

Effect of Ecological Environments on Students' Metacognition and English Learning Performance of Secondary School Students of Badulla Educational Zone in Sri Lanka

Sri Lanka Journal of Social Sciences and Humanities
Volume 5 Issue 1, February 2025: 11-22
ISSN: 2773 692X (Online), 2773 6911 (Print)
Copyright: © 2025 The Author(s)
Published by the Faculty of Social Sciences and Languages, Sabaragamuwa University of Sri Lanka
Website: <https://www.sab.ac.lk/sljssh>
DOI: <https://doi.org/10.4038/sljssh.v5i1.126>



Ekanayake, E.M.S.D.^{1*} and Priyanath, H.M.S.²

^{1*}MA in English and Education Candidate, Faculty of Graduate Studies, Sabaragamuwa University of Sri Lanka, Belihuloya, Sri Lanka

²Department of Economics and Statistics, Sabaragamuwa University of Sri Lanka, Belihuloya, Sri Lanka

Received: 06 October 2024, **Revised:** 03 January 2025, **Accepted:** 21 February 2025.

How to Cite this Article: Ekanayake, E.M.S.D. & Priyanath, H.M.S. (2025). The effect of ecological environments on students' metacognition and English learning performance of secondary school students of Badulla educational zone in Sri Lanka. *Sri Lanka Journal of Social Sciences and Humanities*, 5(1), 11-22.

Abstract

In literature, there is a dearth of studies exploring the influence of ecological factors on metacognition and English language learning performance, particularly in the context of secondary education in Sri Lanka. This study investigates how ecological factors influence metacognition and English language learning performance in secondary school students in Sri Lanka to fill these empirical and contextual knowledge gaps. The study used a quantitative method with a survey for collecting data, adhering to a positivist philosophy in a deductive approach. Primary data were collected from 290 secondary school students in the Badulla Educational Zone, Sri Lanka. A structured questionnaire was used to collect data and the data were analysed employing both descriptive statistics and the Partial Least Square Structural Equation Model (PLS-SEM). Key findings imply that ecological environments positively impact secondary students' English language learning performance and metacognition. The study further revealed that the metacognition of secondary school students has a significant influence on English language learning performance and the metacognition has a mediating effect on the relationship between ecological environments and the English language learning performance of secondary school students. Thus, the results imply that conducive ecological settings improve the English language learning performance of secondary school students. This further highlighted how crucial it is to promote metacognition and productive learning conditions to enhance the English language proficiency of secondary school students.

Keywords: Ecological Environments, English Learning Performance, Metacognition, Secondary School Students

INTRODUCTION

Sri Lanka is a multicultural country where Sinhalese is the main language, while English plays a pivotal role in every sphere (Fernando, 2018). Higher education, national and international job markets, and technological fields demand a higher rate of people who are fluent in English (Perera, 2020). Sneddon (2003) explained that as a global language, it is obvious that English plays an important role in international interaction which includes economic relationships among countries, international business relationships, global trading, and others. Rao (2019) stated that in the present day of globalisation, a large number of Chinese and Japanese people are studying English to increase their work opportunities. In brief, the global significance of English, as highlighted by scholars such as Sneddon (2003) and Rao (2019), it is a critical role in fostering international interaction, economic relationships, and cross-cultural communication, making it an integral part of multicultural nations.

Furthermore, after invasion of Sri Lanka by English-speaking colonizers hundreds of years ago, English became the language of an elite class. However, the situation is the same in the country, and many rural and middle-class students are afraid to learn English (Fernando, 2018; Perera, 2020). Wijesekara (2014) showed that language is a strong instrument, and the association of English with past colonial powers has had a widespread impact on the educational system in Sri Lanka, largely resulting in adverse socio-political conditions, as a result of misguided policies. Although Sri Lanka has a 91.1% literacy rate, with the majority of the population speaking Sinhala (81.8%), 15% of Sri Lankans are fluent in English (Sittarage, 2018). Notably, urban areas have greater competency in English, with approximately 32.9% of residents speaking the language and 34.1% reading and writing in English (Sittarage, 2018). Further, the historical influence of English as a language associated with colonial power dynamics in Sri Lanka

* Corresponding author: Tel.: +94 (74) 351 8000; Email: sewwandilanka@gmail.com

<https://orcid.org/0009-0001-4654-9221>



This article is published under the Creative Commons CC-BY-ND License (<http://creativecommons.org/licenses/by-nd/4.0/>). This license permits use, distribution, and reproduction, commercial and non-commercial, provided that the original work is properly cited and is not changed in anyway.

continues to shape language perceptions, resulting in disparities in proficiency, particularly among the rural and middle classes (Sittarage, 2018).

It is essential to identify the factors contributing to the persistent failure rate in the G.C.E. (O/L) examination. The Presidential Task Force (1997) highlighted that, despite nearly ten years of learning English as a Second Language (ESL), most students were unable to use the language at an acceptable level (NEC, 1997; Wijesekara, 2014). According to the Department of Examination in 2022 G.C.E.(O/L) pass rate of English was 73.5% and the fail rate was 17.50 %. In particular, in rural areas, the failure rate is higher than that in urban areas. This proves that English learning in Sri Lanka cannot meet the expected level, and that the levels of learners' proficiency by the end of compulsory education are lower than those required by higher education and the labour market.

In particular, Sri Lankan schools have different socioeconomic backgrounds, which consist of a mix of urban, suburban, rural, and estate, and students who come from diverse levels of ecological backgrounds. In the Sri Lankan context, Liyanage (2021) states that students who are fluent in English typically have the opportunity to develop communicative language skills in dwellings where English is widely spoken. The ecological theory (Bronfenbrenner, 1979) emphasises that socioeconomic status plays a significant role in shaping individuals' lives. There are apparent differences in parental educational qualifications and the income of the parent for their children's education performances (Careemdeen, 2023). For instance, positive parental support for children's learning creates the best learning environment at home. Encouraging children to complete homework and engage in home-based learning activities directly contributes to fostering learning performance (Johnson & Lee, 2020). According to Bronfenbrenner's (1979) Ecological Theory, students are influenced by multiple layers of their socioeconomic environment; Microsystem, Mesosystem, Ecosystem, Macrosystem, and Chronosystem. In addition, as there is no evidence of how English language performance connects with each of these levels, this study expects to research this gap.

Some students were fluent in four English skills, while the majority could speak only the things they learned, and a few of them could speak well according to the situation. When considering students' cognition levels, they differ in engaging in activities, using strategies, and acquiring knowledge of the English language. The reason may vary for each student's cognition level (Lai, 2009). By taking samples from 1st-year University students of Botswana, Magogwe (2013) highlights that the reading proficiency of Botswanan English learners and their usage of metacognitive reading strategies have a relationship. For example, Zhong (2015) studied Chinese migrant learners' and found a relationship between migrant learners' beliefs and the strategies they used to learn. Further, he mentioned that they changed their beliefs and 'learning strategies' which is a part of the metacognition explained by Flavell (1979). Zhong's (2015) study presents the complex relationship between learner beliefs and strategies that may change over time when exposed to a new learning context and environment. Most studies show a positive correlation between metacognition

and English language learning, but most of them have taken their sample as adult or primary students (Flavell, 1979; Schraw & Dennison, 1994). Thus, there is a lack of knowledge regarding secondary school students' metacognition and English language learning performance.

Moreover, there is little research on the ecological backgrounds of children, their learning performances, and the correlation between metacognition and English learning performance (Brown & Smith, 2020; Johnson et al., 2019). However, few studies have addressed the effect of the ecological environment on the metacognition of school students, especially when developing performance in English. Astriani et al. (2020) state that, various kinds of research have revealed a positive relationship between metacognitive skills and learning performance. According to Raoofi et. al., (2013), metacognitive research and metacognitive strategy/knowledge are directly connected to second/foreign language acquisition success. Raoofi et al., (2013) indicated that metacognitive procedures have the potential to improve language performance; however, inconsistent evidence was identified regarding the intervention's effectiveness in improving metacognitive awareness/strategy usage. Existing empirical research has generally concentrated on the influence of individual characteristics (e.g., instructional tactics and teacher quality) on students' metacognition and language acquisition. This study explores the effect of the ecological environment on metacognition and English language-learning performance of secondary school students in Sri Lanka. This study tries to understand the processes behind this association and give practical recommendations for educational policymakers, school administrators, and instructors by drawing on empirical evidence, theoretical viewpoints, and rigorous techniques. It is intended that by gaining a better knowledge and appreciation for the influence of ecological contexts, educational interventions may be devised to establish optimum learning environments, thereby improving students' metacognition abilities and English language learning performance.

LITERATURE REVIEW

Theoretical Background

Ecological Systems Theory: Bronfenbrenner's Ecological System Theory (EST) developed by Bronfenbrenner (1979), focuses on an individual's relationship with their local and larger social contexts within their life span (Zaatar & Maalouf, 2022). The EST offers a framework for understanding how various environmental factors influence an individual's development. According to Bronfenbrenner (1979), the ecological environment is a series of layered structures, with each level enveloping the next. At the most fundamental level, the environment directly impacts an individual's development, whether it involves the family, classroom, or, in specific contexts, is utilized for research purposes. However, going further entails investigating the links between these different variables, which goes beyond the traditional notion. According to Bronfenbrenner, a child's competence in learning to read throughout the primary grades is dependent not only on teaching techniques but also on the quality and nature of the interactions between the school and the family. Bronfenbrenner's finding shows the correlation between the various ecological environments and human development which influences his positive or negative

development. In addition, many psychologists have proven that human development is a process that follows their backgrounds, attitudes, parenting, etc. The EST consists of five systems which are interrelated: the microsystem, mesosystem, exosystem, macrosystem, and chronosystem (Bronfenbrenner, 1979).

Within microsystems, the dimension of the interpersonal environment refers to the immediate social interactions and connections that have a direct influence on an individual. The person's immediate environment comprises a system of influence called the microsystem (Crawford, 2020). This setting comprises familial ties, friendships, interactions between teachers and students, and peer relationships. Crawford (2020) refers to those with daily, in-person contacts, such as family members, as vital microsystem components. The microsystem may extend outside the household to include others who have frequent and consistent interaction with the individual. Bronfenbrenner and Evans (2000) expanded this circle by adding new personalities as they strongly affected the child's ecological environment. Positive and negative interactions that they meet in their early phases affect a child's cognitive and verbal skills both directly and indirectly.

The mesosystem is comprised of the quality and traits of interactions between the family and the school (microsystem). Parent-teacher communication, parental engagement in school activities, and the amount to which home and school interact to foster metacognitive development are all elements in this dimension. According to Crawford (2020), the interactions between different microsystems that exist in an individual's life form the mesosystem. The mesosystem is the outcome of the interactions between multiple microsystems, for instance, the relationship between home and school. Within the ecosystem, the component of the cultural and societal environment includes the larger cultural, social, and institutional circumstances that affect people's lives. Cultural norms, extended family members, values, belief systems, legal and political frameworks, economic situations, and societal expectations are all part of this component (Bronfenbrenner, 1979; Neal & Neal, 2013). An exosystem refers to one or more settings that involve the developing person as an active participant, but in which events occur that are affected by what happens in the setting containing the developing person. It explores how cultural and socioeconomic elements impact people's experiences, possibilities, and limits in their ecological surroundings (Bronfenbrenner, 1979; Neal & Neal, 2013).

The macrosystem dimension includes the larger sociocultural milieu in which students find themselves. This setting comprises educational and metacognitive cultural norms, values, and beliefs. Crawford (2020) highlights Bronfenbrenner's position on family culture formation within the microsystem structure. This sophisticated process is controlled not just by the mesosystems and ecosystems of the individuals within the family, but also by all of these systems (Bronfenbrenner, 1979). Furthermore, the larger socioeconomic and cultural framework shapes these interrelated processes (Vygotsky, 1978). It also takes into account cultural attitudes toward cognitive growth as well as the function of metacognition in learning (Flavell, 1979).

Life Experiences (Chronosystem), which is frequently related to the chronosystem, refers to the dynamic and growing nature of people's experiences across time. Crawford (2020) emphasises that the developmental process includes not only people's natural ageing and maturity but also the historical epoch in which they live and grow. Bronfenbrenner (1979) highlights research on the effects of the Great Depression on children and adolescents as an example. The study demonstrates how people who were born during the Depression's start suffered distinct consequences than those born shortly thereafter (Elder, 1999). It takes into account the overall influence of life events, transitions, historical events, and personal milestones on an individual's growth. Significant life changes, such as relocating to a new area, enduring trauma, reaching educational milestones, or meeting cultural upheavals, are examples of life experiences (Clausen, 1995). This dimension investigates how these life events, which occur at various stages of a person's life, impact their growth and metacognitive processes (Elder, 1999).

Metacognition Theory: According to Flavell (1979), a person who believes that people manage their cognitive processes may have an 'internal locus of control'. According to Flavell's metacognition theory (1979), the importance of metacognitive awareness, control, and experience in improving successful learning and problem-solving is further emphasised. He highlighted the significance of metacognitive tactics in coping with varied scholastic habitats. People who had well-structured metacognition did not find it difficult to adjust themselves to different aspects of nature and have maximum benefit out of them for better learning purposes. Flavell (1979) described learners' awareness of their cognition and its process, which is investigated as 'knowledge and cognition about cognitive events'. This theoretical foundation not only justifies metacognition as a study variable but also drives the creation of treatments and methods targeted at improving students' metacognitive skills and academic achievement. Metacognition involves awareness of how they learn, an evaluation of their learning needs, generating strategies to meet these needs, and then implementing the strategies (Jaleel & Premachandran, 2016). In brief, metacognition entails understanding how one learns, analysing one's learning requirements, developing strategies to meet those needs, and putting those strategies into action.

Metacognitive knowledge entails the essential feature of metacognition in which individuals demonstrate knowledge of their cognitive processes and learning procedures. Keren (1991) shows that declarative knowledge in metacognition refers to understanding one's personality, skills, shortcomings, and learning style. According to Keren (1991), procedural knowledge in metacognition includes abilities, heuristics, and problem-solving techniques. It entails understanding how to apply specialised strategies to various tasks, effective cognitive process execution methods, and learning regulation mechanisms. Flavell (1979) argues that metacognitive knowledge plays a significant role in language-related cognitive activities such as communication, persuasion, comprehension, and writing, as well as language acquisition and self-instruction.

Sun et al.'s (2021) study highlighted the importance of metacognitive experiences like cognition and emotions in

education. These experiences shape metacognitive knowledge and motivate students to employ strategies. Sun et al. (2021) emphasised that metacognitive experiences are crucial for language learning, but research on their impact on second language writing remains limited. The metacognitive practice of reflecting on one's learning experiences and techniques is represented by this component. To manage learning, people use skills like planning, monitoring, checking, and judging progress. Winne and Azevedo's (2022) study showed that setting clear goals before studying English helps achieve success. Paying close attention during English lessons is part of monitoring learning. Students who assessed their understanding as they went along did better at learning the language. Regulating means adjusting study habits based on results, like spending more time on areas of struggle. These skills allow learners to take charge of acquiring new knowledge effectively.

English Language Performance: According to Flavell (1979), metacognition adds to spoken language comprehension by including processes such as monitoring comprehension, recognising when comprehension breaks down, and adopting measures to improve comprehension. Additionally, they show that readers employ metacognitive skills to assess their comprehension of written content. For instance, Self-questioning, summarising and altering reading tactics. In the writing process, metacognition is essential. It helps writers plan, organise, rewrite, and edit their writing. Flavell (1979) investigates metacognition's complex function in many cognitive processes and talents. Flavell investigates the impact of metacognition on oral communication, persuasion, comprehension (both oral and reading), writing, language acquisition, attention, memory, problem-solving, social cognition, and forms of self-control and self-instruction. Furthermore, he highlights the increasing links between metacognitive notions and related ideas in social learning theory, cognitive behaviour modification, personality development, and educational theories. This research will explore further the correlation between metacognition and English language learning proficiency. English Language Proficiency studies a person's total competency and capacity to understand, communicate, and engage successfully in English. It has four major characteristics that represent various elements of language use. In this research reading, writing and speaking are taken into consideration to find the co-relation of the research.

Reading ability entails the ability to read written materials in English. It includes abilities like word decoding, comprehending sentence patterns, recognising context, and extracting meaning from a range of written sources such as books, articles, and digital information (Snow, 2010). Reading competency includes the ability to comprehend an English text as well as the ability to decode words, grasp sentence patterns, recognise certain contexts, and extract meaning from a range of written sources such as books, articles, or websites (Gough & Tunmer, 1986). Writing competency involves effectively conveying thoughts, ideas, and facts in written English. It includes grammar, syntax, vocabulary selection, text organisation, and successful communication (Bereiter & Scardamalia, 1987). This research focuses on children's writing strategies and knowledge in three stages: planning, writing, and revising, aiming to measure metacognitive knowledge and English language proficiency (Graham & Harris, 1997).

Listening and speaking proficiency skills encompass the ability to clearly and intelligibly communicate simple concepts, ideas, and messages in spoken English, which is regarded as speaking proficiency (Brown, 2014). This skill assesses pronunciation, intonation, effective communication in a variety of social and professional settings, and the capacity to interact with others through verbal connections (Brown, 2014; Richards & Schmidt, 2010). Vocabulary knowledge has a major impact on language ability. It involves recognising, comprehending, and applying English vocabulary effectively. This skill greatly affects reading, academics, and communication across contexts. To enhance vocabulary acquisition, students benefit from applying varied self-learning word strategies. Research by McKeown et al. (2017) emphasises that vocabulary instruction should actively engage students in deep thinking about word meanings, word relationships, and the versatile usage of words in different scenarios.

Hypotheses

Ecological Environment and Metacognition: There are some positive effects of a good ecological environment which are well supported by students' background with their developing metacognition. Martin and Dowson (2009) found that teenage students who are anxious about their future tend to perform better in school. In addition, Stanton et al., (2021) state that metacognition is the awareness and control of one's own thinking for learning. Moreover, Flavell (1979) discovered that contextual elements, such as physical surroundings and social interactions, contribute to the development of metacognitive abilities. Teng et al. (2021) found that students' metacognitive approaches and cognitive writing skills are influenced by their environmental setting, which includes cultural and linguistic disparities. Therefore, the study assumes that;

H1: *The ecological environment has a positive effect on the metacognition of secondary school students in Sri Lankan schools.*

Ecological Environment and Learning Performance: The relationship between the ecological environment and learning performance is multidimensional, with empirical research indicating that numerous factors influence how people learn and perform academically. Fernández et al. (2020) discovered that students' ecological impact is linked to their relationship with nature and pro-environmental attitudes. This shows that a better connection to the natural world can promote a sustainable attitude, which may lead to learning behaviours that prioritise environmental considerations. Jitreanu et al., (2022) investigated environmental values and behaviour, concluding that a strong understanding of environmental values is closely linked to pro-ecological behaviour and life satisfaction. This suggests that an ecological environment that fosters awareness and values can improve learning outcomes by encouraging behaviours that increase well-being and satisfaction. Furthermore, Ramanathan (2016) describes an irregular relationship between environmental performance and financial performance, implying that the relationship between the ecological environment and learning performance may be non-linear and influenced by numerous factors. Munir et al., (2021) demonstrate that the learning environment, including ecological factors, has been found to influence student performance. A suitable ecological environment can create an environment that promotes learning, potentially leading to improved

academic achievements. Based on the available information, this analysis expects a significant association between the ecological environment and learning performance.

H2: *There is a positive relationship between the ecological environment and the English language learning performance of secondary school students in Sri Lankan schools.*

Metacognition and Learning Performance: Ohtani and Hisasaka's (2018) meta-analytic review indicated that metacognition is one of the most significant predictors of academic performance, even after controlling for intelligence. This study emphasises the significance of metacognitive knowledge and actions, such as goal setting, monitoring understanding, and method selection, which are essential for effective learning. Cheng and Chan (2021) emphasised the importance of metacognitive education in increasing students' academic results in a variety of domains, including problem-solving and reading comprehension. Their study emphasises the importance of metacognitive teaching practices for promoting self-regulated and independent learning. In addition, Goradia and Bugaric (2017), found that metacognitive techniques greatly improved learning performance. These approaches require learners to actively assess and evaluate their comprehension and strategies, which leads to higher academic performance. The empirical research provides plenty of proof supporting the positive relationship between metacognition and academic success. Therefore, the study assumes that;

H3: *Metacognition has a positive impact on the English language learning performance of secondary school students in Sri Lankan schools.*

Mediating Role of Metacognition: Metacognition has a significant role in improving the learning performance of students. The environment in which children grow up, including their socioeconomic status, support from their families, and availability of educational materials, greatly influences their English learning. Thus, the impact is indirect, with metacognitive knowledge mediating the relationship between the ecological context and the academic performance of school children. By integrating metacognitive strategies into the English language course, including differential integration for students with varied levels of metacognitive skills and generating a reflective learning atmosphere, schools could enhance the effect of the ecological context on English language learning. Finally, reconciling and improving the power of the mediator of metacognition may lead to a meaningful prevalence of equity and pragmatic educational policies in Sri Lankan secondary schools.

H4: *Metacognition has a mediating effect on the relationship between ecological environment and English language learning performance of secondary school students in Sri Lankan schools.*

MATERIALS AND METHODS

This study follows a positivist philosophy with an ontological position of realism (objectivism) because it is founded on a coherent theoretical framework to explain the variables. The study used a deductive approach with an explanatory nature, intending to test hypotheses about the impact of ecological settings on metacognition and English learning performance. Therefore, a quantitative method was selected. A multi-stage sampling procedure was used to

determine the sample from the secondary school students in Sri Lanka which was the unit of analysis. First, the Badulla district was chosen from 25 districts using a simple random sampling technique. Following that, one educational zone, i.e. the Badulla Educational Zone was selected randomly among the six education zones in the district. Thirdly, the sample size was decided based on the total number of secondary school students within the educational zone. According to Uva Provincial Education Office calculations (2022), there are 18637 secondary school students in grades 6 to 11 in 112 schools spread across urban, suburban, and rural areas. The sample size was approximately 390 students out of the total student population (calculated by Ravo.com calculator) for this research based on Krejcie and Morgan (1970) sample size determination formula. A representative sample of students represented different ecological environments (e.g., urban, suburban, rural) and were selected to ensure diverse perspectives and experiences. Finally, respondents were selected using a simple random sampling technique.

A structural questionnaire was administered to collect data from secondary-level school students and data were collected with face-to-face interviews with respondents. The study measured the microsystem using three attributes including familial ties, communication, and support systems, which directly impact their emotional well-being and academic achievement adopted by Fiese et al. (2002), and Hawkins and Dollahite (1997). The mesosystem has been measured using a network of interpersonal contexts, emphasising family communication, parental involvement, and peer interactions based on Fredricks, Blumenfeld, and Paris (2004); Pianta and Hamre (2009); Wentzel and Peers (2009). The Exosystem was assessed using external social systems like workplace policies, community resources, and media, which indirectly influence a student's growth (Bronfenbrenner, 1979; Van Der Molen, & Van der Linden, 2018). The macrosystem was assessed with the help of the four dimensions adopted by Blumenfeld and Paris (2004); Renshaw & Brown (2019); and Matthews & Lopez (2020). The chronosystem was measured employing life experiences and historical contexts and focuses on how technological advancements, economic changes, sociohistorical transitions, personal experiences, and environmental changes affect a child's long-term growth and behaviour (Bronfenbrenner, 1979; Elder, 1998; Schmitt, & Pomerantz, 2013).

Metacognition is measured using three dimensions including metacognitive knowledge, experience, and skills. Each dimension was measured using different attributes adopted by Flavell, (1979); Schraw (2001); Veenman, et al. (2006). English language performance was measured with the support of six attributes including reading, writing, speaking, listening, vocabulary Knowledge, and grammar proficiency adopted by Bachman & Palmer (2010); and Brown (2004). Each dimension of the questionnaire was measured by different question items. Each question was assigned a 7-point Likert scale.

Basic descriptive statistical analyses were used to understand the behaviour of each variable. In addition, a Partial Least Squares Structural Equation Model (PLS-SEM) was used as the main analysis technique to test the hypothetical relationships. First-order analysis was used to

evaluate the validity and reliability of the questionnaire items and constructs. Internal consistency reliability, indicator reliability, convergent validity, and discriminant validity were employed to assess the reliability and validity of measurements. The structural model was assessed based on first-order and second-order results. The structural model evaluated the multicollinearity, significance of path coefficients, coefficients of determination, R square, effect size, and predictive relevance.

RESULTS AND DISCUSSION

The variables regarding the ecological environment, metacognition, and performance in English language learning performance were checked with a focus on their reliability and validity using various measures. PLS-SEM analysis initially examines the reliability of two major

indicators; indicator reliability which requires outer loadings to surpass 0.7, and T-statistics, which should be more than 1.96 to indicate significance at a 95% confidence level. Internal consistency was also evaluated using Cronbach's Alpha (CA) and Composite Reliability (CR), both of which should be more than 0.7. The Average Variance Extracted (AVE) was used to establish convergent validity, with an acceptable threshold of larger than 0.5 for each latent variable. Finally, discriminant validity was measured with the square root of AVE larger than correlations with other components. All first-order constructs were greater than the agreed-upon criterion value of 0.7, thus demonstrating strong indication reliability (See Table 1). In addition, all the T-statistics of indicators were far above 1.96, hence indicator reliability was statistically significant. Table 1 further shows that CR and CA were above the criterion of 0.7, hence it indicates a high internal consistency reliability.

Table 1: Evaluation of first-order construct

Construct and Item Description		Factor Loading	T-stat	CR	CA	AVE
1 Ecological Environment						
1.1 Microsystem				0.892	0.875	0.671
1.1a	Family members often engage in open conversations with me.	0.908	53.026			
1.1e	We have healthy communication strategies when we resolve conflicts.	0.720	18.370			
1.1f	We practice special traditions and rituals within the family.	0.763	18.649			
1.1g	Our family is bonded and strengthened by special traditions and rituals.	0.888	31.579			
1.1h	We see ourselves as a tightly connected group.	0.802	20.294			
1.2 Mesosystem				0.963	0.959	0.714
1.2a	At home, I feel my family is warmly supported.	0.821	21.321			
1.2b	My parents attend school meetings or events frequently.	0.924	57.694			
1.2c	My parents are actively engaged in my education.	0.872	26.351			
1.2d	I connect well with my teachers.	0.822	22.165			
1.2e	I feel comfortable seeking help or guidance from them.	0.929	79.444			
1.2f	I interact with classmates during school hours by.	0.882	36.971			
1.2g	I know my neighbors well engage friendly conversations with them.	0.738	14.104			
1.2h	I participate in academic and social activities with my peers.	0.843	29.142			
1.2j	These connections are important for my overall well-being.	0.882	43.141			
1.2k	My parents communicate with my teachers about my progress.	0.727	16.828			
1.2l	I collaborate with peers on group projects or assignments frequently.	0.829	26.783			
1.3 Ecosystem				0.861	0.861	0.706
1.3d	Available healthcare services keep me healthy.	0.830	29.953			
1.3e	After-school programs help me learn.	0.847	32.307			
1.3l	Pollution can hurt my breathing, so I care about the environment.	0.852	30.382			
1.3m	Green areas are cool because they let me play outside and stay fit.	0.832	24.469			
1.4 Macrosystem				0.677	0.743	0.734
1.4c	My ethnicity impacts how I feel about fitting in at school.	0.813	29.284			
1.4d	Where I live makes it easier or harder for me to get a good education.	0.898	94.164			
1.5 Chronosystem				0.817	0.809	0.567
1.5a	New gadgets changed how I do things in the last ten years.	0.711	20.357			
1.5b	Money problems such as historical events or economic recessions affected my family recently.	0.817	39.851			
1.5d	New school rules changed how I felt in class.	0.747	23.051			
1.5e	What I want to be when I grow up changed as I got older.	0.722	18.102			
1.5g	The friends I spend time with have a big effect on how I live my life.	0.762	24.487			
2: Metacognition						
2.1 Metacognitive Knowledge				0.916	0.912	0.763
2.1b	I can identify different learning strategies I use for studying English.	0.805	22.558			
2.1c	I am confident in applying different learning strategies effectively in my English studies.	0.918	67.038			

2.1d	I have used specific study techniques successfully to improve my English learning.	0.937	77.318			
2.1e	I can identify when to use specific study techniques or problem-solving strategies.	0.896	57.610			
2.2 Metacognitive experience				0.890	0.879	0.805
2.2a	I can identify when I am struggling with understanding English language concepts or tasks.	0.865	42.493			
2.2b	I frequently check my understanding of the material during English language learning tasks.	0.916	83.496			
2.2c	I can identify areas for improvement in my English language skills through reflection.	0.910	57.002			
2.3 Metacognitive skill				0.901	0.897	0.710
2.3a	I set specific learning goals before studying English.	0.767	24.758			
2.3b	I check if I am paying attention during English language learning activities.	0.873	48.991			
2.3c	I change my learning strategies when I encounter difficulties in understanding English concepts.	0.785	26.689			
2.3d	I often allocate time for learning English.	0.897	61.648			
2.3e	I use feedback from teachers or peers to improve my English language skills.	0.883	54.045			
3 English Language Learning Performance						
3.1 Speaking Skills				0.785	0.780	0.697
3.1a	My pronunciation in English is clear and accurate	0.778	24.839			
3.1b	I speak English fluently without hesitation.	0.906	107.495			
3.1c	I use a wide range of vocabulary in my spoken English.	0.815	28.837			
3.2 Listening Skills				0.841	0.835	0.752
3.2a	I can easily grasp the main ideas in spoken English.	0.935	63.618			
3.2b	I am successful in picking up specific details in spoken English.	0.934	70.670			
3.2c	I can understand nuances and implied meanings in spoken English.	0.900	32.741			
3.3 Reading skills				0.916	0.913	0.852
3.3a	I understand the main ideas in written English texts.	0.935	87.265			
3.3b	I am good at recognizing specific details in written English texts.	0.934	93.724			
3.3c	I can interpret different types of written English texts.	0.900	55.380			
Writing Skills				0.854	0.852	0.772
3.4a	I can organize and present ideas coherently in written English.	0.884	55.491			
3.4b	My use of grammar in written English is accurate.	0.910	75.404			
3.4c	I have a diverse vocabulary usage in written English.	0.840	36.791			
Vocabulary Knowledge				0.773	0.770	0.751
3.5a	I can recognize and understand a wide range of vocabulary words in English.	0.855	42.084			
3.5b	I can use a wide range of vocabulary words in my English communication.	0.878	79.867			
Grammar Proficiency				0.882	0.877	0.891
3.6a	I am confident in my knowledge of English grammar rules	0.949	46.421			
3.6b	I accurately apply English grammar rules in my communication.	0.938	29.396			

Source: Survey, 2024

According to Table 2, the AVE of all constructs is above 0.7 confirming the discriminate validity according to the Fornell-Larcker criterion. This is because, for each construct, the square root of the AVE is larger than the correlations of other constructs.

Table 2: Discriminant validity

Constructs	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	3.1	3.2	3.3	3.4	3.5	3.6
1.1 Microsystems	.819													
1.2 Mesosystem	.810	.845												
1.3 Ecosystem	.841	.835	.842											
1.4 Macrosystem	.645	.666	.667	.857										
1.5 Chronosystem	.747	.719	.730	.720	.753									
2.1 Metacognitive Knowledge	.566	.590	.516	.630	.555	.891								
2.2 Metacognitive experience	.439	.466	.389	.497	.416	.833	.897							
2.3 Metacognitive Skills	.697	.683	.662	.658	.690	.761	.718	.843						
3.1 Speaking skills	.338	.378	.322	.336	.308	.594	.616	.579	.835					
3.2 Listening Skills	.524	.556	.510	.556	.478	.632	.569	.601	.684	.867				
3.3 Reading Skills	.555	.578	.542	.566	.573	.630	.516	.670	.552	.759	.923			
3.4 Writing Skills	.332	.390	.281	.317	.329	.480	.499	.510	.606	.547	.621	.879		
3.5 Vocabulary Knowledge	.540	.607	.456	.377	.491	.538	.569	.566	.662	.630	.552	.734	.867	
3.6 Grammar Proficiency	.212	.297	.140	.197	.166	.467	.480	.336	.615	.541	.404	.677	.723	.944

Source: Survey, 2024

Based on the latent variable scores of the first-order constructs, 14 constructs at the second-order level were formed (See Table 3). The study has developed 5 constructs under the ecological environments, 3 constructs under the metacognition, and 6 constructs under the English language learning performance. For all the second-order constructs presented in Table 3, standardised factor loadings were greater than 0.7 and factor loadings were significant at 0.05 significance level showing the indicator reliability of the second-order constructs revealing that all constructs have a greater extent of indicator reliability. Furthermore, Table 2 indicates that the CA was higher than the required value of 0.7 and CR was higher than the recommended 0.7 value for all the constructs. The results confirmed the convergent validity of the second-order constructs. Table 3 demonstrates that AVE for each construct was higher than the required value of 0.5 indicating convergent validity.

Table 3: Analysis of the second-order constructs

Construct and Item	Factor Loading	T-Statistic	CR	CA	AVE
1. Ecological Environments			0.945	0.944	0.818
1.1 Microsystems	0.920	68.225			
1.2 Mesosystem	0.944	100.326			
1.3 Ecosystem	0.921	51.612			
1.4 Macrosystem	0.828	34.968			
1.5 Chronosystem	0.905	58.001			
2. Metacognition			0.918	0.91	0.847
2.1 Metacognitive Knowledge	0.938	103.319			
2.2 Metacognitive Experience	0.914	71.006			
2.3 Metacognitive Skills	0.908	71.039			
3. English Language Learning Performance			0.916	0.908	0.683
3.1 Speaking Skills	0.833	40.177			
3.2 Listening Skills	0.857	57.047			
3.3 Reading Skills	0.807	32.981			

3.4 Writing Skills	0.83	40.262
3.5 Vocabulary Knowledge	0.859	37.965
3.6 Grammar Proficiency	0.767	29.396

Source: Survey, 2024

The results further indicate that the square root of AVE was greater than all the correlations of the constructs as demonstrated in Table 4. The results confirmed the discriminant validity of all the second-order constructs.

Table 4: Discriminate validity of second-order constructs

Construct	Ecological Environments	English Learning Performance	Metacognition
Ecological Environments	0.905		
English Learning Performance	0.569	0.826	
Metacognition	0.689	0.731	0.920

Source: Survey, 2024

The Variance Inflation Factor (VIF) is used to measure multicollinearity in the structural model. The structural model has no issues with multicollinearity since all VIF values are less than 5 (VIF value on the relationship between ecological environments and English language learning performance was 1.902, between ecological environments and metacognition was 1.00, and between metacognition and English language learning performance was 2.729). This indicates that the structural model is free of the multicollinearity issue.

Table 5 revealed that the path coefficients in the structural model show a positive and direct association between ecological environments and English language learning performance confirming hypothesis 1 (H1). The association between ecological environments and metacognition (H2) is highly significant and positive, implying that favourable environmental conditions significantly improve

metacognitive abilities. Furthermore, the association between metacognition and English language learning performance (H3) has a strong and positive significant relationship, emphasising the importance of metacognition in improving language learning outcomes. Furthermore, the mediation analysis reveals that the indirect influence of ecological environments on English language learning performance via metacognition is largely mediated (H4).

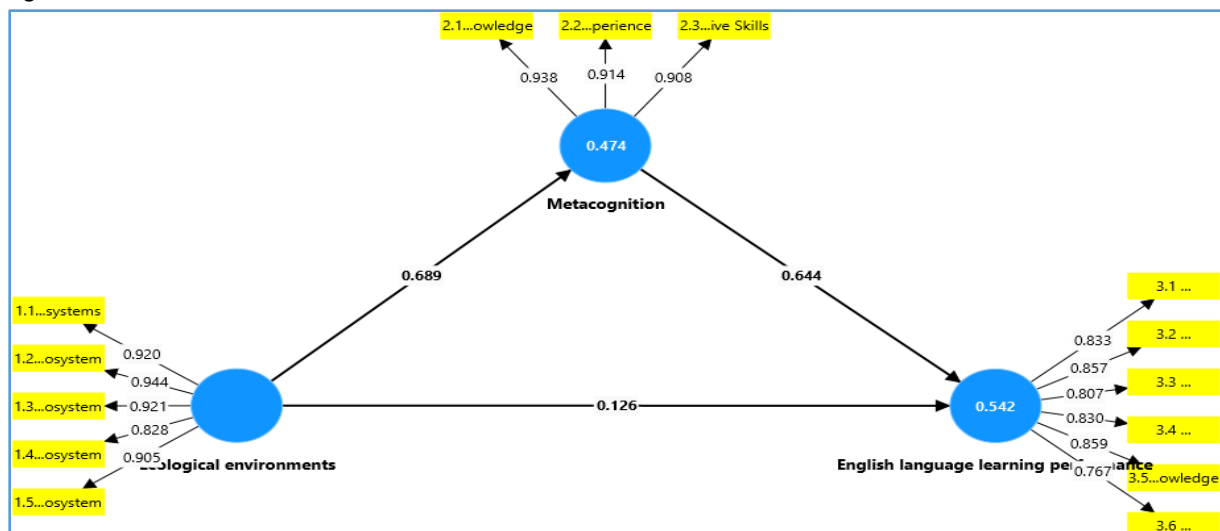
Table 5: Path coefficients and hypotheses

Hypothesis and Path	Coefficient	T-Statistic	P-Value	Decision
H1: Ecological Environments → English Language Learning Performance	0.126	2.296	0.022	Accepted
H2: Ecological Environments → Metacognition	0.689	20.231	0.000	Accepted
H3: Metacognition → English Language Learning Performance	0.644	11.814	0.000	Accepted
H4: (Mediating Effect): Ecological Environments → Metacognition → English Language Learning Performance	0.444	9.741	0.000	Partial Mediating

Source: Survey, 2024

Figure 1 shows that the model's independent variables, ecological environments and metacognition, explain 54.1% of the variance in English language learning performance ($R^2 = 0.54$). The R^2 score of 0.541 indicates that the model sufficiently predicts English language learning performance based on the factors. Ecological environments explain 47.4% of the variance in metacognition. This score indicates that the model has a moderate capacity to predict metacognitive abilities based on ecological context.

Figure 1: The results of the structural model



Source: SmartPLS output, 2024

Strong empirical evidence is provided by the PLS-SEM analysis for the first hypothesis (H1), which holds that secondary school students' metacognition is positively impacted by the ecological environment. The significant path coefficient ($\beta = 0.689$, $p < 0.001$) suggests that there is a close relationship between these two factors. This relationship is supported by previous studies (Bronfenbrenner, 1979) that have emphasised the influence of the learning environment on altering students' cognitive processes. The family, school, and community make up the ecological environment, which provides a framework for secondary school students' metacognitive growth. The discovery aligns with the ecological systems theory of Bronfenbrenner (1979), which posits that distinct environmental layers impact an individual's development.

The findings support the second hypothesis (H2), with a statistically significant path coefficient ($\beta = 0.126$, $p = 0.022$), demonstrating a positive association between the ecological environment and English language learning performance. This result is in line with other studies on the significance of environmental elements in language learning, which have shown that favourable and encouraging environments enhance language learning results (Cummins, 2000; Lightbown & Spada, 2013). The natural world affects language learning because it offers opportunities to interact with English-speaking people, form a family that is encouraging, and engage in school-related activities, all of which enhance language proficiency. While the environment promotes competence through contacts, family, and school activities, the effect is moderate, implying that other factors such as instruction quality may play a larger role in language learning results. The study significantly supports the third hypothesis (H3), as metacognition has a considerable impact on English language learning performance ($\beta = 0.644$, $p < 0.001$). This is in line with previous research, which has identified metacognitive methods as crucial for language learners' ability to successfully organise, monitor, and assess their learning processes (Wenden, 1998). The findings show that students who have more awareness of their cognitive processes and actively engage in metacognitive methods are better prepared to learn English. This could entail self-monitoring comprehension, establishing explicit language learning goals, and altering techniques in response to feedback.

The mediation analysis supports the fourth hypothesis (H4), which states that metacognition partially mediates the association between the ecological environment and English language learning performance. The path coefficient for the indirect effect ($\beta = 0.444$, $p < 0.001$) indicates that the ecological environment has a direct impact on language learning, but a large percentage of its influence occurs through metacognition. This partial mediation shows that the ecological environment improves language learning outcomes by first strengthening students' metacognitive skills, which then lead to greater English performance. This study supports the notion that metacognition serves as a vital intermediary, translating environmental support into effective learning methods (Veenman et al., 2006). The findings focused on the significance of educational interventions that emphasise not only enhancing the learning environment but also increasing students'

metacognitive abilities to maximise their language learning potential.

CONCLUSION

The study attempts to explore the effect of the ecological environment on students' metacognition and performance in English-learning of secondary school students in Sri Lanka. The study found that ecological environments have a positive impact on English language learning performance and metacognition of secondary students. The study further revealed that the metacognition of secondary school students has a significant influence on English language learning performance and that metacognition has a mediating effect on the relationship between ecological environments and the English language learning performance of secondary school students. Thus, the results indicate that conducive ecological settings improve the English language learning performance of secondary school students.

The research findings provide several important contributions to the body of existing knowledge in educational psychology and pedagogy, particularly in the setting of Sri Lankan secondary school students. The study contributes by filling a gap in prior studies that lacked such thorough quantitative examination. The study's contextual value rests in its focus on the particular educational environment of Sri Lanka, providing empirical results relevant to this context and guiding local educational initiatives and policies. The study makes an important theoretical contribution by pioneering the development of a conceptual framework mixing ecological factors, metacognition, and English language learning performance to explain how these variables interact. The new framework developed can be used as a base for other subsequent studies and provide a clear guideline for studying the interaction of ecological environments, cognitive development, and academic performance in other educational settings.

This study suggests several policy recommendations aimed at improving English language learning and metacognitive skills in diverse ecological contexts. It highlights the importance of contextualised learning by incorporating local cultural, social, and environmental elements into educational materials. Ecologically responsive pedagogy can be supported through sensitisation workshops and training, with a focus on environmental variables influencing student learning. Additionally, professional development programs should emphasise metacognitive skill-building, helping faculty foster self-regulation, planning, monitoring, and evaluation of learning strategies. To address socioeconomic inequalities, resources should be distributed equitably, particularly in underprivileged areas, and access to educational technology should be expanded to improve learning opportunities. Inclusive policies that consider students' socio-economic and cultural backgrounds, such as scholarships and nutritional programs, are also recommended. Language exposure programs, promoting real-world English use through community initiatives and local business collaborations, should be developed. Environmental education can be incorporated into the English curriculum, encouraging sustainability practices like recycling and energy-saving measures. Family engagement programs, involving parents in the educational process, and

community collaborations with local centres offering English classes or real-world practice opportunities can further support student learning. Finally, the implementation of data-driven policies and feedback mechanisms will allow for regular assessments of environmental impacts on student performance, enabling timely adjustments to improve educational outcomes in Sri Lanka. This comprehensive approach aims to enhance both metacognitive skills and English language proficiency in diverse ecological settings.

Despite efforts to utilise a representative sampling approach, not all natural conditions and demographic groupings may be fully captured. Certain subpopulations or remote areas might be underrepresented, limiting the generalizability of the findings to all secondary pupils in Sri Lanka. Furthermore, while quantitative methods are effective for identifying broad trends, they may fail to capture the depth and diversity of individual experiences, restricting the study's ability to comprehend the nuanced effects of environmental factors on metacognition and English language proficiency. The study's potential reliance on cross-sectional data imposes temporal limits, as it may not fully capture longitudinal changes or demonstrate causal links. Furthermore, the intricacy and interconnection of the variables studied; ecological environment, metacognition, and English language performance make it difficult to separate individual consequences, and unaccounted-for confounding factors may influence the findings. Finally, using self-reported data raises the possibility of biases such as social desirability or recollection bias, which could alter the accuracy of the findings.

REFERENCES

- Astriani, D., Susilo, H., Suwono, H., Lukiati, B., & Purnomo, A. R. (2020). Mind mapping in learning models: A tool to improve student metacognitive skills. *International Journal of Emerging Technologies in Learning*, 15(6), 4–17. <https://doi.org/10.3991/ijet.v15i06.12657>
- Bachman, L. F., & Palmer, A. S. (2010). *Language assessment in practice: Developing language assessments and justifying their use in the real world*. Oxford University Press.
- Bereiter, C., & Scardamalia, M. (1987). *The psychology of written composition*. Lawrence Erlbaum Associates.
- Bronfenbrenner, U., & Evans, G. W. (2000). Developmental science in the 21st century: Emerging questions, theoretical models, research designs and empirical findings. *Social Development*, 9(1), 115–125. <https://doi.org/10.1111/1467-9507.00114>
- Bronfenbrenner, U. (1994). Ecological models of human development. In T. Husén & T. N. Postlethwaite (Eds.), *International encyclopedia of education* (2nd ed., Vol. 3, pp. 1643–1647). Pergamon Press.
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Harvard University Press.
- Brown, A. L. (1987). Metacognition, executive control, self-regulation, and other more mysterious mechanisms. In F. E. Weinert & R. H. Kluwe (Eds.), *Metacognition, motivation, and understanding* (pp. 65–116). Erlbaum.
- Brown, A., & Smith, J. (2020). Ecological factors and their impact on learning performance: A review. *Journal of Educational Psychology*, 45(2), 120–135.
- Brown, H. D. (2014). *Principles of language learning and teaching* (6th ed.). Pearson Education.
- Brown, H. D. (2004). *Language assessment: Principles and classroom practices*. Pearson Education.
- Cheng, E. C. K., & Chan, J. K. M. (2021). Metacognition and metacognitive learning. In Springer eBooks (pp. 11–24). https://doi.org/10.1007/978-981-16-5569-2_2
- Clausen, J. A. (1995). *American lives: Looking back at the children of the great depression*. University of California Press.
- Crawford, M. (2020). Ecological systems theory: Exploring the development of the theoretical framework as conceived by Bronfenbrenner. *Journal of Public Health Issues and Practices*, 4(2), 1–6. <https://doi.org/10.33790/jphip1100170>
- Fiese, B. H., Tomcho, T. J., Douglas, M., Josephs, K., Poltrock, S., & Baker, T. (2002). A review of 50 years of research on naturally occurring family routines and rituals: Cause for celebration? *Journal of Family Psychology*, 16(4), 381–390. <https://doi.org/10.1037/0893-3200.16.4.381>
- Elder, G. H. (1998). The life course as developmental theory. *Child Development*, 69(1), 1–12. <https://doi.org/10.1111/j.1467-8624.1998.tbubs.101>
- Elder, G. H. (1999). *Children of the Great Depression: Social change in life experience*. Westview Press.
- Fernando, D. (2018). *Language and society in Sri Lanka: A multicultural perspective*. Colombo: University of Colombo Press.
- Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. *American Psychologist*, 34(10), 906–911. <https://doi.org/10.1037/0003-066X.34.10.906>
- Goradia, T., & Bugarcic, A. (2017). A social cognitive view of self-regulated learning within the online environment. *Advances in Integrative Medicine*, 4(1), 5–6. <https://doi.org/10.1016/j.aimed.2017.05.001>
- Gough, P. B., & Tunmer, W. E. (1986). Decoding, reading, and reading disability. *Remedial and Special Education*, 7(1), 6–10.
- Graham, S., & Harris, K. R. (1997). Self-regulation and writing: Where do we go from here? *Contemporary Educational Psychology*, 22(1), 102–114.
- Hawkins, A. J., & Dollahite, D. C. (1997). Beyond the role-inadequacy perspective of fathering. In A. J. Hawkins & D. C. Dollahite (Eds.), *Generative fathering: Beyond deficit perspectives* (pp. 3–16).
- Jaleel, S., & Premachandran, P. (2016). A study on the metacognitive awareness of secondary school students. *Universal Journal of Educational Research*, 4(1), 165–172. <https://doi.org/10.13189/ujer.2016.040121>
- Jităreanu, A. F., Mihăilă, M., Alecu, C., Robu, A., Ignat, G., & Costuleanu, C. L. (2022). The relationship between environmental factors, satisfaction with life, and ecological education: An impact analysis from a sustainability pillars perspective. *Sustainability*, 14(17), 10679. <https://doi.org/10.3390/su141710679>
- Johnson, A., & Lee, M. (2020). The impact of home learning environments on student performance. *Academic Journal of Education*, 45(3), 215–230.
- Johnson, L., Williams, P., & Carter, M. (2019). Metacognition and language acquisition: The link to English performance in secondary students. *Language Learning Journal*, 28(3), 250–265.
- Keren, G. (1991). Calibration and probability judgements: Conceptual and methodological issues. *Acta Psychologica*, 77(3), 217–273. [https://doi.org/10.1016/0001-6918\(91\)90036](https://doi.org/10.1016/0001-6918(91)90036)
- Lightbown, P. M., & Spada, N. (2013). *How languages are learned* (4th ed.). Oxford University Press.
- McKeown, M. G., Deane, P. D., & Lawless, R. R. (2017). *Vocabulary assessment to support instruction: Building rich word-learning experiences*. Guilford Publications.
- Magogwe, J. M. (2013). Metacognitive awareness of reading strategies of University of Botswana English as second language students of different academic reading proficiencies. *CC Attribution*, 4(1), 54–68. <https://doi.org/10.4102/rw.v4i1.29>
- Martin, A. J., & Dowson, M. (2009). Interpersonal relationships, motivation, engagement, and achievement: Yields for theory, current issues, and educational practice. *Review of Educational Research*, 79(1), 327–365. <https://doi.org/10.3102/0034654308325583>
- Matthews, J. S., & López, F. (2020). Race-reimagining educational psychology research: Investigating constructs through the lens of race and culture [Editorial]. *Contemporary Educational Psychology*, 61, Article 101878. <https://doi.org/10.1016/j.cedpsych.2020.101878>
- Munir, M., Ali, M., Iqbal, A., Farid, M. F., & Siddique, M. (2021). Relationship between learning environment and performance of students at university level. *Humanities & Social Sciences Reviews*, 9(3), 877–844. <https://doi.org/10.18510/hssr.2021.9385>
- Neal, J. W., & Neal, Z. P. (2013). Nested or networked? Future directions for ecological systems theory. *Social Development*, 22(4), 722–737. <https://doi.org/10.1111/sode.12018>

- Ohtani, K., & Hisasaka, T. (2018). Beyond intelligence: A meta-analytic review of the relationship among metacognition, intelligence, and academic performance. *Metacognition and Learning*, 13(2), 179–212. <https://doi.org/10.1007/s11409-018-9183-8>
- Perera, K. (2020). The role of English in Sri Lanka's education and job markets. *Journal of Language and Society*, 12(3), 45–58.
- Pianta, R. C., & Hamre, B. K. (2009). Conceptualization, measurement, and improvement of classroom processes: Standardized observation can leverage capacity. *Educational Researcher*, 38(2), 109–119. <https://doi.org/10.3102/0013189X09332374>
- Ramanathan, R. (2016). Understanding complexity: The curvilinear relationship between environmental performance and firm performance. *Journal of Business Ethics*, 149(2), 383–393. <https://doi.org/10.1007/s10551-016-3088-8>
- Rao, P. S. (2019). The role of English as a global language. *Research Journal of English*, 4(1), 65–79.
- Raofi, S., Heng Chan, S., Mukundan, J., & Md Rashid, S. (2013). Metacognition and second/foreign language learning. *English Language Teaching*, 7(1), 36–49. <https://doi.org/10.5539/elt.v7n1p36>
- Renshaw, P. D., & Brown, M. (2019). Understanding the macrosystem in educational contexts: Four dimensions of influence. *Journal of Educational Psychology*, 111(4), 679–692. <https://doi.org/10.1037/edu0000321>
- Richards, J. C., & Schmidt, R. (2010). *Longman dictionary of language teaching and applied linguistics* (4th ed.). Longman.
- Schmitt, M. A., & Pomerantz, E. M. (2013). The role of the chronosystem in children's development: A focus on technological change and economic transitions. *Developmental Psychology*, 49(11), 2085–2096. <https://doi.org/10.1037/a0030678>
- Schraw, G. (2001). Promoting general metacognitive awareness. *International Journal of Educational Psychology*, 1(3), 219–228. [https://doi.org/10.1016/S0883-411X\(99\)00027-7](https://doi.org/10.1016/S0883-411X(99)00027-7)
- Schraw, G., & Dennison, R. S. (1994). Assessing metacognitive awareness. *Contemporary Educational Psychology*, 19(4), 460–475. <https://doi.org/10.1006/ceps.1994.1033>
- Snow, C. E. (2010). *Reading for understanding: Toward an R&D program in reading comprehension*. RAND Corporation.
- Sun, Q., Zhang, L. J., & Carter, S. (2021). Investigating students' metacognitive experiences: Insights from the English as a foreign language learners' writing metacognitive experiences questionnaire (EFLWMEQ). *Frontiers in Psychology*, 12, Article 744842. <https://doi.org/10.3389/fpsyg.2021.744842>
- Teng, M. F., Qin, C., & Wang, C. (2021). Validation of metacognitive academic writing strategies and the predictive effects on academic writing performance in a foreign language context. *Metacognition and Learning*, 17(1), 167–190. <https://doi.org/10.1007/s11409-021-09278-4>
- Van Der Molen, J., & Van der Linden, D. (2018). Understanding the role of contextual factors in educational outcomes: A review of the exosystem's influence on student development. *Educational Psychology Review*, 30(1), 1–28. <https://doi.org/10.1007/s10648-017-9410-6>
- Veenman, M. V. J., Van Hout-Wolters, B. H. A. M., & Afflerbach, P. (2006). Metacognition and learning: Conceptual and methodological considerations. *Metacognition and Learning*, 1(1), 3–14. <https://doi.org/10.1007/s11409-006-6893-0>
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
- Wentzel, K. R. (2009). Peers and academic functioning at school. In K. H. Rubin, W. M. Bukowski, & B. Laursen (Eds.), *Handbook of peer interactions, relationships, and groups* (pp. 531–547). The Guilford Press.
- Wijesekera, H. D. (2014). Dreams deferred: English language teaching in Sri Lanka. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2438893>
- Winne, P. H., & Azevedo, R. (2022). Metacognition and self-regulated learning. In Cambridge University Press eBooks (pp. 93–113). <https://doi.org/10.1017/9781108888295.007>
- Zaatari, W. E., & Maalouf, I. (2022). How the Bronfenbrenner bio-ecological system theory explains the development of students' sense of belonging to school? *SAGE Open*, 12(4), 1–18. <https://doi.org/10.1177/21582440221134089>
- Zhong, Q. (2015). Changes in two migrant learners' beliefs, learning strategy use, and language achievements in a New Zealand context. *System*, 53, 107–118.