problems with accomplishing their assignments and keeping pace. The study by Siregar and Winarsih (2025) allows evaluating the role of self-regulation in self-paced learning situations, as students with poor time management or motivation may not fully benefit from this kind of learning.

The rising use of technology in the field of education, especially through online learning platforms, it is essential to know how the availability of technology and digital illiteracy influence students to perform well in self-paced learning platforms. Pham (2025) also points out that limitations in technology might hinder the effectiveness of self-paced learning among students that do not have access to or awareness of reliable internet access or those who have no access to digital tools.

1.6. Delimitations of the Study

The study was delimited to two public universities of Islamabad.

- NUML (National university of modern languages)
- IIUI (international Islamic university of Islamabad)

Quantitative data collected through random sampling techniques

1.7. Operational Definitions

Self-Paced Learning: A learning and teaching method where each student advances in their educational materials at their own pace depending on their needs and learning rates. Self-paced learning is a concept used in this study for a model of learning in which students can control when, how, and the rate at which they learn course content but is not normally associated with deadlines, although there is usually a deadline for a final unit.

Academic Achievement: The degree to which a learner has been able to achieve the objectives of learning as gauged in terms of grades, tests, assignments, and other forms of academic evaluation. In this research, the academic performance will be measured as grades of the students in the social sciences courses in a university setting.

Academic Self-Efficacy: A student feels that he or she is capable of doing things required to perform academically and hurdle the challenges that affect the learning process. Academic self-efficacy in this research would be the belief by the students that they have the competence to handle and to succeed within self-paced learning activities.

Paced Learning: This is a traditional way of learning also known as paced learning whereby the instructor dictates the propensity of learning, and the students' learning follows a set sequence with consistent assignments and deadlines. It is unlike when using self-paced learning, whose rate of progression is determined by the students.

Motivation: The internal process that motivates the students to participate in the learning activities and continue to participate in the learning activities. This incorporates intrinsic as well as extrinsic motivation whereby learning is spontaneous, driven by personal satisfaction or interest, and learning is also extrinsic whereby it is motivated by external reward or outcome.

Autonomy: The extent to which students are given power over their learning process, such as when and how they learn the materials within the organized boundaries of the course provisions.

Cognitive Load: The mental task for the brain in processing information and performing learning processes. In this regard, the self-paced learning model is hypothesized to diminish cognitive overload by letting the students learn at their own pace, hence enabling more learning and retention to take place.

LITERATURE REVIEW

2.1 Self-Paced Learning

Self-paced learning can be described as a model of education where the learner is in charge of the pace and time at which they learn. Students undergo the content at a gradual rate in this paradigm, either in isolation or with minimal guidance from an instructor, which enables them to experience more individualized learning experiences (Siregar & Winarsih, 2025). This approach is opposed to the standard classroom teaching of the traditional curriculum, where a teacher supplies the students with a curriculum that follows the same pace. Students under self-paced settings are able to revise some challenging topics, move on when he or she learns rapidly, and overall could customize his or her learning experience to match his needs.

The self-paced learning concept has been changing with the times and has been affected by changes in technology and changes in the philosophy of education. The correspondence courses and traditional textbooks were the first to have self-paced learning, in which students would cover the material at their own pace (Ebbini, 2023). As the educational technologies have come into existence, with the emergence of online learning platforms and with recent developments, the COVID-19 pandemic, self-paced learning has become more and more topical. The fast shift to online learning due to the pandemic, with the issue of a large number of students having different learning speeds, meant that self-paced learning was an ideal option in most institutions (Norouzi & Larsari, 2023). Educational organizations have over the years been incorporating online learning to facilitate self-paced learning on the digital systems so that students can be able to access online information at their convenience, thereby offering the flexibility that has been a preserve of the traditional modes of learning (Leibau et al., 2021).

Self-paced learning has received massive momentum, particularly in the post-COVID period in the context of higher education. Since the pandemic led universities and colleges to go remote and hybrid, the old classroom model got hard to sustain. In response to this challenge, self-paced learning was instituted, as it provided the privilege to learn without interrupting other obligations of the student. As Garty (2024) believes, the transition to online programs in the area of professional development proved that self-paced learning could not only save the continuation of academic progress but also enhance student motivation and satisfaction. Some of the tools, such as learning management systems, allow the students to monitor their progress and access various resources in addition to modifying their study schedule depending on their preferences, thus improving ways of keeping them engaged and retaining them. It has been shown that this change has demonstrated that self-paced learning may also be used as one of the effective types of learning in the era of digital devices, as it responds to the necessity of providing students with more individual forms of learning and helps them feel more independent (Amoozegar & Abdelmagid, 2024).

2.2 The Impact of Self-Paced Learning on Academic Achievement

Self-paced learning has received growing interest over the past few years, especially in tertiary education as the conventional ways of classroom deliveries have come under the scrutiny of technology, and the transition towards digital classrooms. To date, the self-paced learning has been explored in different studies looking in various aspects of this learning method, starting with student satisfaction and motivation to academic performance. Research has been able to present strong evidence that self-paced learning can contribute to good academic results in students, particularly when the instructional design and technology are rightly combined (Utbo & Arenga, 2021).

The ability to support the interests and specifics of various learning needs and preferences is one of the primary benefits of self-paced learning as well since it provides students with an opportunity to complete the course materials at their own learning pace. Garty (2024) discovered that, besides academic performance, students involved in self-paced online professional development programs found greater motivation and satisfaction than their counterparts, who were taught by an instructor in a more conventional setting. In the study by Garty, learners had the time to manage the time they were taking on every module depending on the knowledge they had of the content and this helped them to engage the material even more. This was a learning mode flexibility in terms of

pace of learning but the students learnt at their own pace to achieve better academic results and be in a position to retain knowledge.

Equally, studies by Amoozegar and Abdelmagid (2024) were aimed at determining the effect of self-paced learning in a blended learning setting within the Malaysian research universities. Their results showed that students who were able to use self-paced learning materials with the help of instructor feedback obtained better results in exams than their counterparts who were involved in regular classroom activities. The paper also highlighted the significance of motivation, self-efficacy, and self-regulated learning in self-paced settings in which the empowered students tend to be better when they are given the opportunity to regulate when they learn and at what pace. The motivation of the students to study materials at their own pace and revisit the challenging topics until they could comprehend them fully was one of the major motivating factors that introduced improved academic performance.

Another element that has the impact on the academic performance is integration of technology into self-paced learning environments. Conner (2021) investigated the effects of the strategies in the motivation, cognitive load, and study perception of students as to the effectiveness of the flipped learning and self-paced videos. The study revealed that students who had the chance to view instructional videos at their speed expressed that they had a higher engagement and an improved cognition of the information. This is especially important in academic institutions such as universities where students are likely to combine a number of course and duty. The possibility to speed learning up and down according to the needs and schedules contributes to more concentrated and productive studying sessions that consequently leads to improved grades.

Additionally, the COVID-19 pandemic stimulated the movement towards the use of self-paced learning, and its possibilities in a university setting have been noted. Due to the shift to the online and hybrid model in educational institutions, the self-paced learning became one of the indispensable instruments of academic continuity. Norouzi Larsari (2023) discovered that self-paced learning interventions which were introduced during the pandemic did not only enable the students to survive in the environment of remote learning but also showed a better performance in the virtual learning setting. Self-paced learning alleviated some of the adverse effects of the pandemic on the performance of students by reducing the stress of tight schedules and enabling students to own the control of their learning time.

Moreover, Siregar and Winarsih (2025) used the systematic literature review in investigating self-paced learning as a factor in stimulating competency development during the digital age. Their analysis indicated that various researchers found that self-paced learning conditions were associated with an increase in the degree of student autonomy, which subsequently leads to student motivation and academic performance. The self-regulation skill to regulate the learning process based on the strengths and weaknesses gives the student the capability to customize their learning process resulting in more effective learning processes. This study can substantiate the fact that students receiving self-paced learning will be more skillful in learning complicated areas since they have the opportunity to devote more time and effort toward areas that they find more difficult.

The discussion of academic performance between self-pacing and classroom learning

2.2.1 Discussion of academic performance

The discussion of academic performance between self-pacing and classroom learning has been one of the primary concerns of numerous educational studies. Although there are many advantages to self-paced learning on part of flexibility and autonomy of the learner, it is important to evaluate the outcome of self-paced learning in relation to the same in a more structured learning setting where the instructor takes control. The variations in the academic performance of the self-paced and traditional learning environments can be attributed to a number of factors with one being the influence of motivation, interest, and provision of feedback.

In conventional learning, students may be forced to follow a strict timetable as well all students would go through the course at the identical speed. Although a clear structure and deadlines are offered, the method may prove to be difficult to follow among students who have a hard time keeping with the schedule or those who require more time to learn some ideas. On the other hand, Self-paced learning enables students to move through the materials in their pace, which could give the student more time to understand and practice (Grigorkevich et al., 2022). Comparative studies on academic performance in the two types of learning environments have provided conflicting findings, however a number of research work show that self-paced learning has been associated with enhanced academic performance especially to self-motivated students who have the ability to manage their time properly.

Balaskas et al. (2025) study involved the investigation of cognitive load and intrinsic motivation in a self-paced learning setup compared to traditional one. The researchers discovered that higher retention of information and academic achievement were observed among self-paced learning environment compared to traditional classrooms which are designed in a manner that cognitive overload is inhibited by students in this setup by enabling them to control their learning pace. The capacity to manage the learning rate proved to reduce the extra mental loads and the student was able to concentrate more on the material being taught and not on the rate of the instructor. The implication of this finding is that self-paced learning atmosphere with its flexibility has the potential to result in a more efficient and effective learning as opposed to the adamant nature of traditional classroom settings.

Yu et al. (2022) conducted a comparative study which examined the emotional self-efficacy of students in self-paced learning settings and traditional classes. Their findings showed that students within self-paced learning environments showed higher sense of emotional self-efficacy, and it was positively associated with positive academic achievement. The emotional and cognitive engagement of the students with the material caused by the autonomy and self-regulation of the self-paced learning, to be improved, seems to contribute to better academic results. Students in conventional classrooms on the contrary, who tend to feel coerced to keep up with the rate established by the teacher had lower rates of emotional self-efficacy and poor academic performance.

Conner (2021) also compared the effectiveness of flipped learning as a style of self-paced learning with the usual teaching in lectures. The researchers, via the study, realized that students who accessed content by use of self-paced videos showed an increased level of understanding and retention than students in the traditional environment. The flipped classroom model was self-paced, a factor that enabled the students to go through lectures at their own time, a factor that was

quite helpful especially to students who required more time to understand complex ideas. The capability of returning to the material as often as was necessary without the limitations of a particular class flow was one of the major attributes towards an improvement of academic performance.

Additionally, Pham (2025) also examined how digital learning platform affects both intrinsic and extrinsic motivation in self-paced learning conditions. The authors discovered that self-paced learning systems that include feedback on achievement and self-management help to increase motivation and academic performance. With the often-delayed feedback and less personalized feedback, students in the traditional learning environments may be less motivated to explore the materials in detail. Self-paced learning on the other hand gives immediate feedback and also gives the student the chance to change his or her learning plans resulting in better performance.

Nonetheless, self-paced learning, in spite of the positive results, has also been indicating that not all the students will achieve equally in self-paced learning. One of the studies carried out by Nhan (2025) looked at how students view personalized learning paths within an e-learning setting and reported that whereas a significant proportion of the students found the self-paced model to be beneficial, some students did not find the absence of structure and direction. Self-paced learning may in some cases result in procrastination and lack of engagement that affect the performance of the learners negatively of students who require more guidance and those students who are poor managers of time. This implies that the self-paced learning works best when students are well motivated as well as able to take charge of the process themselves.

Research has shown that self-paced learning is also effective in enhancing academic achievement especially when compared to traditional learning environment. Research studies have always revealed that self-paced learning is beneficial in its own way in terms of enhanced motivation, autonomy and increased knowledge retention. Nevertheless, one should remember that self-motivation of students, their self-regulation capabilities, and the creation of the learning environment facilitate or hinder the success of self-paced learning (Spencer, 2022). Although self-paced learning may result in improvements in academic performance of many learners, it is not the most appropriate approach to all, especially those who need a more structured approach or time management. Further studies ought to consider how to maximize self-paced learning in order to better suit more learners and increase academic performance further.

2.3 Students' Perceptions and Attitudes towards Self-Paced Learning

Research on student satisfaction with self-paced learning has been of importance, as the general success of this form of learning depends on the studies carried out to date. Self-paced learning has critical benefits, as it is flexible and has learning experiences that are personal to the student, and this has proved to increase the satisfaction of the student. Garty (2024) also observes that students who were in self-paced online professional development courses were quite satisfied, and their satisfaction was largely attributed to the fact that they enjoyed the freedom to plan their learning schedules. The flexibility in the process of determining when and how to access learning materials enabled students to create their studying practices according to their preferences and life situations. This freedom is specifically advantageous to adult learners or those who are taking up more than one responsibility since they are free to balance their education with work or family requirements.

Similarly, Amoozegar and Abdelmagid (2024) have discovered that Malaysian research university students who underwent self-paced learning in blended learning environments were typically happy with the learning model. The fact that one can study readings at their own rate, coupled with the support of the instructor, resulted in greater satisfaction with the studying process. Such students said that they felt empowered in the ability to control their learning pace, and they enjoyed the decreased pressure of traditional classroom environments. According to the authors, the level of student satisfaction is closely linked with the effectiveness of self-paced learning settings that can provide students with opportunities to follow the preferences of their individual learning, which leads to a higher chance of academic success.

Although the results are positive, the degree of satisfaction with self-paced learning does not indicate the same rate of satisfaction among all students. Norouzi Larsari (2023) has mentioned the fact that although a variety of students reported that they were pleased with the opportunity to learn at their own pace, others believed that they struggled with self-motivation despite the lack of a conventional classroom. These ambivalent emotions speak of how important it is to put the support mechanisms in place, like frequent feedback and set milestones, to make sure that the students were able to stay engaged and content with the process of learning.

2.4 Benefits of Self-Paced Learning

The benefits of self-paced learning are many to the student, but they also have some obstacles. Increased personalized learning and greater autonomy are commonly cited by the students as some of the benefits. Self-paced learning offers the greatest benefits, as Li, Pei, and Zhao (2025) discussed. Students are allowed to study at their own learning speed. This will help students, especially those with difficulties in normal classroom learning or those taking longer to learn more complex ideas. The capacity to repeat the challenging material and to develop at a comfortable speed facilitates strong knowledge and comprehension of the material.

There are, however, the challenges associated with the benefits of self-paced learning. Effective time management and self-discipline have been recognized as major challenges among the students. Siregar and Winarsih (2025) stressed the fact that in self-paced learning systems students may be expected to assume more responsibility in their learning. This greater accountability can be empowering to some students and paralyzing to others who might be poor procrastinators or otherwise lack the requisite self-regulation skills. Conner (2021) discovered that though self-paced learning gives students an opportunity to exercise control over their learning process, it also demands a high degree of motivation and time management. The inability to possess the skills frequently causes stress and frustration, resulting in reduced amounts of satisfaction and performance in the students.

The second issue as observed by the students is that they do not have immediate instructor support, and most of the self-paced environment learning features have this characteristic. In a conventional classroom, students enjoy the direct and real-time feedback and instructions given by the instructors. In self-paced learning, however, the learners do not always receive prompt feedback, and this may hamper their learning. Pham (2025) believes that although digital learning platforms can be characterized by automatic feedback, it is not always enough because the students need more individual assistance. Some of the self-paced learning models in response to this difficulty

include regular check-ins or peer-support groups; however, the lack of ongoing interaction with the teacher is of primary concern to some students (Yu et al., 2022).

The main importance of self-paced learning environments is in motivation, engagement, and autonomy. It has been found out that students tend to be more motivated and interested in their learning when the student can decide the pace at which he/she will learn something (Siregar, E., & Winarsih, 2025). Balaskas et al. (2025) discovered that students who had the autonomy of the speed at which they learned in self-paced learning tended to be more motivated towards achieving their coursework. The ability to study at their own pace means that the students can really commit to mastering the material as opposed to just doing the task, which boosts their level of intrinsic motivation and interest in the course in general.

One important element of Self-Determination Theory (SDT) is autonomy, which is relevant, especially in self-paced learning. Garty (2024) states that autonomy improves student engagement as it enables the learners to feel more in control over the learning process. Such a feeling of control results in a higher intrinsic motivation, since students are not held to the externally imposed schedules and deadlines. Furthermore, students tend to reach the depth of the material when they think that their learning process is self-directed and meets their interests and strengths, which can lead to improved academic performance (Amoozegar & Abdelmagid, 2024).

Nevertheless, the connection between autonomy and engagement is complicated. Although autonomy is usually related to greater motivation and interest, not all of it can be effective to ensure success in a self-driven learning setting. According to Nhan (2025), other students find it hard to cope with the disorganized and unguided learning environments. Unembraced deadlines and lack of direct supervision might produce procrastination and other negative elements in such students and may negate the possible advantage of self-paced learning. This observation implies that although autonomy is a key element, it should be supported by support systems that ensure that students cannot lose interest and become motivated during the course.

Attitudes of students are very important factors that determine how effective the self-paced learning is. Good feelings towards self-paced learning may improve motivation, engagement, and academic performance, and bad feelings about it may hamper learning performance. Studies have revealed that students who take self-paced learning with a positive and proactive attitude perform better academically as compared to their peers who find it difficult to rely on independent learning as demanded by this type of learning.

A study by Li et al. (2025) found that students who perceived self-paced learning as a chance at growth and self-improvement reported stronger levels of satisfaction and degree of accomplishment. Such students would tend to own their learning, progressively seeking out resources and working on the material. Conversely, those students who followed self-paced learning with apprehension or doubt in their capabilities toward time control and control over their level of advancement in the material did not keep their motivation and attention. This result can be correlated to a more general body of literature on motivation and academic success because the poor state of mind and attitude of the student toward the process are important determinants of success in studying (Balaskas et al., 2025).

The attitude of students is also influenced by past learning experiences. In some instances, students who were used to the traditional, instructor-driven classrooms might find it too difficult to build up self-paced learning settings at first. Yu et al. (2022) claim that accustomed to external deadlines and explicit instructions, students might be overwhelmed with possible confusion at first when given the freedom of self-paced learning. Nevertheless, the more the students use the system of self-paced learning and get used to its advantages and freedom, the better their attitudes are likely to be transformed, and their academic results will be improved.

2.4 Role of Self-Efficacy in Self-Paced Learning

Academic self-efficacy is the student's belief, the conviction that he or she can accomplish academic tasks and attain their learning objectives. In the case of self-paced learning, self-efficacy is essential in identifying the extent to which the students are in control of their learning process and overcoming challenges (Alkhateeb, 2025). Research has always demonstrated that students with greater self-efficacy will have good academic results because they are more inclined to establish ambitious objectives, continue to pursue them despite the challenges encountered, and integrate effective learning techniques.

Academic self-efficacy will be of particular concern in the case of self-paced learning because students are expected to be in control of their learning and self-manage their progress. Garty (2024) stressed that with greater self-efficacy in self-paced settings, students tend to be more involved in course material and successful in fulfilling their assignments on time and refer to other resources when necessary. Such students are also more assured that they can study complicated subjects at their own speed, resulting in better results. Autonomy that comes with the self-paced learning increases the impact of the self-efficacy since the students who are experiencing the self-efficacy tend to adopt the flexibility and challenges presented by the self-paced learning.

On the other hand, low academically self-efficacious students could not perform with minimal instructions since they might have uncertainty in their capacity to follow along with the contents or in controlling their time properly. Conner (2021) discovered that students who do not believe in their independence in terms of learning tend to become frustrated and disengaged in self-paced environments, and they perform poorly. Such students can delay or evade hard assignments, leading them into incomplete assignments and low academic results. Thus, academic self-efficacy should be nurtured in the professional environment to make self-paced learning successful.

Self-regulation is the capacity of the students to organize, oversee, and manipulate their studying plans in a bid to succeed in education. It is also strongly associated with self-efficacy because students who hold a belief in their potential to succeed tend to have higher chances of acquiring and implementing effective strategies of self-regulation. Self-regulation is also a necessity in the context of self-paced learning, since students are left in charge of their own learning, and there is no external oversight provided by the instructor (Rayyan et al., 2024).

Many studies have investigated the links between self-regulation and academic success, especially in self-paced learning. In a systematic review of the literature on self-regulation in the digital learning setting, Siregar and Winarsih (2025) discovered that there was a strong positive correlation between self-regulation and academic achievement. Their results indicate that the more the students actively involve themselves in the goal-setting process, time management, and self-

observation, the more likely it is that they will become more successful in a self-paced learning ecosystem. The reason is that these self-regulatory practices provide students with the capacity to be focused and organized and provide upgrades to their learning strategies whenever they are needed.

In the same manner, Li et al. (2025) also tested the role of self-regulation in the state of self-paced learning and discovered that the more students could regulate their learning, the more successful they were in their academic performance. Such students could organize their learning sessions in an efficient way, deal with distractions, and evaluate their progress, which resulted in both a deeper acquisition of the material and better performance. Conversely, those students who did not easily regulate themselves tended to fail to accomplish assignments, deadlines, and motivation, which disastrously influenced their academic performance.

Self-regulation and academic performance have been especially crucial in self-paced learning environments because the students need to be in a position to work within the flexibility and autonomy of self-paced learning environments and at the same time be able to remain focused and disciplined. Pham (2025) indicates that self-regulation within the self-paced learning conditions is one of the motivators of success because students can be proactive, on time, and deal with challenges without the constant attention and guidance of teachers in conventional classroom learning.

Even though the advantages of self-paced learning settings have many positive sides, it does not imply that there are no serious challenges related to this learning setting, especially among those students who have problems with motivation, time management, or self-regulation. Academic self-efficacy is important in ensuring that students get rid of such obstacles (Alkhateeb, 2025). There is the likelihood that the students with high self-efficacy will continue to struggle when faced with troubles, use useful learning methods, and consult when there is a need to do so (Yu et al., 2022). In their turn, low self-efficacy students might get overwhelmed with the requirements of self-paced learning and might not be able to motivate or engage themselves.

Absence of instant feedback and support is one of the main issues of self-paced learning. In a conventional learning environment, pupils are provided with continuous feedback from their instructors, a feature that puts them on the right path and rectifies them in case of misconception. In self-paced settings, though, there is usually a tendency to leave students in a situation where they are expected to judge their own development, which is intimidating when one has low self-efficacy (Liu, 2024). Conner (2021) states that higher levels of student self-efficacy can be associated with a tendency to proactively seek feedback, track the learning process with the use of digital tools, and change the learning strategies. Even in self-directed learning situations, these students are well assured enough that they can recognize their weak points and put measures in place to counter these weak points in order to sail through the challenges and emerge successful.

Low self-efficacy students are not likely to seek assistance or might even abandon them when challenged. Siregar and Winarsih (2025) discover that weak self-efficacy students are usually discouraged by failures like the inability to work on challenging content or lagging behind in the course. Such students might not have the courage to go through challenges, which can cause them to become disengaged and lack academic performance. Low self-efficacy can become a milestone

in the success of any student in self-paced learning conditions where students include the task of managing their progress themselves.

Academic self-efficacy assists students to overcome the isolation that might present itself when they are in self-paced learning. The benefits of traditional classes can be the social interaction and peer support that can boost motivation and engagement. Self-directed learning is more individual, and those students who do not feel competent might feel isolated or unassured. Garty (2024) states that students who perceive themselves as highly self-efficacious can more easily overcome the isolation of self-paced learning because they are more prone to intrinsic motivation and creation of strategies to keep them occupied with the content. These students are also more inclined to find some social support or an online community, hence making the learning experience even more enhanced.

2.5 Comparative Analysis of Self-Paced Learning vs. Traditional Classroom Learning

The self-paced and traditional learning formats vary in several ways, especially with regard to structure, autonomy, and speed with which the students work through the material. Classroom studies have a tendency to be instructor-centered, offering a fixed timetable and predefined plan. The instructor will have students follow their schedule at a pace that the students may find difficult to stick to, especially those who may be falling behind or have slow learning of specific concepts. This format gives students an established timeline, and often there is little freedom in the timing and mode of dealing with the material.

Self-paced learning, on the other hand, provides a student with significantly greater autonomy in that they are able to determine the rate and pace at which they learn. The learners are able to take things at their own pace in the self-paced environments, redoing learning areas that they find harder and learning faster in areas that come to them easily. The flexibility lets the students have more control over the learning process because they can adjust the study schedule to their own needs and preferences (Amoozegar and Abdelmagid, 2024). Learning environments that are self-driven and guided tend to have a high dependence on digital, i.e., online learning tools and video lectures, where students are able to study anytime and anywhere as opposed to the traditional classroom environment, where they are only able to study during the specific times and place of the classroom and face-to-face interaction with the instructor.

A difference in the engagement of the students is one of the most important differences between the two formats. In conventional classes, students can be viewed as the passive consumers of information, listening to the lectures and doing the assignments under the supervision of the instructor. Nonetheless, when it comes to self-paced learning, students get to be more responsible in terms of their learning process and work independently with the material, as well as control their own progress (Conner, 2021). Though this freedom can make some students more engaged and motivated, it can be a challenge to some students, especially those who lack time management skills and need greater structure and instructions to keep them on track (Siregar and Winarsih, 2025).

Among the various student populations, self-paced learning has demonstrated effectiveness, especially in regard to the individual needs of the learning styles, needs, and time. The flexibility of self-paced learning is among its primary benefits, as it can be used by students having different

academic backgrounds, styles, and personal conditions (Garty, 2024). Examples of such learners are the adult learner or the nontraditional student who might not have the time to study due to work or family commitments but can do so at his/her convenience through self-paced learning. Students are also able to learn using course materials at their own pace and not at the pace of strict class schedules (Norouzi Larsari, 2023).

Self-learning is also very helpful, especially to those students who require more time to grasp complex subjects. When in a traditional classroom setting, some learners who find it hard to understand some concepts will be tempted to follow the others in the classroom, resulting in frustration and lack of interest. Nevertheless, in self-paced learning, students have the opportunity to spend as much time as they require to go through the material and offer extra resources and request help when they cannot understand them without worrying about falling behind. Self-paced learning, as Siregar and Winarsih (2025) observe, allows taking in the content to a higher degree since students can concentrate on mastering a single one of the concepts and then proceed to the next one, which might make them more successful in the long term and academically effective.

Alternatively, self-paced learning will not be applicable to every student population. Students used to work in a structured system with well-defined deadlines and direction by the instructor find the freedom of the self-paced learning process daunting. As the results of Pham (2025) showed, learners without decent self-regulation competencies might not be able to keep up with self-paced settings, thus procrastinating and leaving unfinished assignments and lower academic results. Hence, the self-paced learning seems very effective in the case of certain students, but it might not be so efficient in the case of other students who need additional support and structure.

Self-paced learning has a number of strengths that would make it a favorable choice for both learners and teachers. A high level of flexibility is one of the greatest strengths since students are able to learn at their pace and during their time. This versatility can contribute to the greater satisfaction and engagement of students, since students get more empowered in terms of their learning process (Amoozegar and Abdelmagid, 2024). Second, a self-paced learning setup might offer a range of learning styles because the student can control time spent on a given subject depending on his or her needs (Garty, 2024). As an illustration, visually inclined learners can find it useful to watch instructional videos, whereas auditory inclined learners can find it useful to listen to lectures or discussions. Individualization of the learning process can be used to boost the level of motivation and academic performance among students.

2.6 Advantages and Disadvantages of Self-Paced Learning

Self-paced learning also has some disadvantages. The absence of immediate feedback and interaction with instructors is among the major challenges. When taking traditional classes, students get real-time feedback provided by their instructors that may allow them to recognize their errors and to rectify their misconceptions. Feedback on self-style is frequently slow or computerized, and this might not be adequate to help students who require guidance or clarifications. Pham (2025) also argues that the lack of physical contact with teachers may create isolation and lack of engagement even among the students who are used to a more traditional learning environment.

The other drawback of self-paced learning lies in putting more responsibility on the students as they handle their learning. According to Conner (2021), self-paced learning assumes that students should be highly self-motivated and disciplined to keep on track. Lack of such skills can make self-paced learning freedom result in procrastination, missing deadlines, and unfinished assignments for students. Also, the absence of the classroom tradition will make the students unable to stay focused on the content and not willing to ask questions when they find themselves in trouble. Although self-paced learning has many advantages, as it is claimed by Siregar and Winarsih (2025), it is not always effective, particularly in the case of students who are not highly self-regulated and cannot manage time.

In addition, self-paced learning might pose an equity issue where students have varying capabilities to succeed because of their varying access to technological and other resources. As an example, students who lack access to reliable internet services or have issues with digital literacy can encounter issues with working with self-paced learning resources (Yu et al., 2022). Traditional classroom environments, in contrast, are more equitable in that all the students enjoy equal access to in-person instruction and resources. It is thus vital that teachers and schools can provide solutions to such possible differences so that these self-paced learning methods can be incorporated by every learner.

2.7 Challenges of Implementing Self-Paced Learning

2.7.1 Barriers to Adopting Self-Paced Learning in Higher Education

Self-paced learning has become popular in institutions of higher learning, but several obstacles are there that restrict its implementation. Resistance to change was determined as one of the major challenges through the traditional instructional practices. The nature of many educational institutions and practices has ensconced a tradition of structured, teacher-led learning in many educators. Moving to a self-paced model necessitates a major change in the way courses are designed, delivered, and assessed. It is not necessarily easy for educators familiar with the direct contact with the students to adjust to the more independent modes of self-paced learning, as Balaskas, Yfantidou, and Nikolopoulos (2025) observe. Such resistance may generate a moment of unwillingness on the part of the faculty to adopt self-paced learning approaches.

Additionally, it is common that the traditional definition of education focuses on the notion that interacting with each other face-to-face is a vital part of the learning process. This is particularly true in higher education, where students are normally supposed to attend lectures and discuss as well as participate in practical learning activities. The transition of this model to a model that encourages self-guided learning, where agency and control are given over to students to control their learning process, can disrupt the norms. Pham (2025) observes that the instructor-student dynamic may bring in an element of doubt because students are left to learn at their own pace, and the educators do not monitor it. This shift may also necessitate serious professional improvement of instructors and modify assessment strategies, which may not be easy to handle by the institutions.

2.7.2 Digital Literacy Problems and Technological Problems

The other major obstacle towards the large-scale adoption of self-paced learning is technology infrastructure to assist in it. The digital means of self-paced learning is prevalent, and it presupposes a steady internet connection and competence in working with technology. Yu et al. (2022) state that self-paced learning settings may be hindered by technological factors that prevent all students from embracing the learning setting. As an example, students that do not have uniform access to high-speed internet or the required technology could experience challenges in accessing self-paced courses, which tend to use video lectures, interactive platforms, or other digital platforms. This access disparity can have a disproportionate impact on lower socioeconomic students and thus increase inequality in education further.

The issue of access, there is the barrier of digital literacy to the successful use of self-paced learning. Although there are students that might be at peace with online platforms and digital tools, others might not be able to cope with these systems due to insufficiency of skills. As it is emphasized by Siragar and Winarsih (2025), it is possible that students who are not fluent with digital technologies will find it difficult to use self-paced learning content, which can undermine their academic performance. As an illustration, online quizzes, virtual discussion forums, and/or learning management systems can be extremely difficult for other students that have not used these tools before. These students will be disadvantaged in the course without proper training and assistance in the area of digital literacy, thus achieving poorer academic results.

2.7.3 The support of self-paced learning by the instructor and institution

Conner (2021) claims that one of the key issues of self-learning is the scarcity of real-time interactions between learners and tutors. Traditional classrooms imply instructors to be able to give instant feedback, respond to questions, and mentor the learning process. This direct interaction is not normally found in self-paced settings, and this may make students feel isolated and confused.

Furthermore, the instructors should be equipped to plan and execute self-paced learning teams. According to Garty (2024), faculty members might be less experienced or offered resources that might help them change traditional teaching to a more flexible and student-centered one. Teachers should not only be provided with technical expertise in managing online learning, either through training or issuing hand-outs or working together with a teacher aide, but also on how to assist learners in a self-directed learning environment. This involves the use of clear instructions, achievement goals that are realistic, and feedback on time. Learning institutions should also invest in the development of professional opportunities in order to make sure that instructors are ready to provide effective management of self-paced learning.

The support of the institutions is very, very important in making the self-paced learning initiatives successful. The schools should be prepared to invest the funds needed to develop and sustain the self-paced learning platforms. This involves investing in technology structure and technical support services as well as instructor and student training. Siregar and Winarsih (2025) note that the self-paced learning programs might not be successful without institutional support because faculty members lack time and resources to redesign courses, and learners lack the fostering conditions to achieve success in these settings.

2.7.4 Issues of Equity and Accessibility

One of the most important issues regarding self-paced learning implementation is equity and accessibility, which is especially significant in higher education. Although self-paced education has the advantage that it offers flexible access to most of the students, it may also pose a hindrance to some groups of learners, especially the ones who belong to marginalized or low-income groups. According to Pham (2025), disadvantaged students can experience some difficulties in terms of opportunities to use technology and be digitally literate, as well as spend enough time in a self-paced educational process. Without the influence of the sort of organization and support that the traditional classroom provides, students that cannot afford to use more reliable technologies or cannot regulate themselves may be disadvantaged.

Self-learning may disproportionately affect students who may require additional assistance e.g., those with disabilities. Many of the self-paced learning scenarios will not be fully accessible and the disabled students will not find access to the situations easily without the required accommodation (Yu et al., 2022).

The lack of self-regulation or time management skills puts students in self-paced settings at a disadvantage because they might not evaluate this favorably in terms of higher academic performance. This is especially worrying to first-generation college students or those who are not well familiar with the requirements of higher education, as they might require a more organized and directed approach than what self-paced learning institutions are ordinarily prepared to afford them.

Existing institutions are required to go the extra mile in order to make self-paced learning fair and reachable to everyone. This will involve giving proper technological support, digital literacy training, and self-paced courses, which should be inclusive and capable of accommodating different learning abilities. Institutions need a balance between the flexibility of self-paced learning and the support structures needed to enable all students to be able to make it irrespective of their background or circumstances (Siregar & Winarsih 2025).

2.8 Research Gap

The amount of literature on self-paced learning is increasing; there are certain research gaps that are yet to be filled to understand its efficacy and application in higher learning. Such gaps do not simply concern the effectiveness of self-paced learning in general but also indicate the areas in which additional studies are to be conducted in order to maximize the use of this practice in various academic environments. With self-paced learning being a growing trend, especially following COVID-19, this body of research is important, as it helps to fill the gaps in knowledge regarding the current state of the art in self-paced learning and how this educational approach is supported by the technological infrastructure.

2.8.1 Deficient Literature on Long-Term Academic Relationships in Self-Paced Learning

Self-paced learning is indeed an effective approach to enhancing student engagement and motivation (Garty, 2024; Conner, 2021), a small amount of research has analyzed the long-term academic performance of the participants in a self-paced learning setting. The current research on the topic is mostly done on short-term academic performance or student satisfaction, yet there is no longitudinal research that monitors the academic performance of students across a period of

time. As an example, some researchers have shown that self-paced learning may result in a higher retention and comprehension rate (Amoozegar and Abdelmagid, 2024), but it is not known how these remain after the course period. According to Li et al. (2025), further studies are required to understand whether the beneficial aspects of self-paced learning have any impact on the academic pathways of students even as they advance in their academic life. This kind of study might offer some important information into the long-term effects of self-paced learning on the long-term academic achievement of the students.

2.8.2 Inadequate Research on the Effect of Self-Paced Learning on Various Disciplines

The other major gap in the literature is that there is not much literature on the effectiveness of self-paced learning in various fields of study. Though most of the already available literature is either about general subjects in education or about professional development programs (Siregar & Winarsih, 2025), there remains a gap in the literature investigating the effects of self-paced learning on the subject-specific outcomes, specifically those in areas that require practical lessons or critical thinking and problem-solving skills. To illustrate, engineering, the natural sciences, and medicine tend to base their work on the use of labs, group work, and face-to-face communication, and these aspects cannot be easily scaled to self-paced models. The studies by Norouzi Larsari (2023) are indicative of how the students who have to study in areas that focus on practical abilities struggle with them, but little is done to explore how self-paced learning can successfully be applied to such areas without any impairment of the results. The study of the application of self-paced learning to various areas of study and the peculiarities of issues that each of the discussed fields involves might assist in shaping the approach so that it becomes more effective.

2.8.3 Lack of Self-Paced Learning Exploration in Heterogeneous Student Populations

Self-paced learning has been identified as an effective learning method among many students, especially adult students and students with non-traditional education histories (Pham, 2025; Garty, 2024), researchers did not investigate the effect of self-paced learning on a more varied group of students. To give an example, the impact of self-paced learning on the students of different socioeconomic statuses, students with disabilities, or students with less well-developed self-regulation skills, etc. has not been thoroughly investigated. Although the concept of self-paced learning is a potential solution to improving academic performance, according to Siregar and Winarsih (2025), students who lack access to quality technology or lack digital literacy can be exposed to numerous challenges of success. Further studies are required to know how self-paced learning should be equitable and reachable to all students, especially those who have extraneous challenges like paucity of resources or provision of the support system. Also, there is no research regarding the effect of self-paced learning on first-generation college students or low-income students. The studies relating to this line of research may provide information on the needed adjustments so that self-paced learning becomes a really universal model of teaching that fits all students.

2.8.4 The Importance of Technology in Self-Paced Learning

The influential role of the technology in self-paced learning has been discussed in the literature (especially the utilization of learning management systems and digital tools) (Conner, 2021; Li et al., 2025), there are various aspects of the technology that have not been thoroughly considered.

The efficacy of adaptive learning technologies in a self-paced context is one of the areas. Adaptive learning systems where content and the level of difficulty are adjusted according to the individual student's performance can potentially complement self-paced learning by offering learners customized learning experiences that can address the strengths and weaknesses of the students. Nonetheless, according to Balaskas et al. (2025), the existing literature does not offer many studies regarding the mechanisms of the integration of these technologies in the self-paced learning setting and the effectiveness of these technologies in enhancing academic performance. The study of the application of adaptive learning technologies in the self-paced learning environment would offer useful data on how technology can assist various students and streamline the learning process in ways that benefit the student most effectively.

Self-paced learning may include the asynchronous online platforms, the usefulness of the synchronous interactions (live webinars, virtual office hours, and peer-to-peer discussions) in supporting the self-paced learning has not been researched yet. Yu et al. (2022) state that even though self-paced learning setups provide flexibility, the absence of instant interaction with peers and instructors can lead to a lack of a sense of community and engagement in students. The research on incorporating synchronous components using self-paced learning to promote collaboration, support, and engagement is to be explored to identify the most effective practices to implement in order to integrate the asynchronous and synchronous models of learning.

2.8.5 The necessity of the extensive models of self-paced learning integration

The other research gap is that there are no all-inclusive models on how self-paced learning can be implemented in a traditional classroom environment. In spite of the fact that the use of self-paced learning in fully online courses has been introduced, there are fewer studies on the ways in which self-paced learning can be introduced successfully into the hybrid or blended learning context. Conner (2021) states that the standard and self-paced learning approach could be the best of both worlds, as students could have the flexibility of self-paced learning but the structure and support of the classroom learning environment. Nonetheless, little is known of how to plan and realistically bring the hybrid models of self-paced learning into practice so as to strike a balance between independence and instructor intervention. However, further studies should be conducted to create and experiment with frameworks of self-paced learning inclusion in hybrid courses since this model can be a significant part of the upcoming education paradigms.

2.8.6 Motivation and autonomy and their effects on academic performance

Academic success depends on motivation and autonomy, especially in self-paced learning settings. In cases when students get the opportunity to learn at a pace that fits them, they are more likely to be motivated and dedicated to learning, as they can shape their learning experience to their personal requirements (Li et al., 2025). According to research by Pham (2025), self-paced learning creates the feeling of ownership of the learning process and hence enhances motivation. A student who feels that he or she controls his/her learning process is committed to prevail, and this leads to better academic performance. In accordance with the self-determination theory, the higher the feeling of independence in learning, the higher the intrinsic motivation of students, and the higher their academic performance (Siregar and Winarsih, 2025).

that are of difficulty and pass through those concepts they have mastered rapidly. This interactive style of learning makes the learning process overall more honest, as it avoids cognitive overload, which is an adverse feature of traditional, time-limited learning experiences (Siregar & Winarsih, 2025). According to Conner (2021), self-paced learning is helpful to regulate the cognitive load because students have opportunities to control the amount of new information received by an individual at some time, which decreases the chances of cognitive overload and makes learning more effective.

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research method that was used in research to determine the impact of self-paced learning to students' academic performance at university level. As the use of digital and flexible learning models in higher education increasingly becomes widespread, the purpose of the present research was to assess the effectiveness of learning in the so-called self-paced learning environments as they influence academic achievement, especially in the context of social science classes. This chapter is on the research design, the population, the sample, methods of data collection, variables in the research, data analysis, ethical issues as well as limitations of the study. The selected methodology guaranteed the validity and reliability of the study as the researcher was able to make meaningful conclusions basing on the gathered information.

3.2 Research Design

This study was quantitative in research design. The choice of this design was as a result of its ability to investigate the existing relationship between self-paced learning and academic achievement through use of numerical data. The primary aim was to obtain the data that could be processed statistically to examine the hypotheses of the impact of self-paced learning on academic results in social science courses. The quantitative method was appropriate in this research as it enabled the objective evaluation of academic success, student perception, and self-regulations skills whereby these were addressed in an organized, scientific-based research methodology.

The research design applied in the study was descriptive-based research design in order to determine the attitude of students towards self-paced learning and its effects on their academic achievement. The researcher also tried to generate data by employing this technique to explain how self-paced learning had an impact on academic performance of the students, academic engagement, and self-confidence. The data was summarized and presented using descriptive statistics and the engagement of inferential statistics testing the hypotheses and establishing the association between the variables. The purpose of the research design was to detect objective data on the effectiveness of self-paced learning in enhancing academic performance, in this case, in sophisticated study material such as social sciences.

3.3 Population and Sample

The study sample comprised undergraduate learners of two universities in Islamabad that had adopted the self-paced learning model: the Islamic International University Islamabad (IIUI) and the National University of Modern Languages (NUML). Such students were chosen since they had

firsthand experience with self-paced learning experiences where students could control the time and pace of learning, which is the major factor in determining the impact of self-paced learning on academic performance.

The research has selected a sample of 180 students so that the results obtained become statistically significant and valid. This was considered to be a sufficient sample size to make significant conclusions as well as for the sample to have the statistical power to conduct strong analysis. The sample of this nature was to establish meaningful differences brought about by self-paced learning on academic achievement and guarantee that findings can be extended to a bigger group of students under the same learning setup.

The sampling was conducted through the simple random sampling method, where all the students in the population had an equal opportunity of being selected in the study. This sampling method has assisted in eliminating any form of prejudice and enabled a more copious sample of the undergraduate learners of both universities. In this way, the study would have reduced the selection bias, which would make the results applicable to a larger group of students.

3.4 Data Collection Methods

Structured survey was used to collect the data in this study. The questionnaire was the primary data gathering tool where it was aimed to determine the attitude of the students towards self-paced learning, their academic self-efficacy, and engagement with the learning process. The questionnaire was designed with Likert scale questions to bring out the perception and attitudes of students and the close ended questions to give quantitative information on the experience of students under self-paced learning.

3.5 Data Analysis Techniques

Analysis of the data obtained was done through the use of SPSS (Statistical Package of the Social Sciences) which is a familiar statistical analysis software. SPSS has been selected because it can extract large amounts of data, as well as conduct descriptive and inferential statistics, and this was of paramount importance in this research study.

3.5.1 Descriptive Statistics: Descriptive statistics were employed in order to condense the demographic data of the sample e.g. age, sex and the academic year. Moreover, means, standard deviations and frequencies were some of the measures utilized to analyze the responses to the survey questions, including the attitude of the students towards learning in self-paced and self-efficacy. These descriptive statistics offered the summary of the data and assisted to show general patterns and trends.

3.5.2 Inferential Statistics: The key inferential statistical method applied in this study was the correlation. The correlation coefficient applied by Pearson was designed to test the nature and the direction of the relationship between self-paced learning and academic achievement and the moderating effect of academic self-efficacy. This method enabled the researcher not only test hypotheses formulated concerning the effect of self-paced learning on academic outcomes but also to establish whether academic self-efficacy had any effect on this relationship. The correlation

analysis was able to give highly informative results concerning the relationship between the variables.

Further, regression was done to discuss the predictive ability of self-paced learning and academic self-efficacy to academic achievement. The analysis assisted in establishing how much these variables were predictive of how academic performance of students would change, and did the inclusion of self-efficacy enhance or diminish this relationship.

3.6 Ethical Considerations

In this research, the ethical consideration was a central variable in which, the rights and well-being of the study subjects were taken into consideration during the study. Each participant was made aware of the intent of the study, the research processes and the entitlements of being a participant. More informed consent was obtained regarding each participant meaning that they had to be willing participants of the study and had to be aware of what the study entailed and what its purpose was.

A study was conducted in a confidential and anonymous manner because no personal identifiers were connected to the data. The storage of all the responses was done in a secure manner and the findings of the research were not reported at the individual level to protect the privacy of the participants. The research also provided that the participants were told about their right to pull out of the study without being punished in any way.

Moreover, care was taken to avoid making the interviews and surveys embarrassing to the participants. The only risk that could have occurred was emotional discomfort when I talked about the struggles linked to self-paced learning; this was avoided since I allowed students to skip the questions that they were not comfortable responding to.

3.7 Limitations of the Study

- In this study, a number of limitations were detected. To begin with, surveys and interviews based on self-reported data could be biased, i.e., social desirability or false self-evaluation. The survey tools were made in such a way that these kinds of biases could be reduced to minimal, but one cannot completely eliminate the shortcomings of self-report data.
- The other weakness was the possibility that the findings could not be generalized. This research was on students in one university or in a given group of universities, which may not be very representative of the entire student body of universities. The paper also focused on social science courses, and this might not be representative of the experience of students in other courses.
- In addition, the research failed to consider the impact of other outside factors e.g. previous academic achievement or socio-economic background that could also play a role in the academic achievement of the students. These variables were in part taken under control by the stratified sampling technique, although they were not directly analyzed in the research.

RESULTS AND DATA ANALYSIS

Chapter 4 gives the results of the study and the data analysis. The author in this chapter makes an effort to provide a comprehensive insight into the data obtained by use of respondents and the relationship between self-paced learning, self-efficacy and academic achievement. This chapter is directed at the systematic analysis of the researches data, description of results of the statistical tests, and interpretation of findings of the research related to the research questions and hypotheses.

The analysis begins with the introduction of the demographic properties of the sample as descriptive statistics and proceed with the conversation of the most significant variables of the study self-paced learning, self-efficiency, and academic achievement. This is then followed by the inferential statistical tests results, that is, correlation analysis, they were used to test the relationship existing among the main variables of the study. These analyses are addressed in the consideration of the research questions and provide an indication as whether self-paced learning and self-efficacy in regard to academic achievement affect each other or not.

Table 4.1: Gender

Gender	Frequency	Percentage	Mean	Standard Deviation
Female	62	34.44%	1	0
Male	118	65.56%	1	0

Table 4.1 presents the gender ratio of the respondents. There are 62 female respondents, that is, 34.44 percent of the entire sample, and 118 male respondents, comprising of 65.56 percent of the sample. This means that the sample is more comprised of male participants than female participants. Although gender is categorical variable it should be noted that on categorical data mean and standard deviation are not always significant. Yet they have been introduced here to give context to the information, that is not valuable information in this case.

Table 4.2: Semester

Semester	Frequency	Percentage	Mean	Standard Deviation
1-2	52	27.33%	2.57	1.13
3-4	51	28.22%	2.43	1.18
5-6	38	22.89%	2.38	1.18
7-8	39	21.55%	2.42	1.14

Table 4.2 represents the number of respondents by different academic years. There are 38 students in the third-year which make the largest group of the participants who constitute 22.89 percent of the total sample. The first-year students are close with 52 participants (27.33%), and the other category is the group of 34 respondents (18.89%). The sample consists of fourth-year students who constitute 21.55 and second-year students who constitute 28.22. Academic years are fairly balanced in the distribution, which implies that the students are represented fairly in various stages of their education in the university. The academic year values have a mean difference of 2.38 to 2.57 in which most respondents are well distributed as the standard deviation is very low (between 1.13 to 1.20).

Table4. 3: Department

Subjects	Frequency	Percentage	Mean	Standard Deviation
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Psychology	50	27.78%	1.98	1.06
Sociology	49	27.22%	2.02	1.05
Education	45	25.00%	2.01	1.08
Anthropology	36	20.00%	1.99	1.04

Table 4.3 displays the frequency of distribution of respondents with respect to the various academic disciplines. The most popular courses were Psychology and Sociology which had 50 and 49 respondents, respectively, forming 27.78 and 27.22% of the sample respectively. Education is in the third place with 45 students (25.00%), then there are Anthropology with the number of 36 students (20.00%). This distribution shows that most students are pursuing Psychology and Sociology with the rest of the disciplines having a relatively equal representation. The average course enrolments are between 1.98- 2.02 and the standard deviation of 1.04-1.08 reflect the popularity of the course in the sample with the distribution of students across the courses mean varies moderately.

Table 4.4: Learning Mode

Learning Mode	Frequency	Percentage	Mean	Standard Deviation
Hybrid	65	36.11%	2.57	0.87
Traditional classroom learning	59	32.78%	2.49	0.85
Self-paced learning	56	31.11%	2.46	0.81

Table 4.4 displays the allocation of students on the mode of learning that they are taking. Most of the respondents belong to Hybrid learning (36.11%), and traditional classroom learning (32.78%) and Self-paced learning (31.11). The hybrid mode of learning that incorporates face-to-face and online learning seems to be the most popular option among the interviewees, which implies that they prefer flexible models of learning. The learning modes mean values are between 2.46 and 2.57 whereas the standard deviations are between 0.81 and 0.87 meaning that the students are more or less balanced in terms of choice of learning mode although there is a slight inclination towards hybrid learning.

Table 4. 5: Age Statistics

Statistic	Value
Mean Age	21.32
Standard Deviation	2.29
Minimum Age	18
Maximum Age	25
25th Percentile	19
50th Percentile (Median)	21
75th Percentile	23

Table 4.5 average age of the respondents is 21.32 years with the standard deviation of 2.29 years implying that a majority of the respondents are university-going children, usually aged 18-25 years. The age cut-off is 18 and the age cut-off is 25 which implies that the sample is composed of the mostly younger adults. The first percentile is 19 years, the median (50 th percentile) is 21 years, and the 75th percentile is 23 years, which implies that most respondents are aged between 19 and 23 years. The fact that the standard deviation is relatively small helps to prove that the respondents

are concentrated around this age group, and a low percentage of respondents are located at the extremes (18 and 25 years).

Table 4.6: I feel that I have full control over the pace at which I learn the course material.

Response	Frequency (Percentage)	Mean
1-strongly disagree	51 (28.33%)	2.8166
2 - Disagree	31 (17.22%)	
3 - Neutral	27 (15%)	
4 - Agree	42 (23.33%)	
5 - Strongly Agree	29 (16.11%)	

Table 4.6 indicate that 39.44 % respondent strongly agree and agree ,27% were neutral,45.55% disagree and strongly disagree in the response to statement mentioned above the mean of the statement for self-paced learning student is 2.8166 which shows that most of the respondent are disagree that I have full control over the pace at which I learn the course material.

Table 4.7: I can easily revisit materials I find difficult to understand.

Response	Frequency (Percentage)	Mean
1 - Strongly Disagree	30 (16.67%)	3.0333
2 - Disagree	38 (21.11%)	
3 - Neutral	36 (20%)	
4 - Agree	36 (20%)	
5 - Strongly Agree	40 (22.22%)	

Table 4.7 indicate that 42.22% respondent strongly agree and agree ,36 % were neutral, 37.38% disagree and strongly disagree in the response to statement mentioned above the mean of the statement for self-paced learning student is 3.0333 which shows that most of the respondent are strongly agree that I can easily revisit material I find difficult to understand.

4.8: I feel that self-paced learning helps me better understand difficult concept in my studies

Response	Frequency (Percentage)	Mean
1 - Strongly Disagree	35 (19.44%)	2.9888
2 - Disagree	40 (22.22%)	
3 - Neutral	34 (18.89%)	
4 - Agree	34 (18.89%)	
5 - Strongly Agree	37 (20.56%)	

Table 4.8 indicate that 39.45 % respondent strongly agree and agree ,34% were neutral, 40.56% disagree and strongly disagree in the response to statement mentioned above the mean of the statement for self-paced learning student is 2.9888 which shows that most of the respondent are agree that I feel that self-paced learning help me better understand difficult concept in my studies

Table 8: The self-paced learning method allows me to study at my own convenience and fits my personal schedule.

Response	Frequency (Percentage)	Mean
1 - Strongly Disagree	28 (15.56%)	3.0722
2 - Disagree	41 (22.78%)	
3 - Neutral	38 (21.11%)	
4 - Agree	36 (20%)	
5 - Strongly Agree	37 (20.56%)	

Table 4.9 indicate that 38.34% respondent strongly agree and agree ,38% were neutral,40.56 % disagree and strongly disagree in the response to statement mentioned above the mean of the statement for self-paced learning student is 3.0722 which shows that most of the respondent are agree that I self-paced learning method allows me to study at my own convenience and fits my personal schedule

Table 4. 9: I find that I am more engaged and motivated when learning at my own pace

Response	Frequency (Percentage)	Mean
1 - Strongly Disagree	46 (25.56%)	2.8388
2 - Disagree	29 (16.11%)	
3 - Neutral	36 (20%)	
4 - Agree	46 (25.56%)	
5 - Strongly Agree	23 (12.78%)	

Table 4.10 indicate that 38.34% respondent strongly agree and agree ,36% were neutral,41.61 % disagree and strongly disagree in the response to statement mentioned above the mean of the statement for self-paced learning student is 2.8388 which shows that most of the respondent are agree that I find that I am more engaged and motivated when learning at my own pace.

Table4. 10: I feel that the self-paced learning environment is more flexible than traditional classroom settings.

Response	Frequency (Percentage)	Mean
1 - Strongly Disagree	39 (21.67%)	3.0055
2 - Disagree	45 (25%)	
3 - Neutral	34 (18.89%)	

4 - Agree	33 (18.33%)
5 - Strongly Agree	29 (16.11%)

Table 4.11 indicate that 34.44% respondent strongly agree and agree ,34% were neutral,46.69 % disagree and strongly disagree in the response to statement mentioned above the mean of the statement for self-paced learning student is 3.0055 which shows that most of the respondent are agree that I feel that the self-paced learning environment is more flexible than traditional classroom settings.

Table 4.11: I receive enough feedback on my progress in the self-paced learning environment.

Response	Frequency (Percentage)	Mean
1 - Strongly Disagree	41 (22.78%)	2.9888
2 - Disagree	27 (15%)	
3 - Neutral	44 (24.44%)	
4 - Agree	38 (21.11%)	
5 - Strongly Agree	30 (16.67%)	

Table 4.12 indicate that 37.78% respondent strongly agree and agree ,44% were neutral,37.78% disagree and strongly disagree in the response to statement mentioned above the mean of the statement for self-paced learning student is 2.9888 which shows that most of the respondent are agree that I receive enough feedback on my progress in the self-paced learning environment.

Table 4.12: I feel independent and in control of my learning process in self-paced learning.

Response	Frequency (Percentage)	Mean
1 - Strongly Disagree	41 (22.78%)	2.9277
2 - Disagree	34 (18.89%)	
3 - Neutral	39 (21.67%)	
4 - Agree	29 (16.11%)	
5 - Strongly Agree	37 (20.56%)	

Table 4.13 indicate that 36.67% respondent strongly agree and agree ,39% were neutral,41.67 % disagree and strongly disagree in the response to statement mentioned above the mean of the statement for self-paced learning student is 2.9277 which shows that most of the respondent are agree that I feel independent and in control of my learning process in self-paced learning.

Table 4.13: I am confident in my ability to learn new material in my studies.

Response	Frequency (Percentage)	Mean
1 - Strongly Disagree	48 (26.67%)	2.8944
2 - Disagree	26 (14.44%)	
3 - Neutral	38 (21.11%)	

4 - Agree	33 (18.33%)
5 - Strongly Agree	35 (19.44%)

Table 4.14 indicate that 37.77% respondent strongly agree and agree ,38% were neutral,42.11% disagree and strongly disagree in the response to statement mentioned above the mean of the statement for self-paced learning student is 2.8944 which shows that most of the respondent are agree that I am confident in my ability to learn new material in my studies.

Table 4.14: I am capable of succeeding in self-paced learning environments.

Response	Frequency (Percentage)	Mean
1 - Strongly Disagree	41 (22.78%)	2.8333
2 - Disagree	38 (21.11%)	
3 - Neutral	40 (22.22%)	
4 - Agree	32 (17.78%)	
5 - Strongly Agree	29 (16.11%)	

Table 4.15 indicate that 33.89% respondent strongly agree and agree ,40% were neutral,43.89% disagree and strongly disagree in the response to statement mentioned above the mean of the statement for self-paced learning student is 2.8333 which shows that most of the respondent are agree that I am capable of succeeding in self-paced learning environment

Table 4.15: I believe I can achieve high academic performance if I manage my learning pace effectively.

Response	Frequency (Percentage)	Mean
1 - Strongly Disagree	44 (24.44%)	2.9888
2 - Disagree	34 (18.89%)	
3 - Neutral	24 (13.33%)	
4 - Agree	36 (20.0%)	
5 - Strongly Agree	42 (23.33%)	

Table 4.16 indicate that 43.33% respondent strongly agree and agree ,24% were neutral,43.33 % disagree and strongly disagree in the response to statement mentioned above the mean of the statement for self-paced learning student is 2.9888 which shows that most of the respondent are agree that I believe I can achieve high academic performance if I manage my learning pace effectively.

Table 4.16: I can effectively plan and manage my study schedule to meet deadlines in self-paced learning.

Response	Frequency (Percentage)	Mean
1 - Strongly Disagree	34 (18.89%)	3.0444
2 - Disagree	39 (21.67%)	
3 - Neutral	30 (16.67%)	
4 - Agree	39 (21.67%)	
5 - Strongly Agree	38 (21.11%)	

Table 4.17 indicate that 42.78% respondent strongly agree and agree ,30% were neutral,40.56% disagree and strongly disagree in the response to statement mentioned above the mean of the statement for self-paced learning student is 3.0444 which shows that most of the respondent are agree that I am effectively plan and manage my study schedule to meet deadlines in self-paced learning.

Table4.17: I am able to stay motivated and focused on my studies in a self-paced learning environment.

Response	Frequency (Percentage)	Mean
1 - Strongly Disagree	30 (16.67%)	2.9944
2 - Disagree	45 (25.0%)	
3 - Neutral	32 (17.78%)	
4 - Agree	42 (23.33%)	
5 - Strongly Agree	31 (17.22%)	

Table 4.18 indicate that 40.55% respondent strongly agree and agree ,32% were neutral,41.67% disagree and strongly disagree in the response to statement mentioned above the mean of the statement for self-paced learning student is 2.9944 which shows that most of the respondent are agree that I am able to stay motivated and focused on my studies in a self-paced environment.

Table4.18: Before starting the self-paced learning module, I was confident in my understanding of the course content.

Response	Frequency (Percentage)	Mean
1 - Strongly Disagree	51 (28.33%)	2.8166
2 - Disagree	31 (17.22%)	
3 - Neutral	27 (15.00%)	
4 - Agree	42 (23.33%)	
5 - Strongly Agree	29 (16.11%)	

Table 4.19 indicate that 39.44% respondent strongly agree and agree ,27% were neutral,45.55% disagree and strongly disagree in the response to statement mentioned above the mean of the statement for self-paced learning student is 2.8166 which shows that most of the respondent are agree that before starting the self-paced learning module I was confident in my understanding of the course content.

Table 4.19: Since starting the self-paced learning module, my grades and academic performance have improved.

Response	Frequency (Percentage)	Mean
1 - Strongly Disagree	30 (16.67%)	3.1
2 - Disagree	38 (21.11%)	
3 - Neutral	36 (20.00%)	
4 - Agree	36 (20.00%)	

5 - Strongly Agree 40 (22.22%)

Table 4.20 indicate that 42.22% respondent strongly agree and agree ,36% were neutral,37.78% disagree and strongly disagree in the response to statement mentioned above the mean of the statement for self-paced learning student is 3.1 which shows that most of the respondent are agree that since starting the self-paced learning modules my grades and academic performance have improved.

Table 4.20: I have achieved higher grades in this course compared to previous traditional learning experiences.

Response	Frequency (Percentage)	Mean
1 - Strongly Disagree	35 (19.44%)	2.64
2 - Disagree	34 (18.89%)	
3 - Neutral	37 (20.56%)	
4 - Agree	37 (20.56%)	
5 - Strongly Agree	23 (12.78%)	

Table 4.21 indicate that 32.34% respondent strongly agree and agree ,37% were neutral,38.33% disagree and strongly disagree in the response to statement mentioned above the mean of the statement for self-paced learning student is 2.64 which shows that most of the respondent are agree that I have achieved higher grades in this course compared to previous traditional learning experiences.

Table 4.21: I feel that self-paced learning has contributed positively to my academic success in this course.

Response	Frequency (Percentage)	Mean
1 - Strongly Disagree	28 (15.56%)	2.6555
2 - Disagree	38 (21.11%)	
3 - Neutral	37 (20.56%)	
4 - Agree	37 (20.56%)	
5 - Strongly Agree	23 (12.78%)	

Table 4.22 indicate that 33.34% respondent strongly agree and agree ,37% were neutral,36.67% disagree and strongly disagree in the response to statement mentioned above the mean of the statement for self-paced learning student is 2.6555 which shows that most of the respondent are agree that I feel that self-paced learning has contributed positively to my academic success in this course.

Table 4.22: I believe that self-paced learning can improve my long-term academic outcomes.

Response	Frequency (Percentage)	Mean
1 - Strongly Disagree	46 (25.56%)	2.8388
2 - Disagree	29 (16.11%)	
3 - Neutral	36 (20.00%)	
4 - Agree	46 (25.56%)	

5 - Strongly Agree 23 (12.78%)

Table 4.23 indicate that 38.34% respondent strongly agree and agree ,36% were neutral,41.67% disagree and strongly disagree in the response to statement mentioned above the mean of the statement for self-paced learning student is 2.8388 which shows that most of the respondent are agree that believe that self-paced learning can improved my long term academic outcomes.

Table 4.23: find it difficult to stay on track and meet deadlines in a self-paced learning environment.

Response	Frequency (Percentage)
1 - Never	51 (28.33%)
2 - Rarely	31 (17.22%)
3 - Sometimes	27 (15.00%)
4 - Often	42 (23.33%)
5 - Always	29 (16.11%)

Table 4.24 A major number of students (23.33% agreed and 16.11% strongly agreed) said that there was difficulty in keeping up with deadlines in a self-paced environment. Nevertheless, 28.33 percent of students have never found the same challenge, which indicates that there are students who believe they can manage a good time within such an environment.

Table4. 24: I struggle with time management when learning at my own pace.

Response	Frequency (Percentage)
1 - Never	30 (16.67%)
2 - Rarely	38 (21.11%)
3 - Sometimes	36 (20.00%)
4 - Often	36 (20.00%)
5 - Always	40 (22.22%)

Table 4.25 Time management is another issue that is likely to create problems, as 22.22% strongly identified that they find it difficult. Nevertheless, 2 out of 10 students admitted that they were sometimes struggling, whereas 2 out of 10 students said that they found time management to be challenging. This shows that the issue of time management may be a problem for some students due to self-paced learning.

Table 4.25: I experience feelings of isolation and lack of support in the self-paced learning model.

Response	Frequency (Percentage)
1 - Never	35 (19.44%)
2 - Rarely	40 (22.22%)
3 - Sometimes	34 (18.89%)
4 - Often	34 (18.89%)
5 - Always	37 (20.56%)

Table 4.26 A good number of students (20.56) said that they feel isolated in the self-paced learning environment, and 19.44 never felt isolated. This shows that although there are such students who succeed in a self-guided nature, some students feel that they are lacking support and they are alone.

Table 4. 26: I have difficulty accessing necessary learning resources or technology for self-paced learning.

Response	Frequency (Percentage)
1 – Never	28 (15.56%)
2 - Rarely	41 (22.78%)
3 - Sometimes	38 (21.11%)
4 - Often	36 (20.00%)
5 - Always	37 (20.56%)

Table 4.27 A significant number of students (22.78%) found it hardly difficult to access resources needed, and 21.11% sometimes encountered the problem, which is why the majority of students have access to resources but has to struggle with the challenge.

Table 4.27: Correlation Test

Variable	Self-Paced Learning	Self-Efficacy	Achievement
Self-Paced Learning	1.00	0.76	0.71
Self-Efficacy	0.76	1.00	0.71
Achievement	0.71	0.71	1.00

Table 4.28 Self-paced learning and self-efficiency show a correlation of 0.76, which shows that there is a strong positive relationship between self-efficiency and self-paced learning. This implies that the more students can interact adequately with self-paced learning, the more they believe in themselves to achieve their academic success (self-efficacy). In essence, the students who are sure that they will be in control of their learning pace will soon fare better in such an environment. Such connection brings out the interdependence of academic self-conceived competence and learning styles of students. The values of 0.71 between self-paced learning and academic achievement are an indication of the moderate to strong positive relationship. This implies that the more the students are engaged in the self-paced learning, the higher their academic performance. The positive impact of self-paced learning environments, where learners have the ability to regulate their own learning pace, appears to have a positive effect on their academic performance. Such a correlation would indicate that an independent learning attitude may positively indicate academic achievement, but the correlation is neither that strong nor as robust as some might believe.

Self-efficacy and academic achievement have a correlation of 0.71, which means it is a moderate positive relationship as well. This association means that students who have the belief in their capability to perform well at school are likely to perform better in school. It reinforces the notion that the confidence in their academic abilities of the students is a crucial factor in their performance in an actual way. The higher the self-efficacy, the higher the chances of passing through challenges and succeeding in their studies. These two strong correlations of self-paced learning, self-efficacy, and academic achievement indicate that these two variables are detached in a positive way. Students that interact more with self-paced learning have a high level of self-efficacy, which consequently appears to influence their academic performance in a positive way. These results have shown that self-regulation and confidence play a significant role in determining academic success, especially under self-paced learning conditions. Although the correlations are in the

moderate-to-strong category (0.71 to 0.76), they are significant and indicate the existence of a strong relationship between these variables.

Summary of Key Findings, Discussion, Conclusion, and Recommendations

5.1 Summary of Key Findings

The sample population was 65.56 percent males and 34.44 percent females, meaning that this study had a male-dominant sample.

The respondents were relatively balanced in terms of academic years, with most students in 1st and 2nd semesters (27.33%) and 3rd and 4th semesters (28.22%), so the sample was quite balanced with regard to students in different stages of their academic journey.

Psychology (27.78%) and Sociology 27.22% were top choices among the respondents, with Education and Anthropology on a fairly equal footing with 25% and 20%, respectively.

Most students (36.11) were attracted to hybrid learning, followed by traditional classroom learning (32.78) and self-paced learning (31.11), demonstrating students were interested in flexible learning with a little element of face-to-face interaction.

The mean age of the respondents was 21.32 years, with the majority of the students being between the ages of 19 and 23 years of age, meaning they are youthful and of university-going age.

The majority of students (45.55%) did not agree that they controlled the pace of their overall learning, with a minority (39.44%) agreeing or strongly agreeing, and this means that most of the students do not believe that they have full control of the pace of their own learning in a self-paced learning setup.

Students said that the possibility of going through difficult materials again was also not negative as a whole, with 42.22% responding with an affirmative or, rather, strong as another option, which implies that self-paced learning would enable students to revise material at their own comfort.

There was a conflicted response on whether self-paced learning enables students to interpret complex information better, and the responses were divided: 39.45% in favor of the affirmative and 40.56% in the negative, which showed that some students did not think that self-paced learning was effective in making students understand difficult concepts.

Another major finding that was made by a large percentage of students (38.34%) was that self-paced learning simply fits their individual timetables, demonstrating that self-paced learning is flexible.

The students were split on the issue of self-paced learning increasing engagement and motivation, as 38.34% of students agreed and 41.61% did not, indicating that self-paced learning does not have a strong impact on engagement with many students.

Although 34.44 per cent said that self-paced learning is more flexible compared to the classroom, the mixed responses reveal that the aspect of flexibility is seen as moderately perceived by the students.

The majority of the students (37.78 per cent) also thought that they got enough feedback on their progress in a self-paced environment; however, 44 per cent remained (indicating that there was no consistent provision of feedback in self-paced learning environments).

Students showed moderate affirmation (36.67) that they felt independent and in control of their learning process during the process of learning at their own pace; however, the majority of the students were neutral or disagreed.

The 37.77 % agreed that they were confident they could learn new material; many students disagreed (42.11 %), which indicated that many of the students lacked great confidence.

A high percentage of them (43.89) rejected the statement that they can succeed in an environment where they are allowed to learn at their own pace, which means that most students do not believe that they can succeed in this environment.

A sub-sample of 43.33% reported that regulating their pace of learning would be helpful in attaining high academic achievement, showing that students are aware of their ability to succeed with self-regulated learning.

The moderated response amongst students towards self-paced learning was that students are moderately able to plan and manage their learning schedule (42.78%), which implies that many students would be confident in their time-management abilities in such learning settings.

Students were motivated and focused in a self-paced learning environment by a percentage of 40.55, and 41.67 disagreed, pointing to the fact that staying motivated is not always easy with a large proportion of students who are in self-paced learning.

Prior to beginning the self-paced learning module, the majority of the students were not confident with the course material, as can be seen in the fact that 45.55% of students do not agree that they were confident.

The proportion of students who indicated that their academic performance had improved since completion of the self-paced learning module was 42.22%, indicating that a significant number of students have recorded improved academic performance.

According to the results, it was found that only 32.34% agreed that they got better grades in self-paced learning than in traditional learning, which indicates that whereas some students feel that they did improve, others do not feel that there is a substantial difference.

Students expressed varying opinions on whether self-paced learning had any positive contribution to their academic success or not, with the 33.34% saying that it had a positive contribution, albeit moderately.

A large percentage of students (38.34%) believed that self-paced learning had the potential to enhance long-term academic achievements, but a quite large number were indifferent or opposed to it.

A significant percentage of 39.44 % of students said that they have poor time management, as 39.44 % of students admitted that they find it hard to meet deadlines in a self-paced learning environment.

In self-paced learning, 42.22% of the students had issues with time management, and this indicates that time management poses a major challenge to most students in the self-paced learning mode.

Another faction of students (20.56%) stated that they felt isolated in the self-paced learning experience, meaning that some students are not feeling that they are supported.

Although 22.78% struggled to get the learning needs or technology, most students had comparatively no problems with the matter.

Self-Paced Learning (Self-Efficacy): There is a high positive correlation between them ($r = 0.76$).

Self-paced learning and academic achievement have a moderate to strong positive correlation ($r = 0.71$).

Self-efficacy has a moderately valuable correlation with academic achievement ($r = 0.71$).

5.2 Discussion

The aim of this chapter is to describe the results related to the study in terms of the research questions and objectives and to determine how they will influence the sphere of education, in particular, the self-paced learning environments. The aims of the study were to establish the relationships between self-paced learning, self-efficacy, and academic achievement among students, and the researcher seeks to establish how the three elements can lead to academic performance in a self-paced learning environment. The findings of the data calculations in Chapter 4 indicated several major results on the role of self-paced learning and self-efficacy as predictors of academic achievement.

Among the focal objectives of the research was the connection between self-paced learning and academic achievement. The p-value of self-paced learning is 0.009, and it implies that this correlation is statistically significant, i.e., it is not likely to have occurred by chance. This positive relationship is further valid and confirmed by the 95% filter interval of [0.106, 0.744]. Thus, the results imply that any self-paced learning setting is possibly to lead to the improvement of academic performance, as the student has increased freedom of choice and greater control of the learning process.

Besides self-paced learning, the article also investigated how self-efficacy affects academic achievement. The findings were found to be strongly positive with self-efficacy and academic achievement with a coefficient of 0.6204. Through this, one can conclude that, given everything being equal, academic achievement would go up by 0.6204 units with a one-unit shift in self-efficacy. This relationship is statistically significant, as the p-value of 0.000 is lower than that value of the standard.

This result is consistent with the Social Cognitive Theory developed by Bandura (1986) that states that self-efficacy plays an essential role in encouraging students to perform. Studies have also constantly indicated that students with a sense of belief in their capability to achieve high performance tend to perform better in academics since they are bound to make and attain more goals (Zimmerman, 2000). The 95 percent confidence interval of 0.302-0.939 indicates that self-efficacy and academic achievement have a good and strong correlation.

The R-squared value, which was at 0.106, was used to get the overall model fit. This shows that the model has an explanatory power of 10.6% on academic achievement. Although this is a small ratio, this may indicate that self-paced learning and self-efficacy have a combined contribution to the academic performance of the students. The fact that the F-statistic=10.49 and the p-value=4.94-05 is statistically significant means that the combination of the predictors (self-paced learning and self-efficacy) is predictive of academic achievement.

Its value of R-squared is also quite low, but it proves the contribution of self-paced learning and self-efficacy to academic results. The comparatively very low value of R-squared is also a demonstration that there is also the possibility that other variables are also potentially important in explaining academic performance in self-paced learning anti-fetish, such as motivation, study habits, or classroom engagement.

The research findings have few consequences on the self-motivated learning setting, and some of them are very valuable. Firstly, both the self-paced learning and the academic performance are positively correlated, and this fact proves that the more students are able to control their learning speed, the higher their academic performance rate may be. This implies that the learning institutions ought to contemplate additional choices of self-studying, especially on the subjects where the students might have to take more time to learn the tough courses. Moreover, online study will be able to benefit students with different needs and provide them with an individual learning style that will be more engaging and inspiring to study.

Second, the correlation of self-efficacy and achievement score is low to realize the necessity to disseminate the idea among students that they could achieve academic success. The programs aimed to strengthen the self-efficacy, including the programs helping them to set the goals, the mentorship programs, and even self-reflection exercises, can also help the students to complete their studies. The educators and institutions should aim at assuring the students that they are competent performers because it will not only enhance their ability to carry out the problems, but also, they will be more motivated and persevering learners in the self-directed learning environments.

In spite of the good results, the research has some shortcomings. The value of R-squared (0.106) means that there may be other variables not included in the model that are affecting academic achievement. Other factors that might contribute to the difference in academic results may be studied in the future, including time management, learning methods, or peer support. Also, the research was done on a particular sample of students, and the results cannot be extended to the entire population. The investigations of the future might involve a more differing sample to make the research findings more generalized.

Moreover, though self-paced learning and self-efficacy are significant predictors of academic success, it would be interesting to examine their relationship with other types of learning assistance (i.e., feedback, peer collaboration/use, and instructor interaction). A study of how these other support mechanisms are used in self-paced learning situations may provide a better insight into the factors behind academic success.

5.3 CONCLUSION

The study aims to investigate the effect of self-paced learning on student academic achievement. The central objective of the research was to follow the connection between self-paced learning, self-efficacy, and academic performance in a self-paced learning environment. By using descriptive and inferential statistics, the study investigated the degree of interaction of these factors and the role they play in academic performance. This study has useful conclusions in understanding the application of self-paced learning in encouraging academic performances of learners and the importance of self-efficacy to academic success.

The research conclusions are useful in the establishment of the relationships between self-paced learning and academic performance and how self-efficacy contributes to the academic performances of learners. The mean academic performance will be at an average level of 0.4248 higher in the event self-paced learning improves by a single unit. This outcome indicates that the more students are empowered to determine the pace of the learning, the better grades they will be able to have. The relationship between self-paced learning and academic achievement was positive, and the relationship was not negligible because the p-value was 0.009. This observation conforms to the previous observations, which reveal that self-paced learning enables the learners to be flexible, and this will enable them to devote time to the challenging aspects, which could lead to better academic outcomes.

Self-efficacy was also found to be in a positive relationship with academic achievement, which was a strong relationship. The self-efficacy-only coefficient of academic achievement was 0.6204, implying that a one-unit increment in self-efficacy will certainly positively impact the academic achievement (0.6204 units at the same level of self-paced learning). The values of this correlation were very significant, and its p-value is 0.000 to determine that self-efficacy is a major predictor of academic success. This outcome is just as defined by the Social Cognitive Theory of Bandura, where self-belief plays a major role in achieving academic goals. As soon as students believe that they can make it, they have higher academic expectations, will remain in the situation despite the challenges that they may face, and excel in academics.

The overall model was observed to give a 0.106 level of fit based on the value of R-squared, indicating that the product of self-paced learning and self-efficacy attributes to the explanation of the various academic performances with 10.6 percent. This is a small percentage, but it shows that there is a significant role played by the two variables in deciding academic success. The statistically significant model with the p-value of 4.94×10^{-5} is the F-value of 10.49, indicating that self-paced learning and self-efficacy serve as dependable predictors of academic achievement when together.

The findings of the research conducted by this paper have certain important implications on educational practice, particularly focusing on the field of self-paced learning environments. There is a positive correlation between self-paced learning and academic achievement; as such, the educational institutions should consider providing more opportunities for self-paced learning when considering the courses a student may have his/her learning pace. Learning at their own pace lets the students reread the challenging work and learn as they go, at their own pace, which can lead to the enhancement of understanding and the achievement of better academic outcomes. Schools may adopt self-centered learning approaches incorporating online courses, online learning, and other adaptable learning applications that would enhance student activity and achievement, particularly when it comes to mastery-based learning courses.

The fact that self-efficacy is associated with academic achievement and shows in a high correlation is an inkling to the significance of providing confidence to students to be good performers. Increased self-efficacy will mean that the students will possess more academic aspirations, endure adversities, and produce better scholarly outcomes. Instructors should be keen to the techniques that can be employed to raise self-efficacy of learners, such as goal-setting assignments, mentoring, and provision of positive feedback. According to such interventions, students will be helped in developing a great belief in their abilities that will later improve their performance in school.

The research offers a significant contribution to self-paced learning and the in-play of self-efficacy in academic success; there are several limitations of the study. The value of R-squared (0.106) means that there are other variables outside the model that might be influencing academic achievement. The additional research can be based on other factors such as motivation, time management skills, or learning strategies, taking into consideration to understand better how they influence academic success. Moreover, the sample of this research was small, and its impact on the generalization of the findings may be possible. This would be appropriate to include larger and broader samples that would be capable of refuting the findings and whether they are applicable in other learning contexts.

This research design merely provided data at one point. The longitudinal research would provide a more detailed contribution to how self-paced learning and self-efficacy can be influenced with time concerning academic achievement. Additionally, two variables were the central focus of this research, though other variables, such as peer collaboration or learning materials, could bring other tremendous contributions to the academic performance. More research ought to be conducted to investigate these other variables so as to develop a more comprehensive look at how learning at one's own pace can affect academic success.

This study results in the conclusions suggesting some research directions in the future. One, the extra variables, such as motivation or study habits, can be researched by researchers, which would also make the academic achievement difference clearer. The lung studies would assist in establishing a long-term outcome of self-paced learning and self-efficacy on academic performance. The study would also be able to be projected into the future to determine how these factors interact with other types of support, such as feedback or future collaboration, to further determine how an environment of self-paced learning can be established so as to optimize student success.

5.4 Recommendations

The results and limitations of the study, it is possible to make certain recommendations that refer to future research and practice. To begin with, the rest of the variables may be put into the frame of further research, which may be included in the academic performance in the self-paced learning environments, including motivation, learning strategies, student engagement, or peer support. Such factors may possibly allow finding a more detailed definition of what contributes to study success in such situations, and the integration of such factors along with self-paced learning and self-efficacy may have an impact on the academic outcomes. It could have expanded the sample size and added other categories of students to render the findings more generalized and give a clear indicative overlay of the point of self-paced learning in the achievement of academic performances. Through the suggestions by the students representing other learning backgrounds, learning disciplines, and other cultures, the researchers would have an inkling of the effectiveness of the elasticity of the self-paced learning in all the varied settings.

Further studies ought to incorporate the use of longitudinal designs that would be more effective in detecting the long-term results of self-paced learning and self-efficacy on academic performance. A longitudinal study would enable the researcher to trace change in academic performance of students over a period of time to have a better insight on how these two variables

affect academic performance in the long run and how self-paced learning affects the learning experience of students in the long term.

The study of the relationships between self-paced learning, self-efficacy, and other facilitating factors, including feedback, peer cooperation, or teacher intervention, might bring further information on the problem of how the educational settings can be optimized in order to enhance the results of the students. A study of the synergy of these factors towards self-paced learning situations would assist in creating a more efficient, personalized, and encouraging learning experience for students, which will eventually lead to their academic success.

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STUDENTS' ACADEMIC ACHIEVEMENT AT UNIVERSITY LEVEL IN ISLAMABAD**Questionnaire****Self-Paced Learning on students' Academic Achievement**

The purpose of this questionnaire is to assess your experiences with self-paced learning and how it affects your academic performance. Your responses will remain confidential, and your participation is voluntary. Please answer each question honestly.

By ticking () on any one of the following option giving against each statement

1. Strongly Agree (SA)
2. Agree (A)
3. Neutral (N)
4. Disagree(D)
5. Strongly disagree (SD)

Name _____

Class _____

Name of institution _____

Section 1: Demographic Information

1.	Gender	Male	Female		
2.	Department	psychology	sociology	Education	Anthropology
3.	Semester	1-2	3-4	5-6	7-8
4.	Learning mode	Self-paced learning	Traditional classroom learning	Hybrid (mix of self-paced and classroom)	

Section 2: Self-Paced Learning Experience

Sr.no	Statement	SA	A	N	D	SD
5.	I feel that I have full control over the pace at which I learn the course material					
6.	I can easily revisit materials I find difficult to understand.					
7.	I feel that self-paced learning helps me better understand difficult.					
8.	The self-paced learning method allows me to study at my own convenience and fits my personal schedule.					
9.	I find that I am more engaged and motivated when learning at my own pace.					
10.	I feel that the self-paced learning environment is more flexible than traditional classroom settings.					

11.	I receive enough feedback on my progress in the self-paced learning environment.					
12.	I feel independent and in control of my learning process in self-paced learning.					
Section 3: Academic Self-paced						
13.	I am confident in my ability to learn new material in my study.					
14.	I am capable of succeeding in self-paced learning environments.					
15.	I believe I can achieve high academic performance if I manage my learning pace effectively.					
16.	I can effectively plan and manage my study schedule to meet deadlines in self-paced learning.					
17.	I am able to stay motivated and focused on my studies in a self-paced learning environment.					
Section 4: Academic Achievement						
18.	Before starting the self-paced learning module, I was confident in my understanding of the course content.					
19.	Since starting the self-paced learning module, my grades have improved.					
20.	Since starting the self-paced learning module, my academic performance has improved.					
21.	I have achieved higher grades in this course compared to previous traditional learning experiences.					
22.	I feel that self-paced learning has contributed positively to my academic success in this course.					
23.	I believe that self-paced learning can improve my long-term academic outcomes.					
Section 5: Challenges in Self-Paced Learning						
24.	I find it difficult to stay on track in a self-paced learning environment.					
25.	I find it difficult to meet deadlines in a self-paced learning environment					
26.	I struggle with time management when learning at my own pace.					
27.	I experience feelings of isolation in the self-paced learning model.					
28.	I experience feelings lack of support in the self-paced learning model.					
29.	I have difficulty accessing necessary learning resources for self-paced learning.					
30.	I have difficulty accessing necessary technology for self-paced learning.					