




Umar Amin Khan¹, Muhammad Iqbal² & Razzaq Ahmad³

¹PhD Scholar, Department of Teacher Education, International Islamic University Islamabad (IIUI)

²Lecturer, Department of Education, Faculty of Social Sciences, Thal University Bhakkar

³Ph.D. Scholar, Department of Educational Leadership & Management, IIUI, Pakistan

KEYWORDS	ABSTRACT
Metacognitive Awareness, Procrastination, Educational Achievement, Students, HEIs	<p>Few of learners cannot complete their academic tasks not because that they are unintelligent or dull, however because of postponement in completion of academic tasks and it is due to procrastination. This research study focused on exploring meta-cognitive awareness and procrastination and its effect on students' achievement. Quantitative approach with survey technique was employed. Sample comprised of 700 students studying at undergraduate and postgraduate programs in HEIs, selected by paying multistage sampling. The instruments applied in present analysis were Metacognitive Awareness Inventory organized and standardized by (Schraw & Dennison, 1994) and Aitken Procrastination Inventory (Aitken, 1982) Results showed there exists significant difference in the meta-cognitive awareness and procrastination of students based on gender. It was found that there was a significant influence of meta-cognitive awareness in addition to procrastination on educational achievement of undergraduates & postgraduates in HEIs of Islamabad. So, it was suggested that students of various disciplines should be taught many strategies & procedures.</p> <p> 2023 Journal of Social Research Development</p>
Correspondence	Muhammad Iqbal
Email:	m.iqbal@tu.edu.pk
DOI	https://doi.org/10.53664/JSRD/04-02-2023-10-339-351

INTRODUCTION

The ability to recognize and control one's own thought processes is referred to as the metacognitive awareness (Alt & Raichel, 2020). It entails being conscious of the one's own ideas, knowledge, and cognitive techniques, in addition to having ability to monitor and manage one's thinking in order to improve learning as well as problem-solving abilities (Tuononen, Hyytinen, Räisänen, Hailikari & Parpala, 2023). Individuals are able to plan, monitor, and analyze their own cognitive processes, as well as make adjustments as necessary while utilizing metacognition, which plays an essential part

in the learning process (Saeedzadeh, Raeisoon & Mohammadi, 2018). Thus, in order to encourage metacognitive awareness among university students, instructors may employ instructional methods that involve explicit instruction of metacognitive strategies, provision of opportunities for self-reflection and self-evaluation, and provision of guidance on how to effectively monitor as well as regulate one's own learning (Alt & Raichel, 2020). The training of metacognitive awareness can facilitate the development of self-directed learning skills and abilities among university students, thereby enhancing their academic achievement and preparing them for success in various domains (Khan & Rasheed, 2019).

Procrastination is intentional act of deferring or putting off tasks or actions that require completion. The phenomenon of procrastination has been found to have potential consequences for academic attainment (Hooshyar, Pedaste & Yang, 2019). The scholarly investigations have delved into the correlation between tardiness, gender, as well as academic accomplishment. It is noteworthy that the comprehension of the correlation between gender, procrastination, as well as academic success is heavily influenced by individual variances and contextual factors (Feng, Wang & Su, 2021). While certain research has indicated gender-based trends, it is imperative to acknowledge these results may not be widely generalizable & significant individual differences exist (Pogorskiy & Beckmann, 2023). Moreover, the intricate character of procrastination encompasses a variety of psychological in the nature environmental and motivational elements that surpass gender as the only determinant (Goroshit & Hen, 2021). This study investigates the relationship between metacognitive awareness, procrastination, gender and academic achievement among university students in Pakistan. Findings of this research can enhance our comprehension of the interplay between these said variables and potentially provide insights into interventions and strategies that can aid students in enhancing their academic performance.

LITERATURE REVIEW

A learner's metacognitive awareness refers to their awareness of, and control over, the intellectual processes and material they are learning, both of which are fundamental components of learning experience (Tuononen et al., 2023). It is familiarity with the individual himself as a student, how to solve problems, as well as when and why to practice data, as well as when and when not to practice data (McCormick, 2006). The learners are able to employ metacognition when they are able to execute their own learning techniques, evaluate degree to which such tactics prove to be helpful, and control amount of work that is required for assistance of learning procedure (Abdelrahman, 2020). Another meaning of the meta-cognition is consideration of one's knowledge about himself, knowledge about his tasks, and about his self's intellect (Hacker, 1998a). Meta-cognition is much important concept as it offers the thinking about individual's own cognition (Wang & MacIntyre, 2021). Therefore, it is knowledge and understanding of all that people observe, and accurate vision of academic activity, consciousness & abilities that it requires in diverse situations (Abdelrahman, 2020). Knowledge and ability to regulate one's own cognitive processes are the two components that make up metacognition.

Knowledge of the cognitive process involves the ways in which individuals recognize themselves as individuals and about their personal ability to use proper procedures to perform their obligations.

Also included in this category is the information about the methods in which they are able to use information about other people. The declarative information is information about procedures, and information about situations are all included in knowledge of cognitive processes. Other component concerns the regulation of cognitive processes. To regulate intellectual processes such as planning, carrying out, and analyzing the learning process is purpose of this. It teaches abilities in planning, monitoring, and assessing, among other things (Alt & Raichel, 2020; Wang & MacIntyre, 2021). In this linking, metacognition is defined as the understanding and consciousness of an individual's cognition, together with awareness of when, when, and how to make use of the variety of strategies. As a result, metacognition plays not only the substantial but also an essential part in the process of learning, and it also serves as a reliable measure of academic success. (Dunning, Johnson, Ehrlinger & Kruger, 2003). Consequently, it is described that the learners possessing great meta-cognition awareness, exhibit the greater educational achievement when comparing to learners possessing low meta-cognition awareness.

The learners having low meta-cognition might get advantage by preparation on meta-cognitive strategies to increase their meta-cognition and educational success. Meta-cognitive awareness of different individuals is generally different from each other and individuals possessing low meta-cognition are considered unable to achieve tasks adequately as compared to their fellows. The self-guided learner conduct is believed as the noteworthy feature related to the accomplishment of the instructive exercises, especially in an instructive circumstance where independence is central, for instance, in universities (Fleur et al., 2021). The self-guided academic tasks encompass two types of activities, intellectual undertakings and activity achievements. Thus, the intellectual undertakings incorporate desired strategies of thinking; while activity includes undertakings related to learning procedure. For educational achievement, it is necessary for students to think and also try to achieve their educational objective (Wang & MacIntyre, 2021). In relation to the educational performance, meta-cognitive awareness has been the subject of investigation among the number of researchers. According to the findings of the numerous studies, students who are more self-aware about their metacognition also indicate the significantly higher level of scholastic success (Arsyad & Villia, 2022; Khan & Rasheed, 2019).

In two studies, students' metacognitive awareness of six different learning techniques that were experimentally supported was analyzed. The findings of initial investigation, in general, suggested an inability to anticipate learning results of instructive situations portraying the methodologies of double coding, static-media introduction, low-premium superfluous subtleties, testing & dividing; however, there was powerless support of methodology of creating one's own examination materials. Moreover, there was a correlation between situation execution and a free fraction of metacognitive self-guideline (Akpur, 2021). The second investigation exhibited greater expectation precision for understudies who had gotten focused on guidance on the applied memory points in their science courses, and the best presentation for those understudies straightforwardly presented to the first observational investigations from which situations were inferred. In aggregate, this examination recommends that students are to a great extent unconscious of a few explicit procedures that could profit memory for the course data; further, preparing in applied learning and memory points can possibly improve metacognitive decisions in such areas (Šafranj, 2019). In this connection, the results

of many research studies in diverse contexts showed that performance was significantly increased in post-test findings from learners.

Karpicke, Butler and Roediger (2009) researched the understudies true investigation practices and reviewed 177 undergrads and asked them to list the methodologies they utilized when examining as well as to pick whether they would revise otherwise practice review subsequent to contemplating a course reading section. The consequences of the two inquiries highlight a similar determination, most of understudies more than once read notes or course book (in spite of restricted advantages of this system), however, generally few takes part in the desired self-testing or recovery practice while considering. They suggested numerous learners practicing misconceptions of skill while considering in addition such misconceptions have huge results for the techniques understudies select when they regulate and manage their knowledge. Thus, the study carried out by Parcel (Alsulaimani, 2022) focused on determining meta-cognitive awareness and its effect on the academic achievement. She did work on a sample of one hundred and forty-seven fifth graders and collected data through an online instructional training with meta-cognitive prompts. Thus, in the meantime, when learners progressed during the whole-time instruction, learners were questioned about tell what they have learnt during this instruction. The results showed performance was significantly increased in post-test findings from learners.

Another research analysis revealed (Tachie, 2019; Zhou & Wang, 2020) that students with more meta-cognitive consciousness perform well on academic tasks, attain educational goals efficiently and without any delay while those students who are unaware of their meta-cognitive plans have difficulties in achieving their objectives and demonstrate less performance on educational tasks, therefor meta-cognitive awareness is considered a very important factor in achieving educational goals. According to study conducted by (Ayodele & Adeoye, 2020), the performance of learners was significantly increased who have greater meta-cognitive awareness. The learners between the ages of thirteen to sixteen years of Ludhiana region were investigated. The sample was comprised of two hundred forty elementary and secondary level learners. Meta-cognitive awareness of learners was assessed through questionnaire and academic scores were got from their teachers. The findings demonstrated that learners possessing the greater meta-cognitive awareness show outstandingly educational tasks (Shehzad et al., 2019). In this connection, researches on academic procrastination have demonstrated diverse consequences in diverse situations towards desired outcomes that this phenomenon significantly affects grade point average scores; that are considered as components of educational accomplishment.

Nzeadibe et al. (2019) investigated from research of learners and faculty members in a university of United States that academic procrastination is reason of less quality achievement, postponement in submission of assignments and lesser scores. After investigating the undergraduates from Canadian University, (Al-Zubeiry, 2019; Kummin et al., 2020) stated negative impact existed of academic procrastination upon grade point average and scores when learners didn't practice an advantage of procrastination, for example, concentration on the tasks in stress. Other studies (Hasan et al., 2021; Hooshyar et al., 2019) also demonstrated the academic procrastination significantly and negatively affects educational achievement. Procrastination might more negatively influence achievement of

students in universities rather than schools or colleges in light of more intricate undertakings, more prominent requests for freedom and less criticism on exhibition. Educational activities regularly include composing papers, which is only assignment with deferred rewards, assuming any. In like manner, these learners might need the adequate meta-cognitive attention to know when they are adequately ready for test or when paper is sufficient to get the evaluation that they want. Learners in their 1st year in university are additionally regularly youthful and not completely developed as to motivation control and they wind up in a climate with lot of social interruptions and enticements (Suárez-Perdomo et al., 2022).

The cutoff times for their work frequently lay a long way ahead in time expanding an inclination to dawdle. Individuals will in general seek after objectives that have decent possibility of an alluring outcome. In the event that the ideal end state is hard to characterize, for instance the stuff to get highest score on a paper, it could be hard for an understudy to decide when the errand is done and accordingly sabotage result anticipation. The previous examination recommends that understudies coming up short on a sufficient collection of acquiring systems or abilities delay more (Asio, 2020). One research investigation that was carried out among graduates of Africa, researchers described negative relationship among cognitive abilities and educational procrastination (Ma et al., 2022). Result showed that cognitive abilities were vital aspects which influenced academic achievement of students in the university, thus it is sensible to determine negative effects of procrastination in relation to the educational success. According to few examiners (Arnold, 2022) academic delaying behavior has also negative consequences. Primarily, it is the cause of anxiety and, along these lines, there may be certain corporal indications, for example, the cerebral pains and exhaustion. Also, the procrastinating individuals disparage themselves, and it prompts poorer confidence. Finally, the assignments stay inadequate. Every one of these causes can influence scholastic accomplishment of the learners somewhat.

When considering gender, some studies (Ugwuanji et al., 2020; Wu, 2021) stated that no gender difference is found in the academic procrastination. However, other studies asserted that a gender difference existed in academic procrastination, in that males had a higher procrastination tendency than females. More interestingly, (Syapira et al., 2022; Tajari, 2019) found that although males procrastinated more than females, academic performance showed no significant difference amid males and females. According to some researches of the procrastination (Ajayi, 2020; Rostami et al., 2023) it was determined that variable of gender affects procrastination of learners in universities and it was found that procrastination is common among the female learners while a few researches (Feng et al., 2021) verified male learners show procrastination more. The research on procrastination behavior proved that procrastination behavior of male students is not significantly different from the female students (Mikaeili & Salmani, 2021). Research revealed no huge connection among the profound and surface handling and procrastination, however apparently, no different examinations has researched the commitment of procrastination on understudies' learning draws near (Pogorskiy & Beckmann, 2023; Zhou, 2019). Considering above discussion, current investigation intended to meet following objectives:

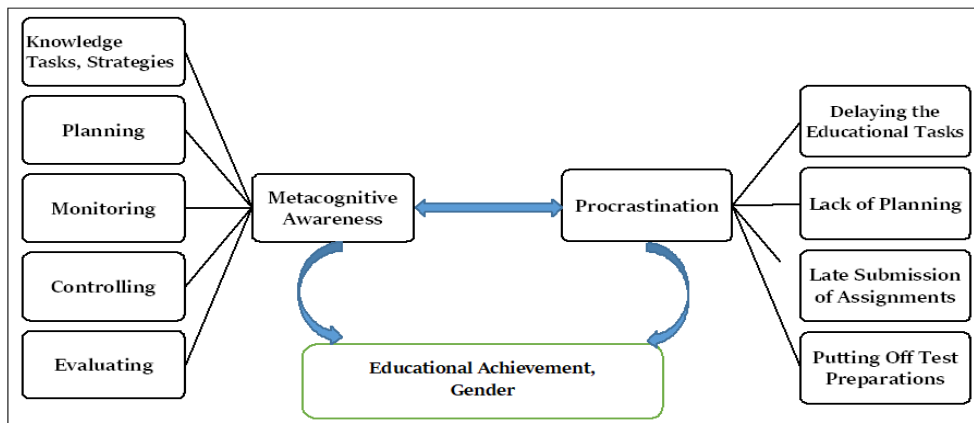
1. To explore meta-cognitive awareness and procrastination regarding gender differences of undergraduates and postgraduates in higher education institutions of Islamabad, Pakistan.

2. To observe effect of meta-cognitive awareness & procrastination in relation to educational achievement of undergraduates and postgraduates and
3. To investigate effect of meta-cognitive awareness about procrastination of undergraduates and postgraduates in higher education institutions of Islamabad, Pakistan.

Conceptual Framework

This research study concentrated on exploring meta-cognitive awareness and procrastination as well as its effect on students' educational achievement and gender. The construct of meta-cognition awareness is based on the interpretation of (Zhang & Zhang, 2019) about meta-cognitive processes and the concept of procrastination be there centered to (Balkis & Duru, 2019) that it has a negative effect on educational achievement. For the effective learning, learners ought to have the ability of acquiring necessary information, converse and share with others and make a useful application of acquired knowledge. To achieve these destinations, students need ability to think as well as grasp their specific cognition. For educational success, students must pick up the necessary understanding and information previously of evaluation and acquire knowledge and understanding, remembering that they have to complete the tasks and responsibilities within the specific duration; thus, planning is essential factor for academic accomplishment at university level. Therefore, it was important to explore meta-cognitive awareness and procrastination and effect on students' educational success in higher education institutions.

Figure 1 The Conceptual Framework



RESEARCH METHODOLOGY

Quantitative analysis was conducted. To determine meta-cognitive awareness & procrastination, opinions of students were determined through surveys. The population was comprised of all the students at the undergraduate and postgraduate programs in the higher education institutions of Islamabad, Pakistan. From the total population, fifty percent of the higher education providing institutions were selected randomly. Clusters of 700 male and female students from departments (30% from each) of the Linguistics and Management, Natural and Social Sciences were sampled through fish-ball random sampling method. The detail of the sample selected for this analysis is given below in table1.

Table 1 Detail of Selected Sample

Department	Number of Students	Percentage
Natural Sciences	217	31
Social Sciences	216	31
Linguistics	169	24
Management Sciences	98	14
Gender		
Male	238	34
Female	462	66
Previous G.P.A.		
<3.20	196	28
3.21-3.70	353	50
>3.70	151	22
Total	700	100

Instruments

Metacognitive awareness and procrastination of undergraduates & postgraduates were examined through self-described surveys. The meta-cognitive awareness inventory of [Schraw and Dennison \(1994\)](#) consisted 52-items that was utilized in the current research investigation to assess the meta-cognitive awareness of undergraduates and postgraduates. Cronbach’s alpha of MAI in the present investigation was 0.9, expressing the noteworthy adequate internal reliability. Thus, for measuring the procrastination, Aitken Procrastination Inventory ([Aitken, 1982](#)) consisted 19-items was used in the current investigation. Cronbach’s alpha of API in the present investigation was 0.7, expressing a noteworthy adequate internal reliability. Consequently, the educational performance was assessed through determining previous GPA of the undergraduates and postgraduates that was confirmed in concerned departments.

RESULTS OF STUDY

The descriptive and inferential statistical analysis was utilized to assess the levels of meta-cognitive awareness and procrastination among the undergraduate and postgraduate students. A t-test was conducted to assess the relationship between gender and the levels of metacognitive awareness and procrastination among undergraduate and postgraduate students. Table 2 presents the summary of the analysis in question.

Table 2 Gender-Based Description

	Male		Female		Independent Samples t -		
	M	SD	M	SD	t	Df	P
Metacognitive Awareness	3.97	.39	4.04	.43	-2.62	698	.009*
Knowledge about Cognition	3.99	.42	4.05	.44	-2.52	698	.012*
Regulation of Cognition	3.94	.39	4.00	.44	-2.44	698	.015*
Procrastination	3.61	.46	3.59	.47	.73	698	.470

*. Significant at 0.05 level.

Table 2 displays description of scores of meta-cognitive awareness; knowledge & regulation about cognition and procrastination of undergraduates and postgraduates based upon gender. Analysis

shows significant variance in the meta-cognitive awareness regarding gender variable, $t(698) = -2.62, p=.009$. Female students are much meta-cognitively aware in comparison to males. The mean score is significantly different for knowledge about cognition regarding gender variable, $t(698) = -2.52, p=.012$. Female students have knowledge about cognition in comparison to males. The mean score is significantly diverse for regulation of cognition regarding gender, $t(698) = -2.44, p=.015$. Female students possess higher degree of regulation of cognition contrary to males. Procrastination level of undergraduates and postgraduates is not considerably different from each other based on their gender, $t(698) = .73, p=.470$.

Table 3 Regression Model (ANOVA)

Model		SS	DF	MS	F	P
1	Regression	1.990	1	1.990	13.770	<.001
	Residual	173.161	698	.145		
	Total	175.151	699			
2	Regression	3.019	2	1.509	10.496	.001
	Residual	172.132	697	.144		
	Total	175.151	699			

The table 3 shows regression model for determining the effect of the meta-cognitive awareness and procrastination in relation to educational achievement. Results show a significant effect of meta-cognitive awareness as well as of procrastination in relation to educational achievement $F(1, 698) = 10.496, p<.001$.

Table 4 Analysis of Regression Coefficients

Model		Coefficients				t	Sig.
		USC		SCE			
		B	SE	Beta			
1	(Constant)	3.641	.076		47.813	<.001	
	Procrastination	-.103	.028	-.107	3.711	<.001	
	(Constant)	3.337	.137		24.415	<.001	
2	Procrastination	-.079	.029	-.082	-2.734	.006	
	Metacognitive Awareness	.059	.022	.080	2.674	.008	

Note R²=.01

Stepwise regression shows the effect of meta-cognitive awareness and procrastination in relation to educational achievement. Results illustrates that procrastination has significant effect on students' achievement ($\beta = -.079, p=.006$). The results of analysis of regression coefficients shows that meta-cognitive awareness has a significant effect on students' achievement ($\beta = .059, p=.008$) and thus help in reaching decision.

Table 5 Regression Model: Effect of Meta-Cognitive Awareness on Procrastination

Model		ANOVA				
		Sum of Squares	DF	Mean Square	F	p
1	Regression	26.851	1	26.851	200.352	<.001

Residual	160.555	698	.134
Total	187.407	699	

Table 5 shows regression analysis for determining the effect of meta-cognitive awareness in relation to procrastination. Results show a significant effect of meta-cognition awareness on procrastination $F(1, 698) = 200.352, p < .001$.

Table 6 Analysis of Regression Coefficient

Model	Coefficients				
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	SE	Beta		
(Constant)	4.155	.102		40.590	<.001
1 Metacognitive Awareness	-.359	.025	-.379	-14.155	<.001

Note R²=.14

Stepwise regression was calculated to see effect of meta-cognitive awareness on procrastination. Results shows that meta-cognitive awareness has a significant effect on procrastination ($\beta = -.359, p < .001$).

DISCUSSION

From the results it was found out that significant differences exist among male and female students about meta-cognitive awareness. Female students were more meta-cognitively aware than male students. While no significant differences existed among male as well as female students regarding procrastination (Hasan et al., 2021). Metacognition plays a significant and crucial role in learning procedure and a solid indicator of educational achievement (Yeh et al., 2019). Outcomes revealed that there is a significant effect of metacognitive awareness in relation to educational achievement of undergraduates and postgraduates and outcomes of this investigation are consistent with several earlier works in the review of related literature (Alenezi, 2020; Polhun et al., 2021). Results showed a significant effect of procrastination in relation to educational achievement of undergraduates and postgraduates as well as outcomes of this research work are consistent with few earlier works in the review of the related literature (Aslan, 2021; El-Adl & Alkharusi, 2020). The findings indicated a significant effect of meta-cognitive awareness in relation to procrastination of undergraduates and postgraduates and the outcomes of this research work are consistent with earlier works in review of related literature (Wahyu et al., 2020). In another research the researcher explored that there is correlation between metacognitive awareness and procrastination in relation to the gender and academic performance of university students in Pakistan (Mokhtari et al., 2019). The examination of the relationship between these factors and their collective influence on academic achievements (Mokhtari et al., 2019).

CONCLUSION

This research work aimed at examining the meta-cognitive awareness and procrastination & their effects on the educational achievement of undergraduates and postgraduates in higher education institutes, Islamabad Pakistan. The objectives were to explore the meta-cognitive awareness and

procrastination about gender differences of undergraduates and postgraduates in higher education institutions of Islamabad, Pakistan. Secondly, examining effect of meta-cognitive awareness and procrastination in relation to educational achievement of undergraduates and postgraduates and lastly, determining effect of meta-cognitive awareness about procrastination of undergraduates and postgraduates in HEIs of Islamabad, Pakistan. Metacognitive awareness is the knowledge and comprehension of everything individuals perceive, likewise a precise view of academic activity and consciousness and capacities it requests Actions, for example, arranging how to move toward particular educational tasks, observing understanding, and assessing improvement toward finishing of tasks are meta-cognitive. Procrastination also assumes an important part in effective learning, so it is imperative to create meta-cognitive understanding in learners as well as reduce the habit of procrastinating behavior, and that isn't the job of instructors just or to be created at organization just, but it must be extended to be created and urged to utilize wherever incorporate schools, colleges, and so forth. It was decided that meta-cognitive awareness and procrastination of female students were different from male undergraduates and postgraduates in higher institutions of Islamabad, Pakistan. It was determined that meta-cognitive awareness & procrastination significantly affect educational achievement of undergraduates and postgraduates in higher education institutions of Islamabad, Pakistan.

Suggestions & Implications

Students in many different fields should be taught a variety of methods and techniques to improve their meta-cognitive awareness. Workshops and workshops should be held to help students break the habit of putting things off until the last minute. This would help students do better in school. It was suggested that teachers help students improve their own motivation and figure out what false or negative beliefs are getting in the way of students getting their work done at the beginning of an educational activity. From the preceding findings, for future researches, it might be beneficial to conduct research in other universities or in colleges as well as in many other disciplines and other aspects, to observe impact of socio-economic status, and utilizing more comprehensive and cultural aspects regarding examination and correlation of meta-cognitive awareness, procrastination and academic performance. Besides, including other exploration strategies could likewise be a decent method to examine this association. For instance, the research investigators can utilize qualitative exploration techniques, such as requesting that contributors have a diary of their scholarly lifetime, which would later fill in as an information point for investigation. Additionally, taking interviews could be another investigation technique, through which investigators could intentionally pose inquiries that they are keen on.

REFERENCES

- Abdelrahman, R. M. (2020). Metacognitive awareness and academic motivation and their impact on academic achievement of Ajman University students. *Heliyon*, 6(9), e04192.
- Aitken, N. D. (1982). College student performance, satisfaction and retention: Specification and estimation of a structural model. *The Journal of Higher Education*, 53(1), 32-50.
- Ajayi, O. S. (2020). Academic self-efficacy, gender and academic procrastination. Epiphany. *Journal of Transdisciplinary Studies*, 13(1), 75-84.

- Akpur, U. (2021). The Predictive Level of Cognitive and Meta-Cognitive Strategies on Academic Achievement. *International Journal of Research in Education and Science*, 7(3), 593-607.
- Al-Zubeiry, H. Y. A. (2019). The Efficacy of Meta-Cognitive Strategies Instruction in Enhancing Saudi EFL Students' Academic Writing. *International Journal of Social Sciences & Educational Studies*, 5(4), 71.
- Alenezi, A. (2020). The role of e-learning materials in enhancing teaching and learning behaviors. *International Journal of Information and Education Technology*, 10(1), 48-56.
- Alsulaimani, A. (2022). Developing a Model for e-Learning Activities Based on Digital Incentives Within Context of COVID-19 and its Effectiveness in Developing Meta-Cognitive Thinking in Higher Education Students. *International Journal of Emerging Technologies in Learning*, 17(17).
- Alt, D., & Raichel, N. (2020). Reflective journaling and metacognitive awareness: Insights from a longitudinal study in higher education. *Reflective Practice*, 21(2), 145-158.
- Arnold, I. J. (2022). The link between procrastination and graduation rates: evidence from the ALEKS learning platform. *Education Economics*, 1-13.
- Arsyad, S., & Villia, A. S. (2022). Exploring the Effect of Digital Literacy Skill and Learning Style of Students on Their Meta-Cognitive Strategies in Listening. *International Journal of Instruction*, 15(1), 527-546.
- Asio, J. R. (2020). The relationship between academic procrastination and academic performance of freshmen students from a teacher education institution. Asio, JMR (2020). The Relationship between Academic Procrastination and Academic Performance of Freshmen Students from a Teacher Education Institution. *Journal of Humanities and Social Sciences*, 2(3), 105-115.
- Aslan, A. (2021). Problem-based learning in live online classes: Learning achievement, problem-solving skill, communication skill, and interaction. *Computers & Education*, 171, 104237.
- Balkis, M., & Duru, E. (2019). The procrastination and rational/irrational beliefs: A moderated mediation model. *Journal of Rational-Emotive & Cognitive-Behavior Therapy*, 37, 299-315.
- El-Adl, A., & Alkharusi, H. (2020). Relationships between Self-Regulated Learning Strategies, Learning Motivation and Mathematics Achievement. *Cypriot Journal of Educational Sciences*, 15(1), 104-111.
- Feng, T., Wang, X., & Su, T. (2021). Developmental cognitive mechanism and neural basis of procrastination. *Advances in Psychological Science*, 29(4), 586.
- Fleur, D. S., Bredeweg, B., & van den Bos, W. (2021). Metacognition: ideas and insights from neuro- and educational sciences. *NPJ Science of Learning*, 6(1), 13.
- Goroshit, M., & Hen, M. (2021). Academic procrastination and academic performance: Do learning disabilities matter? *Current Psychology*, 40, 2490-2498.
- Hasan, U., Bozkurt, A., & Zawacki-Richter, O. (2021). Academic procrastination and performance in distance education: A causal-comparative study in an online learning environment. *Turkish Online Journal of Distance Education*, 22(4), 13-23.
- Hooshyar, D., Pedaste, M., & Yang, Y. (2019). Mining educational data to predict students' performance through procrastination behavior. *Entropy*, 22(1), 12.

- Khan, M. J., & Rasheed, S. (2019). Moderating role of learning strategies between meta-cognitive awareness and study habits among university students. *Pakistan Journal of Psychological Research*, 34(1), 215-231.
- Kummin, S., Surat, S., Amir, R., Mohamad, M., & Yunus, M. M. (2020). The effects of meta-discussion strategies toward low english proficiency students in oral english performance. *Asia Pacific Journal of Educators and Education*, 35(1), 75-91.
- Ma, M., Li, M., Wang, Q., Qiu, A., & Wang, T. (2022). Online self-regulated learning and academic procrastination: A moderated mediation model. *Psychology in the Schools*, 59(9), 1856-1872.
- Mikaeili, N., & Salmani, A. (2021). Investigating the role of parenting styles in predicting students' academic procrastination. *Journal of Family Relations Studies*, 1(1), 13-20.
- Mokhtari, M., Hassanzadeh, R., & Mirzaeejan, B. (2019). The effectiveness of meta-cognitive skills training on the motivational structure and academic performance of drop-out students. *International Clinical Neuroscience Journal*, 7(1), 46-51.
- Nzeadibe, A., Egara, F., Inweregbuh, O., & Osakwe, I. (2019). Effect of two meta-cognitive strategies on students' achievement in mathematics. *Journal of CUDIMAC*, 7(1), 43-57.
- Pogorskiy, E., & Beckmann, J. F. (2023). From procrastination to engagement? An experimental exploration of the effects of an adaptive virtual assistant on self-regulation in online learning. *Computers and Education: Artificial Intelligence*, 4, 100111.
- Polhun, K., Kramarenko, T., Maloivan, M., & Tomilina, A. (2021). Shift from blended learning to distance one during the lockdown period using Moodle: test control of students' academic achievement and analysis of its results. *Journal of physics: Conference series*,
- Rostami, M., Bakhtiarpour, S., Hafezi, F., & Naderi, F. (2023). Investigating the Effectiveness of Verbal Self-education Training on Academic Procrastination and Symptoms of Attention Deficit/Hyperactivity Disorder in Adolescent Boys With Attention-deficit/Hyperactivity Disorder. *Practice in Clinical Psychology*, 11(2), 141-150.
- Saeedzadeh, M., Raeisoon, M. R., & Mohammadi, Y. (2018). The Relationship between Cognitive and Metacognitive Strategies and Academic Achievement of Students of Birjand University of Medical Sciences. *Future of Medical Education Journal*, 8(1).
- Šafran, J. (2019). The effect of meta-cognitive strategies on self-efficacy and locus of control of gifted in foreign language learning. *Research in Pedagogy*, 9(1), 40-51.
- Schraw, H. G., & Dennison, R. S. (1994). Assessing the metacognitive awareness. *Contemporary educational psychology*, 19(4), 460-475.
- Shehzad, M. W., Razaq, S., Dahri, A. S., & Shah, S. K. B. (2019). The association between reading self-efficacy beliefs and meta cognitive reading strategies among Saudi PYP students. *Dialogue*, 14(2), 33-45.
- Suárez-Perdomo, A., Ruiz-Alfonso, Z., & Garcés-Delgado, Y. (2022). Profiles of undergraduates' networks addiction: Difference in academic procrastination and performance. *Computers & Education*, 181, 104459.
- Syapira, S. A., Budiman, B., & Selamat, M. N. (2022). Self-Efficacy and Self-Regulation With Academic Procrastination in Muslim Adolescents During the Online Learning Period. *Psikis: Jurnal Psikologi Islami*, 8(1), 88-101.

- Tachie, S. A. (2019). Meta-cognitive skills and strategies application: How this helps learners in mathematics problem-solving. *Eurasia Journal of Mathematics, Science and Technology Education*, 15(5), em1702.
- Tajari, T. (2019). The relationship between academic stress and motivational beliefs with educational procrastination in athlete students: The mediating role of cognitive strategies. *Sport Psychology Studies (ie, mutaleat ravanshenasi varzeshi)*, 8(27), 193-210.
- Tuononen, T., Hyytinen, H., Räisänen, M., Hailikari, T., & Parpala, A. (2023). Metacognitive awareness in relation to university students' learning profiles. *Metacognition and Learning*, 18(1), 37-54.
- Ugwuanyi, C. S., Gana, C. S., Ugwuanyi, C. C., Ezenwa, D. N., Eya, N. M., Ene, C. U., Nwoye, N. M., Ncheke, D. C., Adene, F. M., & Ede, M. O. (2020). Efficacy of cognitive behaviour therapy on academic procrastination behaviours among students enrolled in Physics, Chemistry and Mathematics Education (PCME). *Journal of Rational-Emotive & Cognitive-Behavior Therapy*, 38, 522-539.
- Wahyu, Y., Suastra, I. W., Sadia, I. W., & Suarni, N. K. (2020). The Effectiveness of Mobile Augmented Reality Assisted Stem-Based Learning on Scientific Literacy and Students' Achievement. *International Journal of Instruction*, 13(3), 343-356.
- Wang, L., & MacIntyre, P. (2021). Second language listening comprehension: The role of anxiety and enjoyment in listening metacognitive awareness. *Studies in Second Language Learning and Teaching*, 11(4), 491-515.
- Wu, J. Y. (2021). Learning analytics on structured and unstructured heterogeneous data sources: Perspectives from procrastination, help-seeking, and machine-learning defined cognitive engagement. *Computers & Education*, 163, 104066.
- Yeh, C. Y., Cheng, H. N., Chen, Z.-H., Liao, C. C., & Chan, T.-W. (2019). Enhancing achievement and interest in mathematics learning through Math-Island. *Research and Practice in Technology Enhanced Learning*, 14(1), 1-19.
- Zhang, D., & Zhang, J. (2019). *Metacognition and self-regulated learning (SRL) in second/foreign language teaching*. Second handbook of English language teaching, 883-897.
- Zhou, J., & Wang, X. (2020). The influence of chinese college students' meta-cognitive strategy and motivational beliefs on their study habits. *The Asia-Pacific Education Researcher*, 1-11.
- Zhou, M. (2019). The role of personality traits and need for cognition in active procrastination. *Acta Psychologica*, 199, 102883.