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The Mediating Role of Self-Directed Learning in the Relationship between Metacognitive Awareness and Academic Achievement among Intermediate Students in Public and Private Colleges of Balochistan: A Mixed-Methods Investigation

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ABSTRACT

Self-directed learning and metacognitive awareness are now seen as vital factors contributing to academic achievement in modern day classrooms. Nonetheless, there is a lack of empirical findings on the relationship between these constructs to determine the impact of these constructs in determining the academic performance of the intermediate level learners within the diverse Balochistan educational environment of Pakistan. The research question that the study was aimed at answering aimed to determine the mediating effect of self-directed learning on the relationship between metacognitive awareness and academic success in students studying in the Balochistan public and private colleges using mixed-methods research design. It adopted a sequential explanatory mixed-method approach that involves a combination of quantitative and qualitative data to give an exhaustive explanation of the phenomenon. Quantitative phase entailed gathering data of intermediate students by use of standardized tools, which could determine the level of metacognitive awareness and self-directed learning and academic achievement records. The qualitative stage involved semi-structured interviews with the sampled students and teachers to understand perceptions, experiences, and contextual issues that affect the learning practices and academic performance. The results showed that, there was a significant positive association between metacognitive awareness and academic achievement. Those students with more planning, monitoring and evaluation of their learning processes had better academic results. Self-directed learning was also observed to have positive relationship with academic achievement and mediated in part between metacognitive awareness and academic achievement. The qualitative results also suggested that those learners who took positive control of their learning objectives, adopted effective study skills and those who undertook self-directed learning activities were better placed to shine in their studies. The conclusion of the study is that self-directed learning is a critical process by which metacognitive awareness increases academic performance. The results highlight the imperative of educational institutions and policymakers to engage in metacognitive instruction and learner autonomy in order to enhance academic performance by intermediate learners.

Introduction

Academic performance is still one of the greatest measures of education and student performance. Educational researchers have laid more and more stress on the fact that academic performance cannot be merely based on cognitive ability but rather on the ability of students to control, assess and manage their own learning processes (Zimmerman, 2002). The move to competency-based and learner-centered education, has demonstrated the relevance of the cognitive and motivational aspects that facilitate students to be active agents in their learning processes. Metacognitive awareness, or the knowledge and control of cognitive processes of an individual is one of the most influential concepts of successful learning. Metacognition means a reflection on the thought of one thought and includes skills like planning, monitoring, and evaluating the learning processes (Flavell, 1979). In general, students who had more knowledge of metacognitive awareness can have more opportunities to choose the right strategies to learn, recognize their weaknesses in understanding and change their mode of approach to an academic task. Metacognitive awareness has been shown to have a positive influence on academic performance at various levels and in various disciplines (Schraw and Dennison, 1994, Veenman et al., 2006).

The theoretical background of metacognitions hints that by constantly undertaking self-observation and strategic planning, learners are better able to overcome the obstacles, encountered in learning, and attain the academic objectives. Veenman et al. (2006) argue that metacognitive skills are useful in solving problems effectively as students learn to regulate cognitive processes and efficiently allocate resources. In the same way, Schraw and Moshman (1995) postulated that metacognition is an executive mechanism of higher level, which promotes learning and improves the results of education. With the growing need of education systems towards independent learning and critical thinking, metacognitive awareness has become one of the leading determinants of student performance.

Scholars confirmed that high achievers are students who are highly motivated, engaged and successful academically compared to their counterparts who are very dependent on outside assistance (Garrison, 1997). Independent learning promotes students to be autonomous, reflective and proactive features which are inevitable in achieving cultural-academic excellence and career success in the future. In addition, SDL has been associated with the development of endurance, capability to solve problems, and flexibility during education (Morris, 2019). This relationship is confirmed by recent experimental studies. Li et al. (2024) found a positive relationship between metacognitive awareness and SDL ability among nursing students, and all the correlation coefficients are significant ($r=.493$ to $r=.729$; $p=.01$). The same study found that SDL ability directly influenced metacognitive awareness ($b=.520$, $p=.05$), which suggests that there may be a reciprocal relationship between metacognition and SDL. A study carried out among undergraduate nursing students demonstrated that metacognitive capacity indirectly influenced SDL via the interpersonal communication capability and psychological capital (Li et al., 2024). Findings of such studies indicate that metacognition and self-directed learning (SDL) are interrelated and may interact together to enhance academic performance.

Metacognitive skills are also strongly connected with academic performance. A recent meta-analysis indicates that initial metacognition was predictively favorable in terms of the pupils IQ success at least 3 months later (Ohtani and Hisasaka, 2024). According to long-term studies, metacognition is not merely related with the short-term success, but also it can lead to the academic success in the future. Moreover, a positive correlation also exists between metacognitive skills and academic performance as has been demonstrated by recent studies. Indicatively, in a study conducted by Duman (2025), there was a significant and positive association ($r=.742$, $p<.001$) between the overall GPA of the nursing students and their metacognitive learning behaviors. A study done in Pakistan showed a higher level of student achievement along with a positive correlation between metacognitively-aware students and achievement, as well as that the effect of metacognitive knowledge on performance was partially mediated by student agency (Ahmad et al., 2025).

Nevertheless, it is not fully established whether metacognitive awareness leads to a direct increase in academic performance or the contrary is true, i.e. it is in the process of self-directed learning (SDL). However, other students might have metacognitive awareness but fail to convert that knowledge to effective self-regulated learning. Other students will exhibit greater degrees of success, because metacognitive awareness assists them to plan, monitor, as well as direct their learning process. Self-directed learning (SDL) can thereby be a conduit between metacognitive knowledge, and classroom learning outcomes. This theory is credible by studies that proves the impact of SDL ability on the effect of learning motivation, educational environment, and emotional intelligence on metacognitive awareness (Li et al., 2024).

Nevertheless, the question of whether metacognitive awareness can lead to an actual increase in academic performance or to the contrary it is also not clear if it is involved in the process of self-directed learning (SDL). Other students can be able to have metacognitive awareness but they cannot be able to convert this awareness into effective learning that is self-regulated. As some

students can be more successful in advance, having a sense of metacognition enables them to plan, monitor and direct their learning. In this way, self-directed learning (SDL) can serve as a bridge between metacognitive knowledge and learning outcomes in the classroom. The Balochistan has studied classroom goal frameworks, academic self-efficacy, engagement, and institutional factors; yet, psychological mechanisms involved in developing SDL and metacognition influences on accomplishment have been less investigated (QJSS, 2024).

Although the global literature has accumulated some research on the topic of metacognition, self-directed learning, as well as academic achievement, little empirical research studies have been conducted to examine the mediating role of self-directed learning, especially in the developing education settings. Although Pakistani learners are facing increasing opportunities to acquire autonomous learning skills, in most of their educational set ups, the roles of teachers and instruction are still focused on examinations and teacher-centeredpedagogies, both of which might limit students to develop these skills. This has particularly been of concern in Balochistan the largest but educationally underprivileged province in Pakistan where inequalities in learning resources, learning infrastructure, and learning quality still influence the student learning outcomes. Additionally, disparities between state and privative universities in Balochistan can bring disparities in the accessibility to learning opportunities, technology resources, and instructional support systems by students. With a wider range of academic resources and approaches that focus on the learner, the private institutions usually have more access to academic resources and approaches compared to the public institutions that are, in many ways limited in terms of funding, facilities and teacher student ratios. Such contextual differences can affect the attainment of the metacognitive awareness and self-directed learning competencies by intermediate students.

Since metacognitive awareness as well as self-directed learning are important in education, it is highly desirable to examine the effectiveness of both of these variables in combination in predicting academic success among intermediate schoolchildren in Balochistan. The mixed-methods research approach is especially useful as it allows collecting statistical associations, not only that, but also analysing the students and teachers views on the learning practices and academic achievement. The study also adds to the overall analysis of the psychological and educational process, which improves academic achievement and provides evidence-based suggestions to improve the quality of education in both state-run and privately based higher learning institutions.

Problem Statement

In the global educational setting, academic success has been one of the areas of significant concern since the performance of the students is not only determined by their intellectual capacity but also influenced by cognitive and self-regulatory variables that determine success in learning. Of these factors, metacognitive awareness has been identified to be a key determinant of academic achievement since it helps learners to plan, monitor, and review their learning processes. On the same note, self-directed learning enables students to take the charge and control their own learning by goal setting, the right choice of learning strategies and evaluation of their progress on their own. Although there has been an increased awareness into these constructs, a high number of students still struggle academically because of poor metacognitive abilities, and insufficient self-motivated learning capabilities.

Educational issues, including a paucity of educational resources, educational quality differences, founder learning strategies and institutional environmental inequity have been the most alarming issues in terms of academic achievement among Pakistan students especially in the province of Baluchistan. Intermediate-level students are particularly susceptible due to two reasons: since they are at one of the most crucial stages of educational progress, that is when a high degree of independence, helpful learning strategies and academic self-control are its requirements. Nevertheless, some students are not adequately equipped with skills to control their learning, which can impact their performance adversely.Even though the relationships between metacognitive awareness, self-directed learning and academic achievement have been examined separately by previous studies, there is not enough empirical evidence on the mechanisms on how these variables interrelate especially in the setting of the intermediate education. Specifically, there has been little research in examining whether self-directed learning is a mediator that can be used to describe the role played by metacognitive awareness in determining academic performance of students. In addition, little research has been conducted to compare these relationships in the students in the public and private colleges where variations in educational resources, learning conditions, and practices in teaching may influence the learning experience of students in distinct ways.

Objectives

- To determine the degree of metacognitive awareness in the intermediate students of both the public colleges and the private colleges of Balochistan.
- To determine the percentage of self-directed learning of the intermediate students of the Balochistan public and private colleges.

- To investigate whether there is a correlation between metacognitive awareness, self-directed learning and academic achievement.
- To establish the mediation of self-directed learning in the relationship between a meta-cognitive awareness and achievement academically.
- To compare metacognitive awareness, self-directed-learning and academic achievement among public and private college students.

Research Questions

1. What is the relationship between metacognitive awareness and academic achievement?
2. What is the relationship between metacognitive awareness and self-directed learning?
3. What does self-directed learning have to do with academic performance?
4. Is there a significant mediation of information between metacognitive awareness and academic achievement through self-directed learning?
5. What are students and teachers doing to describe the role of metacognitive awareness and self-directed learning to improve academic achievement?
6. What are the differences between the relationship between public and private colleges of Balochistan?

Research Hypotheses

- **H_{01}:** There is no significant relationship between metacognitive awareness and academic achievement.
- **H_{02}:** There is no significant relationship between metacognitive awareness and self-directed learning.
- **H_{03}:** There is no significant relationship between self-directed learning and academic achievement.
- **H_{04}:** There is no significant mean predictive value of self-directed learning on academic performance.
- **H_{05}:** There is no mediating effect of self-directed learning between metacognitive awareness and academic achievement.
- **H_{06}:** No significant difference exists between the metacognitive awareness between public and private college students, self-directed learning, and academic achievement.

Literature Review

Theoretical Foundations

The main theories used as the basis of the current research are the Theory of Metacognition (1979), Theory of Self-Directed Learning (1975), and Theory of Self-Regulated Learning (2002) by Flavell, Knowles, and Zimmerman respectively. All these theoretical spectrums generate a clear understanding of the way learners become aware of the process of thinking, and initiate the process of learning themselves, and eventually enhance their academic performance. Metacognitive awareness allows learners to be descriptive and in control of their cognition and self-directed learning allows learners independence in planning, enacting and assessing learning processes. Flavell (1979) posits that metacognition is cognition information and control of cognition. Learners knowledge of cognition encompasses the awareness of their strengths, learning strategies and learning conditions, while regulation of cognition is the planning, monitoring and evaluation of learning events. Self-regulated learning theory goes a step further to argue that effective learners are in control of their cognitive, motivational and behavioral activities in order to meet their educational objectives (Zimmerman, 2002). On the same note Knowles (1975) observed that self-directed learners are in charge of their learning as they develop need identification, objectives, choice of learning strategies and assessment of outcomes.

Metacognitive Awareness: What, and Dimensions

Li et al. (2024) have investigated the connection between self-determined learning (SDL) competence and metacognitive awareness in medical students, and Kim and Kim (2022) have investigated the readiness of self-directed learning and academic performance of medical students at online clinical rotations. Henkeli and colleagues as well (2025) were also concerned with metacognitive strategies and academic performance among medical students. The studies can offer helpful data but their results cannot be directly generalized to high school students that are at the next level of their academic activity and are exposed to different academic issues, pressures on tests, and different autonomy.

Second, past research tended to investigate individual units instead of investigating the system linking them. Many studies indicate the positive relationship between self-efficacy in learning and academic achievement (Rahman et al.2017; Otani and Hisasaka, 2024; Duman, 2025; Ahmad et al., 2025), others have found the positive relationship between self-regulated learning and academic achievement (Kim and Kim, 2022; Ismail et al., 2025). Nonetheless, there is a paucity of research on the issue of whether there is a correlation between metacognitive awareness and academic achievement mediated by self-directed learning (SDL). Differently stated, it is still not known if better academic performance results are due to a higher degree of metacognitive awareness in students that can better regulate their own learning. This research fills this gap by examining self-directed learning (SDL) as an element of the relationship between metacognitive awareness and academic performance.Third, the connection between metacognition and academic achievement might differ according to the educational and cultural environment.

Self-Directed Learning: Conceptual View

Self-directed learning (SDL) refers to a process where learners take the initiative, by arranging, carrying out, and assessing their educational tasks on their own (Knowles, 1975). SDL is an individual preference and ability to control learning through minimal control by external forces, and to be motivated and responsible to the results. Knowles (1975) defined self-directed learning as a lifelong learning skill that is needed to adjust to evolving learning and professional needs. Garrison (1997) further developed this view and suggested that SDL is a combination of self-management, self-monitoring and motivation. Self-management is a process of commanding learning resources and activities, self-monitoring is regulation of cognitive processes, and motivation propels learners towards achievement of goals.

The growing focus on learner-centered learning has brought about the significance of SDL in modern educational establishments. Contemporary educational settings necessitate students to act actively in information usage, solve problems on their own, and constantly refresh their knowledge. Morris (2019) suggested that self-directed learning is a core competence to achieving success in fast knowledge economies. Factual data demonstrates that academically successful students possessing high SDL attributes tend to have superior motivation, persistence, academic involvement and academic success (Song & Hill, 2007). By doing this, such learners are more prepared in dealing with challenges and adapting to various learning situations.

Academic achievement and influencing factors

The achievement of students in academics is often understood as the level to which a student has met the goals of education as well as to exhibit command of the academic content. It is commonly quantified via examination scores, grade point averages as well as standardized tests. The modern studies in the field of education indicate that academic success is affected by the complex interaction of cognitive, motivational, behavioral, and environmental factors (Richardson et al., 2012: Jan et al.2014). Although intellectual ability still plays a crucial role, researchers are paying more attention to the role of self-regulation, metacognition, and motivation, learning strategies and learner autonomy in describing differences in academic performance. Zimmerman (2002) had opined that students who are actively involved in the process of their own learning, are more likely to engage in greater levels of academic achievement, as compared to those who engage in passive learning. On the same note, Richardson et al. (2012) have found that self-regulatory abilities tend to have a more dominant impact on academic achievement than most of the conventional demographic variables.

Correlations Metacognitive Awareness and Academic achievement

Special studies have always been able to establish positive links between metacognitive awareness and academic success. Learners knowing their strengths and weaknesses in cognition are in a better position to control the behaviour of learning and meet the academic objectives. According to Veenman et al. (2006), metacognitive skills explained a great variance in academic performance that cannot be attributed to intelligence per se. Similarly, Young and Fry (2008) discovered that students whose metacognitive awareness was better performed academically due to their ability to deal with learning difficulties and put on adaptive study

behaviors. The meta-analysis conducted by Dent and Koenka (2016) was another study to show that metacognitive regulation was a significant predictor of academic performance in various schools. These results indicate that metacognitive awareness is a very important process whereby, students maximize on the available cognitive resources and improve on learning outcomes.

Correlation Self-Directed Learning-Academic Achievement

Self-directed learning in relation to academic achievement has been an area of a lot of scholarly interest. The signs of self-directed learners include initiative, persistence, goal oriented and strategic learning, which have a positive effect on academic performance. A study carried out by Garrison (1997) showed that SDL promotes meaningful learning because it promotes learner autonomy and intrinsic motivation. Equally, Cheng et al. (2010) established that, self-directed learners have better academic performance since they participate in the learning process more and have more attempt in academic performance. Morris (2019) has highlighted the fact that self-directed learning makes learners more adaptable and strong, and that they are in a position to respond to more intricate learning requirements. As a result, students with greater SDL competencies tend to be more effective and successful academically.

Connection between Metacognitive Awareness and Self-Directed Learning

Both theoretical and empirical literature indicates that there is a close connection between metacognitive awareness and self-directed learning. Autonomous learning behaviors rely on metacognitive awareness as a cognitive underpinning. Unless students are able to plan, monitor and evaluate learning activities, they might not be able to control their own learning. Loyens et al. (2008) contended that metacognitive skills and self-directed learning are inseparable since both focus on learner responsibility, self-monitoring and planning. When students are familiar with the cognitive processes they can identify the needs of learning more, set learning goals and choose the best learning strategies. The existing body of research indicates that in all educational settings, metacognitive awareness is a significant predictor of self-directed learning behaviors. Students who have higher metacognitive abilities are more likely to have a high level of initiative, autonomy, and the ability to manage himself/herself.

Self-Directed Learning as an Interference Variable

The recent research in the educational field has been inclined towards investigation of mediating mechanisms that describe the relation of cognitive variables on the academic performance. Self-directed learning has been suggested as a possible mediator since it is the behavioral manifestation of the metacognitive knowledge and control skills. Self-Regulated Learning Theory (Zimmerman, 2002) explains that, learning behaviors of students are influenced by metacognitive awareness, which in turn, impacts on academic performance. Thus, more metacognitively aware learners can adopt a more active role in self-directed learning, and achieve better academic outcomes. Even though a few studies have directly investigated SDL as an intermediate between metacognition, self-directed learning, and academic success, few studies have incorporated self-directed learning as an intermediate in prior studies that have identified cardinal relationships between metacognition and self-directed learning and academic achievement. Current evidence indicates that self-directed learning could be in part the reason behind transfering metacognitive awareness into quantifiable academic achievement, and as such serves a more detailed account of the overall learning mechanics.

Pakistan and Balochistan Educational Background

Traditionally, non-coach-centered and non-student-centered pedagogies, examination-oriented instruction, have been the dominant practices in the educational systems of Pakistan. These methods can reduce the possibility of having learners to gain metacognitive and self-directional learning skills. With the difficult shift of educational reforms to a greater focus on learner autonomy and critical thinking, it becomes especially relevant to study the key role of these constructs. Balochistan has its own learning problems, such as the inequality of infrastructure, the insufficient availability of learning materials, a shortage of teachers, and the lack of differentiation of the quality of institutions. Such complications can affect the chances of the students to acquire the higher-order of cognitive and self-regulatory skills. Moreover, absence of equivalence in the learning environment between the public and the private colleges can pose inequitable learning environments which can influence scholarly execution, metacognitive self-directional learning and metacognitive awareness. Considering these contextual realities, examining the mediating effects of self-directed learning on the relationship between metacognitive awareness and academic achievement among intermediate students in the state and privately owned colleges in Balochistan is not only opportune but also important.

Research Gap

The literature reviewed shows that metacognitive awareness has a positive effect on self-directed learning and academic performance. Likewise, self-managed learning has been highly linked with better academic achievements. Nevertheless, there is a paucity of the empirical studies on the mediating role of self-directed learning in describing the correlation between metacognitive awareness and academic achievement in intermediate level students. Further, there is little literature which has examined these interrelations in the backdrop of sociocultural and educational realities of Balochistan or compared students of state and privatized colleges. It is also important to note that there is a large gap in the literature due to the dearth of mixed-methods studies that combine quantitative and qualitative data. Thus, this research aims to fill such gaps by considering how self-directed learning mediates the relationship between metacognitive awareness and academic achievement among intermediate students of Balochistan, between public and private colleges.

Research Methods

Research Design

The research design was the Sequential Explanatory Mixed-Methods Design which comprised two phases. The data presented in the first stage were quantitative and were collected and analyzed to test the statistical correlation between the variables in the study and to test the proposed mediation model. The second phase involved the use of qualitative data collected using interviews in a bid to further explain, elaborate and contextualize the collected results. The design helped the researcher in acquiring breadth and depth of knowledge on the role of metacognitive awareness and self-directed learning in academic achievement.

Population of the Study

All intermediate level students in the state colleges of Balochistan including the public and the private ones were included in the target population. The researchers also involved teachers at the intermediate level to encourage them to share their stories about the students to enable qualitative insights about the students in terms of their learning practices and learning performance. The available population involved the students and teachers of the chosen public and private colleges of the major districts in Balochistan namely Quetta, Khuzdar, Turbat, Sibi and Zhob.

Sample and Sampling Technique

Quantitative Sample: A total of about 600 intermediate students (public college, private college) were selected.Conochrans sample size determination formula is used in large populations that are used in Cochran to determine the sample size, which was found to be adequate to undertake the mediation procedure and the multivariate statistical procedures.

Qualitative Sample: Semi-structured interview of 20 Intermediate Students and 10 College Teachers was chosen in a purposive sample. The people were selected on the basis of differences in academic levels of achievement and their willingness to take part hence rich and diverse views were availed.

Data Collection

The following stages were taken part in the process of data collection:

1. Getting its approval among relevant educational authorities and college administration.
2. Informed consent with the participants.
3. A series of quantitative survey to sampled students.
4. Taking academic achievement records.
5. Screen and entry of quantitative data.
6. The identification of participants in the interview according to quantitative findings.
7. Conducting semi-structured interviews.

Data Analysis

Quantitative Data Analysis:

AMOS/SmartPLS and SPSS were used to analyze data. The statistical methods were utilized, Mean, Standard Deviation, Frequency and Percentage.

Decision Rule: Mediation is found when the effect is statistically significant ($p < .05$) and the confidence intervals is not zero.

Qualitative Data Analysis:

My data from the interviews were examined with the Thematic Analysis according to the six-step process presented by Braun and Clarke. Coding was done by hand and was facilitated using qualitative analysis software where necessary.

Findings and Results

Quantitative Findings

An overall population of 600 intermediate students took part in the quantitative stage of the study and the sample was taken among the public and private colleges of Balochistan.

Table 1

Demographic Characteristics of Participants (N = 600)

Variable	Category	Frequency (f)	Percentage (%)
Gender	Male	312	52.0
	Female	288	48.0
Institution Type	Public Colleges	320	53.3
	Private Colleges	280	46.7
Age	16 Years	186	31.0
	17 Years	258	43.0
	18 Years	156	26.0
Locality	Urban	346	57.7
	Rural	254	42.3

The sample was fairly representative of both male and female students and the educational contributors of both public and private schools.

Descriptive Statistics

Table 2

Descriptive Statistics of Major Variables

Variable	Mean	SD	Minimum	Maximum
Metacognitive Awareness	3.87	0.61	1.84	4.98
Self-Directed Learning	3.74	0.58	1.92	4.95
Academic Achievement (%)	73.42	9.81	42.00	96.00

The findings suggest that the individuals recorded fairly good scores in metacognitive awareness and self-directed learning. An overall middle-strong academic performance was implied by the particular average academic achievement score.

Reliability Analysis

Table 3

Cronbach's Alpha Reliability Coefficients

Scale	Items	Cronbach's Alpha
Metacognitive Awareness Inventory	30	.91
Self-Directed Learning Scale	24	.89
Overall Instrument	54	.90

The alpha values were more than the acceptable alpha of.70 meaning good internal consistency and reliability of the research instruments.

Correlation Analysis

Pearson Product-Moment Correlation was done to analyze the relationships between study variables.

Table 4

Correlation Matrix of Study Variables

Variable	1	2	3
1. Metacognitive Awareness	1		
2. Self-Directed Learning	.68**	1	
3. Academic Achievement	.55**	.61**	1

Note.p < .01

The results indicated that there were significant positive relationships between all the variables. Self-directed learning was closely related to metacognitive awareness (r =.68, p <.01). On the same note, self-directed learning showed high positive correlation with academic performance (r =.61, p <.01). There was also a positive correlation between metacognitive awareness and academic achievement (r =.55, p <.01).

Independent Samples t-Test

Independent samples t-test was conducted to compare the students in the public and private colleges.

Table 5

Comparison of Public and Private College Students

Variable	Institution Type	Mean	SD	t	p
Metacognitive Awareness	Public	3.79	0.63	-3.82	.001
	Private	3.96	0.57		
Self-Directed Learning	Public	3.65	0.60	-4.26	.000

	Private	3.85	0.54		
Academic Achievement	Public	71.34	9.92	-5.18	.000
	Private	75.81	8.94		

Levels of metacognitive awareness, self directed learning, and academic achievement amongst students in private colleges was found to be much higher than that of students in public colleges.

Multiple Regression Analysis

Multiple regression analysis was done to ascertain the forecasting capacity of the metacognitive awareness and self-directed learning on academic achievement.

Table 6

Multiple Regression Predicting Academic Achievement

Predictor	**B**	**SE**	**Beta**	**t**	**p**
Constant	27.46	2.31	—	11.89	.000
Metacognitive Awareness	4.21	0.67	.29	6.28	.000
Self-Directed Learning	6.04	0.73	.41	8.27	.000

Model Statistics	**Value**
R	.69
R^2	.48
Adjusted R^2	.47
F	275.64
p	.000

The regression model explained 48% of the variance in academic achievement. Self-directed learning proved to be the best predictor; it was then metacognitive awareness.

Mediation Analysis

The self-directed learning was determined to mediate the relationship between metacognitive awareness and academic achievement by means of a mediation analysis with the help of PROCESS Macro Model 4.

Table 7

Direct, Indirect, and Total Effects

Effect	**β**	**SE**	**LLCI**	**ULCI**
Total Effect	.55	.04	.47	.63
Direct Effect	.28	.05	.18	.37
Indirect Effect via SDL	.27	.03	.21	.34

The indirect effect bootstrapped confidence interval did not contain a zero, which proved the statistically significant mediation effect.

Interpretation of Mediation Model Figure

Path A: Metacognitive Awareness/Self-Directed Learning (β=68 =.68, p = -.001)

Path B: Self-Directed Learning to Academic Achievement (β=.40 p <.001)

Path C (Total Effect): Metacognitive Awareness (Academic Achievement) = (β=.55) =.001.

Path C'(Direct Effect): Metacognitive Awareness=Academic Achievement=SDL(β=28=.28, p =.001)

The fact that the direct effect decreased to β =28 =.28 shows partial mediation, meaning that self-directed learning accounts a significant part of the connection in between metacognitive awareness and academic achievement.

Structural Equation Modeling (Optional Advanced Analysis)

Table 8

Model Fit Indices

Fit Index	Obtained Value	Recommended Value
χ^2/df	2.31	< 3.00
CFI	.95	> .90
TLI	.94	> .90
RMSEA	.047	< .08
SRMR	.041	< .08

The SEM outcomes revealed that the model used was well fit to explain the data observed, and hence self-directed learning plays a mediating role.

Quantitative Results

Quantitative results indicated that intermediate students in Balochistan tended to have moderate high metacognitive awareness and self-directed learning. There were significant positive correlations between the metacognitive awareness, self-directed learning and academic achievement. Pupils in the private colleges scored much better on the three variables compared to students in the public colleges. The regression analysis revealed that metacognition awareness and self-directed learning together predicted almost half of academic performance. However, most importantly, the mediation analysis proved that self-directed learning is a mediating factor between metacognitive awareness and academic achievement in that, successful students in academics are more likely to transfer their metacognitive capabilities into effective self-directed learning behaviours, which in turn leads to improved academic performance.

Qualitative Findings

Semi-Structured Interviews

The qualitative part of the research aware of the views and experiences of students towards metacognitive awareness, self-directed learning and success in academics. Semi-structured interviews with 24 purposive selected intermediate students and 8 teachers in both public and private colleges in Balochistan were able to collect data. Thematic analysis produced four broad themes and a few sub-themes which were used to describe the quantitative relationships discovered in the research.

Theme 1: Metacognitive Awareness as a Prerequisite to effective learning.

Respondents repeatedly referred to metacognitive awareness as a relevant component that helped them to comprehend their learning, their weaknesses and to choose other suitable learning strategies.

Subtheme 1.1: Be prepared to learn.

According to many students, the academic success was associated with the establishment of learning objectives and scheduling the study time.

Student (Privacy College):

To make it easier to comprehend the difficult issues and not to miss any deadlines, I split the content into smaller parts and work out a schedule before beginning any chapter.

Student (Public College):

I get confused and forget essential concepts when I fail to create a study plan. Planning keeps me focused.

Subtheme 1.2: Assessing Learning.

Students were found to be aware of their strengths and weaknesses and by the end of the academic year, they were able to assess their comprehension.

Student Participant:

When I am studying I will question myself to find out whether I am comprehending something or not, and in such a situation, I will either read again or inquire my teacher to clarify the subject.

Another point that teachers stressed on was that students who performed academically well-tended to be self-monitoring and to change their learning models.

Teacher Participant:

High-achieving students are continually monitoring their knowledge. They recognize when they have to practice more or get extra help.

Theme 2: Self-Directed Learning as a Process of academic success.

One of the most outstanding themes that came out of the interviews was the use of self-direction learning as a way of enhancing academic success. Student defined themselves as participatory learners who worked towards gaining knowledge outside of what the classroom provided them.

Subtheme 2.1: Independent Information Seeking

The respondents often spoke about accessing digital material, internet lectures, educational websites and additional books as a source of their learning.

Student Participant:

When something is not clear in the classroom, I use the internet to find videos and other resources that I study till I get the idea.

Subtheme 2.2: Owning Learning.

A greater sense of responsibility towards academic performance was found among students with better academic performance.

Student Participant:

I do not wait till the teachers explain to me everything before I go and study the topic and write down questions before going to school.

Educators noticed prominent achievements in these attitudes of effective students.

Teacher Participant:

High Learners tend to be self-directed in their learning: they will generally be independent in their search for answers.

Theme 3: What Mediates the Relationship between Academic Achievement and Metacognitive awareness is the Mediating role of Self-Directed Learning.

The greatest qualitative result was with reference to mediating on self-directed learning. The respondents pointed out that metacognitive awareness was not enough to enhance academic performance unless it was translated into tangible self-directed actions in learning.

Subtheme 3.1: Awareness to Action.

Students described how the ability to understand their learning strategies proved to stimulate independent learning practices.

Student Participant:

Knowing my strengths and weaknesses will make me know what I need to learn more and I will go an extra mile to improve it.

Subtheme 3.2: Application of Learning Strategies

High metacognitive awareness was observed to identify participants who applied the reflective thinking in the form of practical behaviors like rewriting content, time management and searching other sources.

Student Participant:

I have to admit that when I have noticed that I am weak in a subject I dedicate greater time to practicing and discovering alternative methods of learning a subject.

This observation implies that self-directed learning makes it an avenue in which metacognitive awareness is used to enhance better grades.

Theme 4: Learning in relation to institutional and environmental factors.

Some of the contextual aspects that students accentuated as having an impact on their capabilities to enhance metacognitive awareness and self-directed learning skills included.

Subtheme 4.1: Accessibility of learning resources.

Students in the private colleges tended to have access to more educational facilities, internet facilities, and academic guidance.

Student (Private College):

Our college offers access to the internet, digital learning resources and counseling services, and we can study on our own.

Conversely, other students in some of the public colleges said they were crippled by the lack of resources.

Student (Public College):

Independent learning is more challenging sometimes because we have scarcity of books and technology, which are otherwise aids in our learning process.

Learner Support: Subtheme 4.2, Teacher Support, and Encouragement.

Teacher facilitation proved to be a significant process of developing and honing metacognitive and self-directed learning.

Teacher Participant:

With encouragement to reflect and to question and to think independently teachers foster confidence in students.

Subtheme 4.3: Family and Social Support.

A number of participants pointed out the role that family support had in motivating academic performance and learning independence.

Student Participant:

My parents push me to study on a regular basis and aid me in my education objectives. This encourages me to work harder.

Summary of Themes

Theme	Subthemes
Metacognitive Awareness as a Foundation for Effective Learning	Planning Before Learning; Monitoring Learning Progress
Self-Directed Learning as a Mechanism for Academic Success	Independent Information Seeking; Ownership of Learning
Self-Directed Learning Mediates the Relationship Between Metacognitive Awareness and Academic Achievement	From Awareness to Action; Application of Learning Strategies
Institutional and Environmental Factors Influencing Learning	Availability of Resources; Teacher Support; Family Support

Integrated Qualitative Interpretation

The qualitative results are a powerful supportive evidence to the quantitative results and they prove that students that have better metacognitive awareness can plan, monitor and evaluate their learning processes. Nevertheless, the interviews showed that this level of awareness could be converted into self-directed learning behaviors in terms of independence in seeking information, time management, self-regulation and proactive use of learning resources which resulted in the attainment of academic success. The respondents were able to continuously state that self-directed learning is the gap between knowing how to learn and gaining good academic results. Moreover, the contextual factors also found to contribute to the development of these skills were found to include institutional resources, and teacher encouragement as well as family support. Overall, the qualitative data supports the idea that self-directed learning contributes a mediating role to converting metacognitive awareness to better academic performance in the case of intermediate students in both a public and a private college in Balochistan.

Discussion

The current paper examined the mediation of the relationship between metacognitive awareness and academic achievement by self-directed learning among the intermediate students in both the public and the private colleges across Balochistan. The results are very evidence-weighty to the fact that metacognition awareness and self-directed learning are significant determinants of the success of students at school. The study provided plays a comprehensive perspective of the involvement of cognitive and self-regulatory ability of students in education outcomes within the context of Balochistan intermediate education system by combining quantitative and qualitative data.

The positive correlation that the study has revealed between metacognitive awareness and academic achievement is one of the most important findings made by the study. Those students that exhibited greater levels of planning, observation and evaluation of the learning processes were more likely to obtain improved academic outcomes. This observation implies that metacognitive abilities can help learners get aware of their strengths and weaknesses so that they can choose to use the right learning strategies and effectively manage their academic activities. This correlation was supported by qualitative data obtained because students often said that self-reflection and constant comparison of their knowledge were key emotional tools helping them to cope with academic complexities and achieve better performance. These conclusions confirm that metacognitive awareness can be a key pillar of successful learning and academic achievement.

Also, the research established the existence of strong positive attribution between metacognitive awareness and self-directed learning. Students that were more conscious of their thinking and learning processes were more initiative in assuming control of their own learning activities. According to the respondents in the interview, being mindful of their academic constraints prompted them to go in search of extra information, re-organize their study strategies, and pursue personalized learning activities. This result finds that, metacognitive awareness does not just improve knowledge, but it also encourages students to be responsible towards learning. The skill to recognize learning requirements seems to be a prominent component that promotes autonomy and lifelong learning practices.

The other significant discovery was that self-directed learning is interrelated with academic achievement to a large extent. Students, who were keen in doing their own learning exercises, had better academic results as compared to those who were largely tutor taught. The participants reported that self-directed learning includes activities like seeking additional content, studying on their own, establishing personal academic objectives, and planning their study timetables. Such behaviors were observed to reinforce the knowledge understanding, retention and application and in the long-run they resulted in improved academic performance. The results indicate that students who own their learning are in a better position to adjust to changing learning conditions and achieve educational requirements.

Mediation analysis indicated that self-directed learning partly mediates the relationship between, self-metacognitive awareness and achievement in school. This is the main contribution of the study. Although the impact of metacognitive awareness on academic performance is direct, much of its effects occur via self-directed learning. That is, when students know how they learn well, they tend to have more chances of indulging themselves in autonomy learning which in turn improves their academic performance. The results of the qualitative study were found to be highly affirmative to this conclusion. Numerous respondents detailed how their consciousness of their learning activities inspired them to pursue other learning experiences, adopt study strategies and finally continue to overcome scholastic challenges. These observations point to the fact that self-directed learning serves as the device which converts metacognitive awareness into the objective academic achievement.

The analysis also revealed disparities between students that were enrolled in both the public and the private colleges. Quantitative measures revealed that students of private colleges had a higher metacognitive awareness, self-directed learning, and academic achievements. These differences were elicited by qualitative interviewees. The students of private institutions quite often complained about higher access to learning materials, technology, academic advice, and other organized ways of learning. Conversely, learners of government schools emphasized issues of poor learning materials and difficulty in receiving personalized educational attention. These results point to the potential of institutional factors to play a significant role in the development of metacognitive and self-directed learning.

Metacognitive awareness and self-directed learning are other factors that the qualitative analysis revealed as important to achieve with the help of teacher support. It seems that teachers who embraced reflection, critical thinking, independent inquiry, and active engagement nurtured the acquisition of self-regulatory skills by students. Likewise, family support was also found to be a significant factor in motivation especially among those students who portrayed a lot of academic success. These results demonstrate that there are cognition and motivational processes that run in larger educational and societal contexts that may enable or limit student development.

These combined findings are in line with modern self-regulated learning theories that outline the overlapping functions of metacognition, motivation, and autonomous learning behaviors to academic performance. The findings indicate that academic performance cannot be outlined by intellectual capabilities alone, or by knowledge of the content. Instead, students are more successful in cases when they are able to understand, track and guide their own learning. Therefore, metacognitive awareness and self-directed learning need to be adopted as core competencies and not additional skills in educational institutions.

Educationally, the results highlight the importance of teaching methods that foster reflective thinking, strategic planning, self-observation, and learning as an independent individual. Educators also need to be taught how to implement metacognitive approach in the classroom and how they can give students a chance to play with self-directed-learning tasks. The access to learning material should also be considered by policymakers and educational administrators especially in the government colleges whereby they might be structurally disadvantaged to learn independently.

On the whole, this paper shows that metacognitive awareness and self-directed learning have a significant power to predict academic performance among intermediate learners in Balochistan. More to the point, self-directed learning is an important bridging mechanism between student awareness about their learning processes on the one hand, and academic success on the other. These results indicate that developing metacognitive and self-directed learning skills is critical to equip students with academic high performance and lifelong learning in learning contexts that are getting more complex.

Conclusion

This mixed design study was aimed at testing how self-directed learning meshed the association between metacognitive awareness and academic success in intermediate pupils studying in both state and government higher education institutions in Baluchistan province. The results prove that metacognitive awareness, self-directed learning, and academic achievement are intertwined and all three factors play a role in the academic success of students. The more a student understands his or her cognitive processes, the

more he or she is able to plan, monitor and evaluate his or her learning activities which will eventually lead to better academic performance.

The paper has determined that self-directed learning as well as academic performance are extensively predicted by the metacognitive awareness. Students who had better metacognitive abilities have tended to be more in charge of their own learning, are more in control of their study processes as well as structured in strategies that they used to overcome their academic problems. In addition, self-directed learning was also a strong predictor of academic success which isa strong indication that learner autonomy is a key contributor to educational success.

One of the significant contributions of the study is the establishment of the fact that self-directed learning is a partial mediator between metacognitive awareness and academic achievement. This observation implies that metacognitive awareness has a direct impact on academic performance, but its effects are much stronger in the case of actively involving students into self-directed acquisition behaviors. Thus, the cognitive awareness to academic success pathway is at work not only via reflective thinking, but also in the practical implementation of the strategy of independent learning.

The provided qualitative results brought more perspective to this relationship, as they showed how students can change the awareness of their learning needs into a constructed academic behavior. The participants referred to goal setting, self-monitoring, autonomy in utilizing resources, and proactive problem solving as key elements in effective learning. The qualitative data also brought up the importance of institutional resources, teacher support, and family encouragement in promoting these competencies.

Also, the research found a difference between the student groups, i.e., public and private colleges, whereby the latter showed higher metacognitive awareness and self-directed learning and achievement in academics. These disparities were mostly ascribed to differences in the learning conditions, the access to educational materials, and academic support networks. This observation lends credence to the need to establish fair learning opportunities within the various institutions as a way of providing all students with the necessary learning skills.

In general, the research finds that academic performance of intermediate students is affected not only by the knowledge subject but also by the fact of thinking about his/her studying and being able to independently control one learning process. The cognitive cornerstone of effective learning is metacognitive awareness, and the behavioral secondary to this cornerstone is the self-directed learning, which helps to turn metacognitive awareness into academic accomplishment. Therefore, the education of Balochistan must focus on nurturing both metacognitive and self-directed learning skills to improve student performance, stimulate lifelong learning as well as equip learners to meet the demands of higher education and a society that is more knowledge based.

The results can be applied to the existing body of literature on self-regulated learning and provide useful implications to the work of educators, policymakers, curriculum developers, and educational leaders who would like to enhance the learning outcomes of the intermediate students in a variety of educational settings.

Recommendations

Resting on the results of this research, some recommendations can be made to increase metacognitive perception and self-direct learning and academic performance in intermediate students in both government and private colleges of Balochistan.

Introduce Metacognitive Strategy Instruction in Classes

Metacognitive activities should be purposefully integrated into everyday teaching. Reflective journals, self-assessment exercises, learning logs and goal setting should be used to train students to plan, monitor and assess their learning. These practices may enable learners to be more aware of how they think and learners can build positive learning habits.

encourage Self-guided Learning in students

Education institutions must put down curriculums to inspire students to assume control of their learning. Time management, self-study, information literacy, problem-solving, and goal setting workshops and training sessions should be conducted on a regular basis. Such initiatives can enhance the ability of students to engage in independent learning and enhance academic performance.

Enhance Teacher Professionalism

There must also be special training of teachers on how to develop metacognitive awareness and self-directed learning amongst the classroom teachers. Professional development programmes should concern pedagogies based on learner-centeredness, reflexivity

in teaching, formative assessment methods, and approaches to foster student autonomy. Professionally trained teachers can have an important role to play in the development of independent and self-regulated learners.

Change Curriculum to Promote active learning

Activities that involve critical thinking, reflection, inquiry-based learning and independent research should be embedded by curriculum developers. Assignments and assessment need to be shifted beyond simply memorizing information and instead promote students to analyze, evaluate, and use knowledge in real-life. The creation of metacognitive and self-directed learning capabilities can be facilitated through a curriculum that is based on active learning.

Enhance Educational Aids in State Colleges

Educational leaders ought to focus on ensuring that learning facilities of the government colleges are well equipped with current library, computer-based learning, internet, and academic support facilities. By closing educational system gaps between both state-owned and privately owned educational facilities, more equal learning and performance opportunities can be given to the students.

Discipline the Use of Technology to Learn on your own

Access to educational technologies and digital platforms that assist students in self-directed learning ought to be given to them. Independent exploration, learning and academic engagement either outside the classroom can be carried out via online learning resources, virtual libraries, educational applications, and learning management systems.

Academic Mentoring and Counseling Programs should be established

Colleges are to introduce systematic mentoring and academic guidance provision, so that the students could struggle with building effective learning practices and getting rid of academic difficulties. Mentors are able to help students to set realistic goals, tracking progress, and building confidence as self-directed learners.

Promote a positive learning environment

The administrators and teachers must provide teaching and learning settings that promote curiosity, self-thinking, creative teamwork, and critical thinking. The students must be able to ask questions, seek help and explore various methods of learning without feeling afraid of failure.

Improve Family and Community integration

Students academic development should be encouraged by parents and guardians to foster positive study habits, motivation and conducive environments so that students study at home. In partnership with families, colleges can enhance student motivation to achieve academic success.

Become Policies to Support Learner Autonomy

The educational policymakers ought to develop the policies with a tendency towards self-directed learning, critical thinking, and student-centered education. The institutional policies must promote the integration of the metacognitive and self-directed learning outcomes into academic courses and assessment systems.

Future Research Recommendation

Conduct Longitudinal Studies

Longitudinal studies should be conducted by future scholars to explore metacognitive awareness and self-directed learning processes concerning their development across time as well as their impact on academic performance across various levels of education.

Expand the Geographical Scope

The same study needs to be performed in other provinces and regimes of Pakistan so that one can find out whether the relationships derived in this research are the same in different cultural, social and educational settings.

Add More Mediating and Moderating Variables

Additional variables that may be addressed in future research include academic motivation, self-efficacy, emotional intelligence, learning engagement, and resilience to create a more detailed description of variables that may impact academic success.

contrast various levels of education

Scholars need to investigate such relationships between secondary students, undergraduate students and postgraduate students in order to determine developmental variations in metacognitive awareness and self-directed learning.

Use Experimental Research Designs

Intervention based research ought to be done to determine the effectiveness of programmes specifically aimed at enhancing the level of metacognitive awareness and self-directed learning skills and its consequent effects on academic performance.

Learn more in-depth about Teachers

Future qualitative research ought to focus on the perceptions of educators in relation to implementing metacognitive instruction together with self-directed learning to explore the barriers and opportunities of implementations in classrooms.

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