Original Article

The nexus of self-regulation with academic performance of high school students

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Abstract

In the current situation in Pakistan, teachers and parents are pressing students to get good grades. Students are pushed for hard work, out-of-school tuition and long hours of study. Several factors influence students' academic performance. Self-regulation is one of them. However, limited studies account for students' self-regulatory abilities at school and their academic performance in Pakistan. To fill this gap, this study explores the nexus of self-regulation with the academic performance of high school students. For this purpose, a cross-sectional survey was conducted at four selected schools in District Charsadda, Khyber Pakhtunkhwa, Pakistan. Data were collected from 200 hundred high school students, both male and female. The study measured the association of five elements of self-regulation, namely goal setting, goal attainment, mindfulness, pro-activeness and adjustment, with students' academic performance. The results revealed a highly significant association of various aspects of self-regulation, such as goal setting, goal attainment, mindfulness and pro-activeness with students' academic performance. However, adjustment was insignificantly associated with students' academic performance. The study suggests teachers and parents should help and support students adjust their academic plans when students find it difficult to achieve their academic goals.

Keywords: Self-regulation, academic performance, high school students, goal setting.

Introduction

Several indicators can influence students' academic performance such as strong institutions, parental and teacher support, hard work, and proper planning. Academic achievement in Pakistan is a culturally driven phenomenon as high academic achievement is considered a symbol of honor and respect for the student, family, and teachers (Zahid et al., 2019). That is

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why parents and academicians do focus on making plans and timetables for students to strictly follow in their studies to get high scores in their examinations (Das et al., 2006; Alvi et al., 2016) Apart from it there is a growing emphasis on students grades through pressing students for hard work (Irfan & Hussain, 2014; Batool & Aziz, 2018; Ali et al., 2021). Parents and teachers do make plans for students' studies and expect them to follow them irrespective of their regulatory behavior in life.

However, for achievements in any walk of life, self-regulated behavior is important compared to the external pressure from parents and teachers. Self-regulation enables a person to set goals, make adjustments in life and be mindful of his track to reach his goals. Behavioral scientists and educationists have noted the impact of self-regulation on students' academic performance (Alvi et al., 2016; Khan et al., 2020). Research shows that learners who set their learning goals, monitor their progress and take responsibility for their learning have more chances of getting higher scores and enhanced knowledge (Schunk, 1996; Wood et al., 1990; Rivkin et al., 2005; Khan et al., 2020). But, in Pakistan, more focus has been given to students' studies, hard work and strict timetables to follow (Das et al., 2006) rather than developing the abilities of students to have the abilities to regulate their behavior and plan for themselves. Moreover, researching self-regulation among students is a new phenomenon in Pakistan. A limited number of studies were conducted and that mostly focused on students in the higher education sector (Ghazi et al., 2010) and urban settings. This raises the need for research on self-regulation among school-level students.

Self-regulatory ability helps to utilize metacognition to monitor the learning process and thoughtfully track the learning progress. Self-regulated learners regularly evaluate and control their actions, thoughts and conditions of their work environment and performance and reactions (Zimmerman & Moylan, 2009; Harding, 2018). Self-regulation is not only important in getting good grades, and its importance has been noted in other domains such as health, athletics and academics (Creer, 2000; Paris and Paris, 2003; Clearly and Zimmerman, 2001). Within the educational dominion, the principles of self-regulation were included to help students learn certain academic and reading skills.

The word "self-regulation" means self-control or one's control over his behavior and thoughts. It is a systemic process initiating the required steps to retain oneself in balance. The regulation of biological organisms happens on different levels. For instance, strong emotional self-regulation can keep a person's emotions in check. He can oppose impulsive behavior that can deteriorate his situation and cheer himself up when he feels down (Bell &

Cuevas, 2016). Generally, regulation of self In general, self-regulation is a process that capacitates a person to exercise control over his thought, emotions and actions (Vohs and Baumerister, 2016). Self-regulation includes triggering, sustenance of behavioral change, resistance to undesirable wishes, and the ability to act properly in a given context (Heatherton, 2011).

Experts on the subject under study argue that students with self-regulation skills take part proactively in learning – emotionally, motivationally and cognitively (Zimmerman and Schunk, 2011). Such students self-activate and self-direct energies to acquire abilities and knowledge by implementing specific strategies rather than submissively responding to the teacher's instructions (Soresi, & Nota, 2000). Self-regulated persons make achievable goals, initiate proper struggle to reach them, and consume their resources being conscious of his limitations (Miller & Byrnes, 2001). They have control and ability to adapt and adjust to their environment (Schunk and Zimmerman, 1994).

There are some important elements of self-regulating strategies. These include goal setting, goal attainment, mindfulness, pro-activeness and adjustment. Goal setting is creating concise and usable targets for learning (Schunk, 2003). Scholar argues that goals of high quality must be SMART, i.e., specific, measurable, attainable, realistic and time-bound (Schunk, 2003; West & Thorn, 2001). Goal attainment is performing on the required track towards reaching the goals. (Hulleman & Senko, 2010; Senko et al., 2011). Research has shown that students struggle for goal attainment positively impacts their motivation to work hard and academic performance (Murayama et al., 2012). Mindfulness can be termed mindful awareness or a state of human consciousness where an individual gets aware and pays attention to a particular moment (Brown and Ryan, 2003). Mindfulness is the consciousness that emerges when paying special attention to the rationale or purpose of the activity (Kabat-Zinn, 2003). Consciousness to focus on things we do when we perform them and to feel what happens when it occurs has become an approach to promoting students' performance (Napoli et al., 2005; Snel, 2013). Mindfulness brings a positive behavioral, social and emotional change in adolescents and improves academic performance (Snel, 2013; Parker et al., 2014). Pro-activeness, in general**,** refers to being attentive to and ready to handle the situation when it is going to happen. It was suggested that students higher in pro-activity can search better, benefit from various opportunities, and take action and initiative until goal achievement (Grant & Ashford, 2008**).** Saks, Gruman, and Copper-Thomas (2011) noted that students who engage in proactive behavior experience positive academic outcomes. Adjustment is a behavioral process in which human beings sustain equilibrium

among different needs and environmental difficulties (Searle & Ward, 1990). Various studies have reported that adjustment strongly links students' academic performance and achievements (Jacobson, 2012; Cellar et al., 2011; Margetts, 2002).

Previous studies have pointed out that self-regulation influences students' performance (Zhou et al., 2012; Moffitt et al., 2011). It was further discussed by Allan et al. (2014) in their meta-analysis that performance in both literacy and Maths was greatly influenced by regulation. Studies suggested that self-regulation in childhood becomes a predictor of achievement later in an academic career (Hughes and Ensor, 2011). Dignath and Buttner (2008) also showed how achievements are related to secondary school students' self-regulation.

In their study, McClelland et al. (2013) reported that self-regulation outcomes result in better performance and academic achievement in childhood. Edossa et al., (2018) found in their longitudinal study on primary level school students that self-regulation is also significantly associated with later performance and achievements at higher level. Students who were more self-regulated performed better and were more successful in their later academic careers. They were also self-efficient. They managed their emotions with better cognitive regulation and educational performance. One similar study was carried out by Dent (2013), who reported that self-regulatory abilities with an indirect influence on academic performance (e.g., effortful control, emotion regulation) had a highly significant relationship with students' scores however self-regulation skills with an indirect influence on academic performance (e.g., executive functions) had highly significant relationship with students score recorded on standardized tests.

Most of the studies conducted on self-regulation in Pakistan, such as Zulfiqar & Hussain (2021), Khan et al. (2020), Tariq et al. (2013), and Aziz et al. (2017) had explored the impact of self-regulation on academic performance among university students. These studies concluded that self-regulation is a significant contributor to the academic performance of university students. Similarly, Fatima et al. (2021) reported the influence of self-regulation and other factors on students' academic achievement at higher educational institutions. Qualitative research conducted by Bhamani & Kathawala (2015) noted that the self-regulatory ability of young children influences their academic performance at private schools in Karachi, Pakistan. Likewise, Bakar & Ali (2017) conducted a qualitative study on factors associated with academic performance and reported the link between self-regulation in the secondary schools of Pakistan. The existing literature on self-regulation and academic performance reveals that most of the studies are conducted at higher

educational institutions, while studies focusing on the school level are scant. To fill this gap, this study attempts to evaluate the association of self-regulation with students' academic achievements at secondary-level schools.

Research Design

To conduct this study, a cross-sectional study design was adopted. The study focused on the association of self-regulation and academic achievement among the 9th and 10th-grade students of selected schools (both male and female) in District Charsadda Khyber Pakhtunkhwa. Data was collected from 200 respondents, which included 100 male and 100 female students.

Instruments of data collection

For data collection, a questionnaire was used, which contained two parts, self-regulation and academic achievements. For self-regulation, the short-form self-regulation questionnaire developed by Chen & Lin (2018) was used while students' academic performance was assessed through teacher rating of students in different subject on a five-point Liker scale; ranging from weak, to below average, average, above average and outstanding on three main indicators namely academic grades, class attendance and participation in learning activities.

Validity and Reliability of the Instrument

The validity of the instrument was ensured through the pre-testing of the tool. A pilot survey was conducted to test whether the tool was valid for getting the desired data. Many changes were made as a result of the pre-testing of the tool. While the reliability of the instrument was tested using Cronbach Alpha. Cronbach's alpha is a commonly used statistic for used testing the reliability of a construct to know whether the construct is suitable or fit for the adopted project purpose or not (Taber, 2018). The alpha values were .82 and .71 for self-regulation and academic performance, respectively.

Data Analysis

The collected data were coded and entered into SPSS 25 version. Further data were analyzed with the help Chi-square test to know the association between self-regulation and academic performance among school-level students. Chi-square is a statistical test used to measure the association between independent and dependent variables (Suriman, 2013).

Results and Discussion

Self-regulation and Academic Performance

This section portrays the results of the chi-square association between self-regulation and academic performance of high school students. Self-regulation comprises five sub-variables: goal setting, goal attainment, motivation, adjustment and pro-activeness. The Association of all these sub-variables with students' academic performance is discussed as follows:

3.1.1. Association between Goal Setting and Academic Performance of Students

Table 3.1.1 underneath shows the chi-square results of the association between goal setting and students' academic performance. Goal setting is creating concise and usable targets for learning (Ames, 1992). The results depict a highly significant association ($\chi2$=52.878a, P =.000) of "I do not have difficulties devising my plan to aid me in reaching my goals" with the students' academic performance. This shows that students who are good at making clear plans for reaching their goals have high achievements in their studies and it could be said that a student's academic achievement depends on how clear and well-designed a student's plan is. Li et al. (2018) have offered similar arguments that using an invalid strategy or plan could waste limited resources and result in ego depletion. Explaining this further, Zimmerman (2000) is of the view that such planning and selection or creation of strategies optimize a person's performance learning attempts.

Further, a strong association ($\chi2$=47.0269a, P = .000) was noted between "I can easily set goals for myself" and the student's academic performance. It is in consonance with the findings of Schunk (2003), who reported that students who can set clear learning goals have improved achievements in their studies. Similarly, a meta-analysis by Li et al. (2018) found that two hundred and sixty-three studies conducted on self-regulation have reported correlations between goal setting and students' academic performance. Hence, it could be concluded that students with clear learning goals and well-framed plans for reaching the goals have more chances of improved academic performance.

Table 3.1.1 Chi square results of association between goal setting and students' academic performance

S. No	Aspects of Goal Setting and Academic Performance	P Value Chi Square
1	I do not have difficulties in devising my plans to help me succeed in reaching my goals	χ^2=52.878[a] P = .000
2	I can easily set goals for myself.	χ^2=47.0269[a] P = .000

3.1.2 Association between goal attainment and academic performance

Table 3.1.2 shows the chi-square association between goal attainment and academic performance. It depicts a significant association ($\chi2$ = 42.554a, p = .000) between "when I attempt to make changes in something, I keep my focus on how I am doing" with academic performance. Similarly, a highly significant association ($\chi2$ = 46.109a, p = .000) was noted between "I devise my goals for myself and track my progress" with academic performance. This support the findings of Li et al. (2015), who conducted a study on a similar subject among Chinese school students and reported that self-monitoring and paying attention to time and task students are involved in had a strong relationship with their academic achievements. Likewise, the statement that "once I have a goal, I can usually plan how to reach it" was found to have a significant relationship ($\chi2$ =39.458a, P = .001) with students' academic performance. This supports the finding of Kizilcec et al. (2017), who found that goal orientation and regular planning predict student academic achievement. Further, a strong relationship ($\chi2$ =37.579a, P = .002) was noted between "I am skilled to reach my goals that I have devised for myself" with academic performance of the students. This is in consonance with the views of Sternberg and Williams (2010), who noted that strong belief in oneself and willpower are significant characteristics of learners that influence their learning achievements. Explaining it further, Zimmerman (2008) argues that self-beliefs enable learners to transform their mental abilities into academic performance skills. In addition to the above, "If I make a resolution to change something, I pay a lot of attention to how I'm doing" was also found to have a significant relationship ($\chi2$ =37.785a, P = .002) with academic performance of the students. Similar findings have been reported by Cleary et al. (2006), who noted a significant association between self-reflection on how I am working towards my goal and student achievements.. Likely, a significant association ($\chi2$ = 69.764a, P = .000) was recorded between I usually keep track of my progress toward my goals with academic performance which is in line with the views of Li et al., (2015) who wrote that monitoring of one's progress

towards learning goal is related to one's learning achievements. Zimmerman and Martinez-Pons (1988) also suggest self-evaluation, keeping records and monitoring progress as one of the strategies students should adopt in working toward their learning goals. Moreover, "I have personal standards, and try to live up to them" was also noted as having a highly significant association ($\chi 2$ = 49.666a, P = .000) with academic performance of the students. Similarly, Nota and Sorosi (2002) have pointed out that students who have their personal standards and try to follow their life principles are able to self-activate and self-direct their efforts to acquire knowledge. While Bandura (1997) has argued that belief in self and performing on specific standards are key motivational factors that help in persistent involvement in activities towards goal achievement. Hence would definitely help students achieve higher results.

Table 3.1.2 Chi square results of association between goal attainment and academic performance

S. No	Aspects of Goal Attainment and Academic Performance	P Value Chi Square
1	When I am attempting to change something, I focus on how I am progressing	$\chi^2 = 42.554^a$ P = .000
2	I devise my goals and do keep record of my progress.	$\chi^2 = 46.109^a$ P = .000
3	One I set a goal, I mostly do plan how to reach it.	$\chi^2 = 39.458^a$ P = .001
4	I have the ability to reach my goals that I have devised for myself.	$\chi^2 = 37.579^a$ P = .002
5	If I need to make changes in something, I do pay attention on how I am doing.	$\chi^2 = 37.785^a$ P = .002
6	Mostly, I do keep track record of my progress towards my final goals.	$\chi^2 = 69.764^a$ P = .000
7	I do have particular standards and live up to them.	$\chi^2 = 49.666^a$ P = .000

3.1.3 Association between mindfulness and academic performance

Mindfulness is the awareness that comes when paying special attention to the rational or purpose of the activity (Kabat-Zinn, 2003). The following table 4.3.1.3 shows the result of different factors of mindfulness with students' academic performance. It reveals that "I do not easily distract from my plan" have a significant association ($\chi 2$=30.488a, P = .016) with students' academic performance. However, natural environmental factors such as noise may

distract students from their work. In this regard, Nota et al. (2004) have reported that students with mindfulness skills remove such obstacles or change their environment, for example, a student might turn off his/her radio which distracts his/her mind from studying or isolate himself from anything that causes distraction. In contrast, "I do not have trouble following through with things once I've made up my mind to do something" was found to have insignificant association ($\chi2$=19.071a, P = .265) with academic performance of the students. As previously mentioned, Nota et al. (2004) suggest that there could be unavoidable factors that may distract students' mind that in turn, influence students' performance. To avoid such situations, students need to focus on such obstacles to remove or find a place where such distraction is minimal. Further, a highly significant association ($\chi2$=41.745a, P = .000) was noted between "I do not postpone the decisions regarding my educational work" with academic performance of the students. It could be said that students who are good at time management and meet their targets timely achieve higher results in their academics. Likewise, Zimmerman (2002) have noted that multiple teachers usually assign students different homework assignments. Those students who make a well-managed timeframe can meet their targets and do not postpone their work. This makes it evident that timely completion of assignments would help students' timely learning and hence leads to better performance in their studies. Similarly, a highly significant association ($\chi2$=43.317a, P = .000) was found between "I do not give up quickly" and academic performance. Consonantly, Dembo and Eaton (2000) have reported that students who do not give up because of failure or challenges score higher in their exams. They further noted that such students consider failure part of their learning process and take lessons from it to overcome their weaknesses. In addition, "I notice the effects of my actions until it's too late" was also noted as having significant relationship ($\chi2$=31.771a, P = .011) with academic performance of the students. Such a kind of behavioral mindfulness is called self-control by Zimmerman (2000). Likewise, "most of the time I pay attention to what I'm doing" had a strong relationship ($\chi2$=48.825a, P = .000) with academic performance of the students. This supports the findings of Cleary and Zimmerman (2000), who reported that self-reflection and personal observation through index cards and taking notes along with how long the student studies certain subjects and where he studies predict student academic performance. They further noted that such kind of self-reflection help students adjustment of their plans. In this regard, Zimmerman (2000) reported that students who are good at self-reflection regarding performance processes have higher executive functioning and they can effectively regulate their thoughts and behaviour. Moreover, a significant association ($\chi2$=42.457a, P = .000) was found between "I do not have any trouble making up my mind about things"

and academic performance of the students. This supports Thierry et al. (2016), who noted that students' ability to make their minds up for their work and control their emotions and thoughts are critical for their academic success. Likewise, Arnold et al. (2006) have argued that students who are better able to make up their minds or regulate their emotions are more engaged in learning activities and have more opportunities for learning compared to those who are less able to make their minds up.

Table. 3.1.3 Chi square result of association between mindfulness and academic performance

S. No	Aspects of Mindfulness and Academic Performance	P Value Chi Square
1	I am not easily distracted from my goals and plans.	χ^2=30.488[a] P = .016
2	I do not feel it difficult following my plan and things I have made up my mind to do.	χ^2=19.071[a] P = .265
3	I do not delay the decision about my academic tasks and plans.	χ^2=41.745[a] P = .000
4	I am not the person who easily give up.	χ^2=43.317[a] P = .000
5	I am able to take notice of the effects of my work before its very delayed.	χ^2=31.771[a] P = .011
6	I always do pay attention to things I am doing.	χ^2=48.825[a] P = .000
7	I do not have any difficulty in making up my mind about things.	χ^2=42.457[a] P = .000

3.1.4 Association of adjustment with academic performance

Below table 3.1.4 represent the chi-square results of the association between adjustment and students' academic performance. It depicts a highly significant association (χ2=44.744a, P = .000) between "I think one should learn from his mistakes" with academic performance. This supports the views of Artuch-Garde et al. (2017), who reported that directing and modifying behavior in terms of mistakes or failure is a necessary element of self-regulation, which influence the outcome. Conversely, a non-significant association (χ2= 23.929a, P = .091) was found between "I learn from my mistakes" and students' academic performance. This is in contrast to the findings of Artuch-Garde et al., (2003), who have reported a positive and significant relationship between students learning ability from mistakes and academic performance. Likewise, a non-significant association (χ2=18.979a,

P = .270) was noted between "as soon as I see a problem or challenge, I start looking for possible solutions" and students' academic performance. In the context of our study, it shows a lack of ability of students to learn from their mistakes. It means that students are aware that they should learn from their mistakes but are not capable enough of what they can learn from it and what could be the alternatives. It raises the need for training or guidance of students on how to identify their mistakes, learn from them and find an alternative way to achieve good results. This could be one of the reasons students drop out after their failures because they don't have the ability to learn a lesson from their failure and take a fresh strategy for their success.

Table 3.1.4 Chi square results of association between adjustment and students' academic performance

S. No	Aspects of Adjustment and Academic Performance	P Value Chi Square
1	I feel a person should take lessons from his/her mistakes.	χ^2=44.744[a] P = .000
2	I am able to learn from my mistakes and I do it.	χ^2= 23.929[a] P = .091
3	When I face a challenge or a problem, I do look for alternative solutions.	χ^2=18.979[a] P = .270

3.1.5 Association between Pro-activeness and Academic Performance of Students

Table 3.1.5 below depicts the results of chi-square association between different factors of pro-activeness and students' academic performance. It revealed a significant association (χ2=38.008a, P = .002) between "I can stick to a plan that is working well" and students' academic performance. This is in consonance with the views of Cleary and Zimmerman (2004), who reported that students who regularly evaluate their plans of action and focus on things that work help them reach their goals easily. Similarly, a significant association (χ2=31.687a, P = .011) was noted between "I usually only have to make a mistake one time in order to learn from it" and students' academic performance. This support the views of Zimmerman (1989), who noted that modification and adjustment after failure help students to not repeat the same kind of strategies that do not work. Similarly, Creer (2000) has pointed out that learning from a mistake and readjusting strategies are necessary to avoid continuous failures. In contrast, a non-significant association (χ2=23.381a, P = .104) was found between "I can usually find several different possibilities when I want to change something" and students' academic performance. This means that in the context of the current study, students lack the ability to have

different options available if they want to change their strategy. Hence it could be concluded that students here can stick to their plans and also have the ability not to repeat mistakes; however, they need training on how to find alternatives in case their learning strategies fail.

Table 3.1.5 Chi square results of association between pro-activeness and student's academic performance

S. No	Aspects of Pro-activeness and Academic Performance	P Value Chi Square
1	I am able to stick with my plan that is workable.	$\chi^2=38.008^a$ P = .002
2	I usually only have to make a mistake one time in order to learn from it.	$\chi^2=31.687^a$ P = .011
3	I can usually find several different options when I want to change something.	$\chi^2=23.381^a$ P = .104

Conclusions

The study concentrated on investigating the relationship of self-regulation with students' academic performance. The study concluded that self-regulation is highly related to students' academic performance. Students with skills in self-regulation and their self-regulation practices enhance their academic performance. However, certain aspects of self-regulation have no relationship with academic performance. Students are unable to learn from their mistakes, they are unable to start looking for solutions in wake of problems, and they find it difficult to find various alternatives when they want a change in their plans. Thus students have limited abilities to learn from mistakes and find alternatives to their problems. The study suggests training students on self-regulation to improve their performance instead of pushing them for more hard work, extra tuition and too many long hours of studies. It is also suggested to make aware parents and teachers about the importance of self-regulation for their children and students so they can help them learn and adopt self-regulatory abilities.

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