



UNIVERSIDAD DE CONCEPCIÓN
FACULTAD DE EDUCACIÓN
PEDAGOGÍA EN INGLÉS

**BRAIN-BASED LEARNING LESSONS TO ENHANCE B1-LEVEL READING
COMPREHENSION AMONG 11TH GRADE EFL CHILEAN STUDENTS**

Trabajo de título presentado a la Facultad de Educación de la Universidad de Concepción para
optar al título profesional de Profesor de Inglés

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Diciembre, 2025

Concepción, Chile.

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ACKNOWLEDGEMENTS

As a group, we would like to thank and acknowledge Professor Paola Fanta Vera, our thesis advisor, for her unlimited support and guidance during this process. Her insights and commitment to every piece of advice, feedback, and meeting were fundamental to the development of this project, and we are deeply appreciative of the time and dedication she invested in our work.

We also wish to extend our gratitude to the committee members, Nataly Telles Quezada and Marlene Martinez Urrutia, not only for always helping us through the thesis process but also for being supportive and caring during the program.

Our sincere thanks go as well to all the professors in the English Pedagogy Program, whose classes, mentorships, and passion for education have shaped our growth as students and future teachers. Each of them has contributed to our professional identity, inspiring us to teach with commitment, purpose, and dedication.

Finally, we would like to acknowledge ourselves as a team. This process required cooperation, perseverance, and mutual support. We thank each other for the effort and time invested in this project, and for trusting the process even in challenging moments.

PERSONAL ACKNOWLEDGEMENTS

To my family, thank you for teaching me to see things through the end, even when I doubted myself or questioned my decisions. I would not have made it here without you. To my friends, thank you for being the most loyal and encouraging. You are the ones that filled me with joy on the brightest days and the ones who have always been there in the darkest hours.

To my thesis partners, thank you for all the hard work and laughter during this project. This would not have been possible without you. And to our thesis advisor, thank you for your guidance throughout this process; your professionalism and support were essential to the development of this thesis.

To the educators and classmates I met in this program, thank you for making my journey such a unique and memorable experience. Each of you has left a mark on this chapter of my life. I carry your support, lessons, and kindness with me as I move forward.

Shaquille Berroeta Astudillo

I would like to start by thanking those who helped me along the way to here: my dear family, my precious friends, and the ones who are not part of this earthly realm anymore. Without the support and back-pat of all of you, I wouldn't be able to achieve this.

I also want to thank my teammates for their hard work, enthusiasm, laughs, and commitment. You guys are absurdly extraordinary. To Professor Paola Fanta, who coincidentally was the first teacher I met during the program, and closing this experience with her feels like coming full circle. For the enormous support, for her wisdom, and for the huge patience during the thesis process.

And lastly, I would also like to give myself some credit. Sometimes it felt like a free fall, but gladly I made it until the end.

Katherine Cartes Henríquez

Thanks to my family, especially to my parents, for their unconditional love and support, and to my dear friends for their encouragement and companionship throughout this process. Thank you for always believing in me.

I would also like to thank my thesis partners for their commitment and the teamwork we built together; you guys made this process way more enjoyable. Also, big thanks to our thesis advisor, Paola Fanta, for her guidance, support, and patience, which were fundamental in shaping this project.

A special acknowledgement goes to my high school English teacher, Juan Guevara, who inspired my love for the language and changed my perspective on what teaching can be.

Lastly, I want to recognize my own dedication and effort throughout this journey. Reaching this point has not been easy at all, but this achievement is a reminder of what I am capable of.

Elena Dominguez Hernández

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RESUMEN

La comprensión lectora es una habilidad importante de desarrollar durante el proceso de aprendizaje en las aulas de inglés como lengua extranjera (EFL) en Chile, ya que constituye uno de los pilares fundamentales para el aprendizaje de una segunda lengua. Sin embargo, las actividades de lectura suelen seguir enfoques tradicionales que no consideran los intereses ni las diferencias individuales de los estudiantes. Para abordar esta brecha, este proyecto de tesis propone un cuadernillo basado en el aprendizaje basado en el cerebro (BBL), fundamentado en los 12 principios del aprendizaje basado en el cerebro, las 7 etapas y estrategias de BBL, las estrategias de comprensión lectora desde BBL y las actividades de evaluación formativa desde BBL. Estos marcos buscan transformar estas lecciones tradicionales centradas en el docente en experiencias de aprendizaje participativas y centradas en el estudiante. El producto final sirve como un recurso práctico y adaptable para estudiantes, docentes en ejercicio y futuros profesores, ofreciendo diversas actividades de comprensión lectora que priorizan el aprendizaje significativo, el compromiso emocional y el reconocimiento del perfil cognitivo único de cada aprendiz. En última instancia, este proyecto busca mejorar la enseñanza de la comprensión lectora en el contexto EFL chileno, promoviendo la adopción de prácticas pedagógicas alineadas con la manera en que el cerebro aprende de forma natural.

Palabras claves: Aprendizaje Basado en el Cerebro, Currículum Nacional, Comprensión Lectora, Aprendizaje Significativo.

ABSTRACT

Reading comprehension is a fundamental skill to develop in Chilean EFL classrooms, as it is one of the foundations for learning a second language acquisition. Nevertheless, reading activities often follow traditional approaches that overlook students' interests and individual differences. To address this gap, this thesis project proposes a Brain-Based Learning (BBL) focused booklet grounded in 12 brain-based learning principles, BBL 7 stages and strategies, BBL reading comprehension strategies, and BBL formative assessment activities. These frameworks aim to transform these traditional teacher-centered lessons into student-centered, engaging learning experiences. The final product serves as a practical and adaptable resource for students, in-service teachers, and pre-service teachers, offering diverse reading comprehension activities that prioritize meaningful learning, emotional engagement, and recognition of each learner's unique cognitive profile. Ultimately, this project seeks to enhance reading comprehension instruction in the Chilean EFL context by fostering the adoption of pedagogical practices aligned with how the brain naturally learns.

Keywords: Brain-Based Learning, National curriculum, Reading Comprehension, Meaningful Learning.

INTRODUCTION

In the Chilean educational system, English is recognized as a key subject for developing communicative competence and supporting students' participation in an increasingly globalized world. In this respect, MINEDUC coursebooks are a major instructional resource, guiding teachers in planning lessons and students in experiencing language learning. Since many teachers heavily rely on these materials for classroom practices, the design and pedagogical orientation of the reading comprehension activities they provide play a decisive role in determining the quality of students' engagement with written texts and the opportunities they have to develop effective reading skills.

In recent years, reading comprehension has gained increasing relevance within the field of English as a Foreign Language (EFL), particularly in school-based instruction. Around the world, L2 learners face the challenge of making meaning from written texts in a language they are still acquiring, a process that demands the integration of linguistic knowledge, background experience, emotional engagement, and cognitive strategies. Research in applied linguistics and educational psychology highlights that reading in a second language is not a purely linguistic act but an interaction of attention, memory, motivation, and prior knowledge, all of which vary considerably among learners (Sousa, 2024). The development of strong reading comprehension skills becomes crucial as educational systems aim to give students opportunities to access global information and engage in intercultural settings.

Despite its significance, EFL reading instruction frequently uses conventional methods that might not adequately support how students naturally process information, resulting in classroom settings that are often dominated by techniques like limited scaffolding, decontextualized comprehension questions, and linear text analysis. This environment differs from what

contemporary learning research shows, which is that students construct meaning more effectively when instruction acknowledges the brain's need for patterns, context, and personally relevant experiences (Caine & Caine, 1991; Caine et al., 2005). Building on this perspective, Jensen (2008) emphasizes that traditional methods frequently overlook the role of emotional connection, novelty, movement, and multisensory engagement in sustaining attention and deepening understanding. Consequently, a shift toward brain-compatible, learner-centered approaches appears essential for fostering deeper engagement and more effective reading comprehension in EFL contexts.

CHAPTER I: STATEMENT OF THE PROBLEM

1.1 Statement of the problem

In recent decades, English as a foreign language has become one of the most sought-after languages for Chileans to learn and achieve fluency in (Barahona & Quijanés, 2025). The motivation extends from casual uses to looking for better opportunities in the work field. Although English has been mandatory in Chilean schools since 1998, and there is significant interest in learning the language, proficiency levels in Chilean classrooms remain low. The National Study of English administered to 3rd grade students in 2017 to assess reading and listening skills, according to The Common European Framework for Languages (CEFR) standards, revealed that 68% of the students performed at A1 level or below, which is lower than the level required by the National Curriculum (B1). On a performance scale of 0-100, students scored 22 points in reading and 29 in listening. These results are particularly concerning given that 3rd grade textbooks emphasize reading-based activities and the critical role of reading comprehension in the EFL classroom settings, where learners are expected to interpret and analyze written texts critically.

In addition, classroom observations and national tests such as the SIMCE in English indicate that most students fail to meet the expected reading comprehension abilities (Agencia de Calidad de la Educación, 2018). This highlights a persistent gap between curricular expectations and students' performance. Contributing factors include low student engagement, limited use of differentiated instruction strategies, and the prevalence of traditional, teacher-centered pedagogical methods.

This misalignment is also evident in the national curriculum itself. While the curriculum frameworks for 11th and 12th grades (MINEDUC, 2019) emphasize innovation in English learning and the development of communicative abilities across the "Four Strands"—meaning-focused input, meaning-focused output, language-focused learning, and fluency development (p. 77), these

principles are not always reflected in classroom reading activities. At this level, students are expected to further develop their comprehension of a variety of texts as part of their broader communicative competence (MINEDUC, 2019, p. 79). However, the curriculum's emphasis on aspects such as communication and integration does not consistently translate into classroom practice. Similarly, reading is recognized in the Programa de Estudio de Inglés, 3° Medio (MINEDUC, 2016) as an essential tool for enhancing and solidifying other language systems such as vocabulary and grammar, while supporting independent learning. However, the activities tend to be repetitive and focus on surface-level comprehension, highlighting the need for lesson designs that go beyond simply meeting curricular requirements and instead foster more meaningful and effective engagement with reading comprehension.

Although national course books offer B1 level reading activities in accordance with the curriculum, they are typically presented via traditional pedagogical practices that do not adequately address how students learn best. Recent neuroscience and educational psychology research emphasize understanding how the brain processes, retains, and applies information. Brain-based learning (BBL) is a pedagogical approach that seeks to align teaching strategies with the brain's natural learning processes, prioritizing emotional engagement, multisensory input, pattern recognition, and meaningful context (Jensen, 2005). Formative assessment strategies further support BBL by engaging students' natural thinking processes and promoting deeper understanding (Tate, 2016). Despite their relevance, both BBL and formative assessment remain underappreciated in Chilean EFL classrooms, especially in the preparation and implementation of reading lessons.

There is an urgent need for new and innovative teaching methods that enhance reading comprehension and student engagement through the brain's natural learning processes. To this end,

incorporating the concepts of Brain-based learning into lesson planning presents a practical solution. However, there is a lack of helpful and context-specific resources to assist both pre-service and in-service teachers in applying BBL in English reading lessons.

Therefore, this project aims to adapt a series of B1-level reading comprehension lessons from the 2023 edition of the English coursebook “Create Your Own Future” by MINEDUC, tailored for Chilean EFL students in 11th grade, grounded in brain-based learning principles. By providing a framework that connects curriculum needs with innovative and research-informed teaching methods, this project seeks to enhance both teacher practices and student learning outcomes.

1.2 Aims

1.2.1 General Objective

- To design brain-based learning lesson plans that foster reading comprehension skills among 11th-grade Chilean EFL students through the adaptation of B1-level reading tasks from a national curriculum coursebook.

1.2.2 Specific Objectives

- To develop a set of B1-level reading comprehension lesson plans grounded in Brain-Based Learning (BBL) principles and stages.
- To offer pre-service and in-service teachers a practical pedagogical tool for enhancing reading comprehension through the Brain-Based Learning (BBL) approach.

1.3 Proposal

This instructional resource is designed for teachers and students committed to improving ESL learning experiences in Chilean educational settings. It emphasizes reading skill development,

in alignment with Jensen's (2008) Brain-Based Learning framework, encompassing 12 principles and 7 stages, while adhering to CEFR B1 standards and national curriculum requirements.

This tool was created having in mind the existing gaps between the educational needs and the material provided by the national curriculum as well as the students' textbooks, taking into consideration that most activities are based on reading skill development. Also, it is important to highlight the scarcity of appropriate resources that lack cultural relevance and meaningful connection to Chilean student's experiences.

The material includes the adaptation of the 4 units from the 2023 students' English coursebook, *Create Your Own Future*, covering an academic year. The adaptation will be portrayed through reading lesson plans that follow a Pre-While-Post structure, while integrating BBL strategies based on Jensen's (2008) framework and formative assessment activities, tailored to lesson objectives and student needs. The use of such strategies will be grounded on the BBL framework developed by Jensen (2008) and will vary according to the aims of the lessons and students' needs. Ultimately, this approach offers opportunities to develop students' reading skills and improve their overall learning experience.

The booklet comprises twelve fully developed B1-level reading comprehension lessons, each one including activities with clear learning objectives, BBL lesson strategies, reading strategies, and formative assessment tools. Each lesson includes a brief rationale explaining how its components align with brain-based learning principles and stages. This resource aims to enhance students' reading proficiency while providing teachers with a practical, research-informed alternative to traditional methods—one that can be immediately implemented and promote more effective, engaging instruction.

CHAPTER II: THEORETICAL FRAMEWORK

2.1 Brain-Based Learning

Brain-Based Learning (BBL) could be defined as an approach to teaching and learning that aims to enhance education by aligning instructional practices with the brain's natural processing (Caine & Caine, 1991). This approach, rooted in neuroscience, emerged as a response to traditional methods that emphasized rote memorization over deeper comprehension. BBL is captured in 12 Brain/Mind Learning Principles that frame the design of learning environments where meaningful learning is possible. These principles get translated into three essential components of instruction: relaxed alertness (low threat, high challenge), orchestrated immersion in rich, complex, and compelling experience, and active processing that stabilizes learning with reflection and application (Caine et al., 2005).

2.1.1 Brain-Based Learning and the 12 Principles

Brain-Based Learning (BBL) is conceptually based on the 12 Brain/Mind Learning Principles defined by Caine and Caine (1991). They synthesized findings from education and neuroscience research, connecting key conclusions to explain how learning occurs in the brain. Rather than working on isolation, the principles explain how the mind works dynamically in an appropriate learning environment, providing a framework for designing instruction that is biologically aligned and responsive to students' natural learning processes. A concise overview of the 12 principles is presented in Table 1.

Table 1

The 12 Brain/Mind Learning Principles

No.	Principle	Key Idea
1	The brain is a parallel processor.	Learning involves simultaneous processing of thoughts, emotions, and sensory input.
2	Learning engages the entire physiology.	The body and brain work together; physical state affects learning.

3	The search for meaning is innate.	Learners are naturally curious and driven to understand.
4	The search for meaning occurs through patterning.	The brain learns by organizing information into patterns and relationships.
5	Emotions are critical to patterning.	Emotions influence attention, memory, and the meaning learners assign to content.
6	Every brain simultaneously perceives and creates parts and wholes.	Learners connect specific details to broader concepts.
7	Learning involves both focused attention and peripheral perception.	Learners absorb information from both direct and surrounding stimuli.
8	Learning always involves conscious and unconscious processes.	Learning occurs through both deliberate focus and automatic processes.
9	We have at least two types of memory: spatial and rote.	Both contextual, experiential learning and memorization are important.
10	The brain best understands and remembers when facts are embedded in context.	Learning is deeper when content is part of meaningful experiences.
11	Learning is enhanced by challenge and inhibited by threat.	A safe, stimulating environment encourages engagement and growth.
12	Each brain is uniquely organized.	Learners differ in how they process, understand, and recall information.

Note. Adapted from *Making Connections: Teaching and the Human Brain* by R. N. Caine and G. Caine, 1991, Association for Supervision and Curriculum Development; and *12 Brain/Mind Learning Principles in Action* by R. N. Caine, G. Caine, C. McClintic, and K. Klimek, 2005, Corwin Press.

Over this foundation, Jensen (2005) expanded Brain-Based Learning (BBL) as a practical, classroom-oriented approach, advocating for the application of neuroscience-based strategies to foster meaningful learning experiences. Emphasizing strategies built on principles of BBL as ways of improving the learning experience, a central element of his perspective is in the central place of the educator, with an emphasis on teachers as central facilitators who optimize learners' cognitive performance through learning environments with movement, emotional security, affiliation as a social being, and active engagement (Jensen, 2005). Additionally, Jensen (2008) rejects the notion of a "defective brain," contending that learning difficulties are "usually a defective system that fails to support students' capacity to learn" (p. 6). Jensen further emphasizes neuroplasticity—the

brain's lifelong capacity to change—arguing that successful instruction requires frequent opportunities for meaningful practice, feedback, and reinforcement (Jensen & McConchie, 2020).

2.1.2 Brain-Based Lesson Planning

One of Jensen's most significant contributions to Brain-Based Learning is found in his approach of designing curriculum, that is aligned with the brain's learning systems, recommending flexible, student-focused learning to promote independence, active engagement, and personal relevance (Jensen, 2005). In order to apply these concepts in everyday teaching practice, Jensen suggests that teachers frame lessons in such a way that they engage prior knowledge, sustain attention in students, and consolidate learning through active engagement and reflection. For this reason, he proposes Seven Stages of a Brain-Based Lesson Plan as a systematic framework to structure instruction (Jensen, 2008).

The following table presents the seven stages of a BBL Lesson plan proposed by Jensen (2008) together with their description and some examples Jensen believes to be necessary when applying every stage in the classroom.

Table 2

The Seven Stages of a Brain-Based Lesson Plan

Stage	Description	Practical Examples (Jensen, 2008)
1. Pre-exposure	Introduce key ideas or themes to activate prior knowledge and prepare the brain.	Build rapport, give a topic overview, encourage good brain nutrition (e.g. drinking water), as well as have pre-class questions.
2. Preparation	Establish learning goals, create a low-threat environment, and prime interest and curiosity.	Set clear objectives, provide a hook, give meaningful context, as well as create interdisciplinary tie-ins.
3. Initiation and Acquisition	Engage attention through novelty or emotional	Provide concrete learning experiences (e.g., case study, interview, hands-on learning),

	connection and present core learning content.	give different choices for students to approach the topic, as well as implement multi-sensory input.
4. Elaboration	Deepen understanding through discussion, application, and meaningful extensions of learning.	Provide a debriefing of the previous activity, have learners explore the topic by themselves, integrate peer or small group tasks, design mind maps, as well as have them discuss and report back to class.
5. Incubation and Memory Encoding	Allow time for reflection, rehearsal, and deeper encoding of information into long-term memory.	Implement journaling, quiet reflection time, stretching and relaxation exercises, as well as asking learners to discuss what they learned with family and friends.
6. Verification and Confidence Check	Review and assess learning through feedback, practice, and opportunities to demonstrate mastery.	Implement role-plays, low-stake quizzes, peer assessment, partner teaching, as well as project-based activities.
7. Celebration and Integration	Engage emotions through positive reinforcement, linking learning to personal relevance and future use.	Facilitate class celebrations, play music, provide sharing time, praise students, as well as incorporate new learning in the future.

Note. Adapted from Jensen, E. (2008). *Brain-based learning: The new paradigm of teaching* (2nd ed.). Corwin Press.

These seven stages serve as a practical application of the Brain-Based Learning core principles, providing a systematic approach to interpreting theory into effective classroom use. By applying such stages, teachers can create learning in ways compatible with how the brain processes and stores information, shifting away from merely covering content towards facilitating deeper and more meaningful learning. As Jensen (2008) goes on to say, this approach begins by asking a radically different question with regards to lesson planning:

As we plan learning with the brain in mind, it is critical to ask a different set of questions. Rather than ask “What should I teach?” ask “How will students best learn?” As you plan the learning, keep the focus on the basic principles that support the brain’s natural learning tendencies. Follow through from pre-exposure to celebration, making sure that none of the stages in between are skipped. Learning happens over time. Create a complex, integrated, interdisciplinary curriculum that provides for plenty of learner choice. Provide structure, but in an environment that respects each learner’s unique nature, needs, and experiences. (p.301)

What Jensen expresses above is the idea of the critical shift in thinking that Brain-Based Learning promotes. Instead of reducing teaching to a list of content, BBL encourages teachers to prioritize lessons that resonate with learners’ cognitive development. By reminding educators to devote attention to every stage of the learning process, from pre-exposure through celebration, teachers will be more likely to design learning environments that are participatory, emotionally safe, and connectionally powerful, emphasizing that learning is not a standardized process. This overall approach is aligned with a more effective, more humane teaching approach, in which student development is facilitated best through harmonizing classroom practices with the most natural way that the brain learns.

2.1.3 Brain-Based Learning and EFL Reading Comprehension

David Sousa (2022), in *How the Brain Learns*, defines Brain-Based Learning as a neuroscience-based teaching methodology that emphasizes the significance of teachers influencing students' learning. According to Sousa, educators are "brain changers", stating that "the more they know about how the brain learns, the more likely they are to be effective at helping their students succeed" (Sousa, 2022, p. xii). His support of student-centered classrooms

emphasizes the importance of personal connection, autonomy, and active engagement in the learning process, positioning the teacher as a facilitator. Key learning processes, chunking and patterning to simplify complex information, rehearsal and retrieval techniques to enhance memory, and the incorporation of multisensory input to enhance learning experiences are some of Sousa's most important contributions to BBL (Sousa, 2022). When combined, these concepts equip teachers with practical strategies for implementing more effective, brain-compatible instruction. According to the David Rockefeller Center For Latin American Studies (2024), embedding neuroscience in the natural educational setting not only assess the cognitive function of students, but also strengthens mental health and social connections within the classroom.

In his book on teaching English Language Learners (ELLs), Sousa (2011) refers to various cognitive and linguistic challenges that impede second language reading. Longer-term reading comprehension could be delayed by learners' limited vocabulary, slower decoding, and higher cognitive demands. Moreover, Sousa draws attention to the emotional barriers of anxiety and low motivation that further inhibit language acquisition and comprehension. These classroom variables that could hinder learning are not permanent and could be changed by integrating a systematic and frequent use of scaffolding, visual aids, and vocabulary instruction inside an emotionally safe environment. The use of such strategies should improve ELLs performance, minimize cognitive overload, and enhance reading fluency (Sousa, 2011).

By providing a thorough framework for brain-compatible reading practices, Sousa (2014) incorporates the ideas of BBL into reading instruction. These practices are organized in the logical order of a reading lesson: pre, while, and post stages. First and foremost, teachers should establish a clear reading goal, provide important terminology, and use discussions or multimedia prompts to activate students' prior knowledge during the pre-reading phase. Second, throughout the while-

reading phase, the emphasis should be on sustaining interest and using chunking and questioning to scaffold and facilitate comprehension. Thirdly, in order to strengthen comprehension, the post-reading phase places a strong emphasis on reflection, summary, and application of the material that has been learned. Needs analysis research by Prasetyo et al. (2025) highlights the relevance of brain-based and metacognitive approaches to reading instruction. Their findings indicate that learners benefit from instructional models that integrate cognitive strategy use with emotional engagement and structured learning environments, supporting deeper comprehension and critical reading development. This perspective reinforces the value of instructional designs that align with how learners process information cognitively and affectively, a central assumption of Brain-Based Learning.

Table 3 provides a set of Brain-Based reading strategies, organized and divided into pre-reading, while-reading, and post-reading stages.

Table 3

Brain-Based Reading Strategies for 11th-Grade EFL Students

Stage	Instructional Focus	Example Strategies
Pre-reading	Prepare the brain for new input and activate prior knowledge	<ul style="list-style-type: none"> • KWL charts (Know–Want to Know–Learned) • Visual previews (images/titles) • Pre-teaching key vocabulary • Predictive questioning
While-reading	Support decoding, pattern recognition, and comprehension during reading	<ul style="list-style-type: none"> • Guided reading with annotation • Chunking text into manageable segments • Think-aloud and reciprocal teaching

		<ul style="list-style-type: none"> • Graphic organizers (e.g., cause-effect, sequencing)
Post-reading	Reinforce learning and support long-term retention	<ul style="list-style-type: none"> • Summarizing main ideas • Socratic discussions • Creative responses (e.g., drawing, role-play, infographics) • Retrieval practice (e.g., quizzes, flashcards)

Note. Adapted from Sousa, D. A. (2024). *How the brain learns to read (2nd ed.)*. Corwin.

The effectiveness of these strategies stems from their alignment with the brain's processes for encoding, storing, and retrieving information. When incorporated into lesson planning, such strategies give EFL students with structured, mentally engaging opportunities to enhance their reading comprehension skills, something crucial for students overcoming the additional difficulty of reading in a second language. They exemplify BBL's core principles: responsiveness to learner diversity and alignment with natural cognitive function.

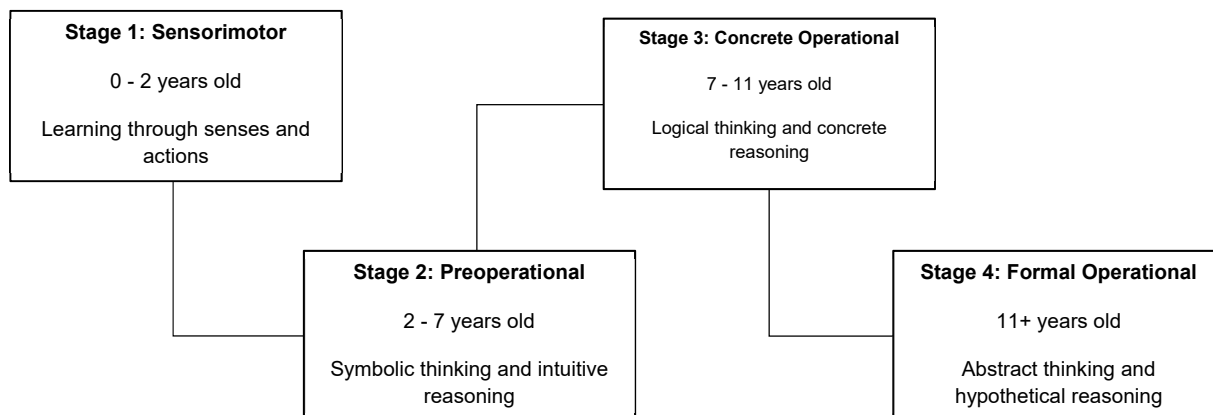
2.2 Cognitive Theories Related to Brain-Based Learning

Cognitive theories are key to understanding how learning happens in the brain. These theories explain the mental processes that shape how we get, process, store, and retrieve information. At the center of cognitive learning is the idea that the brain is not a passive receiver; it is an active processor that constantly adapts and reorganizes based on new experiences. In education, cognitive theories provide valuable frameworks for creating effective teaching strategies that focus on concepts like neuroplasticity, working memory, and automaticity. Cognitive theories in education and second language acquisition are, consequently, connected to BBL, as understanding the cognitive aspects of memory, attention, feedback, and neural adaptation can lead to better learning environments.

2.2.1 Historical Foundations of Cognitive Development: Piaget's Early Work

Jean Piaget's *The Psychology of Intelligence* (1950) establishes a crucial theoretical framework for comprehending intelligence as an adaptive and developmental process. Piaget views intelligence as a flexible mechanism that allows individuals to engage with their environment, propelled by the core processes of assimilation and accommodation (Piaget, 1950). Assimilation entails incorporating new information into pre-existing cognitive frameworks, while accommodation involves altering those frameworks in reaction to new experiences. Piaget argues that this dynamic interaction results in the gradual development of more complex cognitive functions, leading to advanced reasoning abilities (Piaget, 1950). He presents the idea of groupings, which refers to structured systems of mental operations that empower learners to logically manipulate and organize knowledge. Furthermore, Piaget differentiates between sensorimotor intelligence, which defines learning during early childhood through physical engagement with the environment, and conceptual intelligence, which arises later with the formation of abstract reasoning (Piaget, 1950). This distinction highlights the gradual aspect of intellectual growth, indicating that learning develops from tangible actions to formal reasoning, influenced by the ongoing interaction between the individual and their environment.

In *The Psychology of the Child* (Piaget & Inhelder, 1969), Piaget elaborates on his theory of cognitive development by formally outlining the four-stage model that describes how thinking develops from infancy to adolescence. These stages—sensorimotor, preoperational, concrete operational, and formal operational—represent fundamentally different methods of reasoning and perceiving the world, with each stage marked by unique cognitive abilities, as children advance through these stages in a predetermined sequence as a natural result of biological growth and interaction with their surroundings (Piaget & Inhelder, 1969).

Figure 1*The Four Stages of Cognitive Development*

Note. Adapted from Piaget, J., & Inhelder, B. (1969). *The psychology of the child* (H. Weaver, Trans.). Basic Books.

Piaget's theory has a significant influence on pedagogic practice since it promotes fundamental knowledge on how to build reasoning from early childhood to young adulthood. Having knowledge that children move from concrete, sensory knowledge to abstract, logical thinking, teachers are able to modify teaching lessons based on students' intellectual growth. As such, this approach serves as a reminder to respect children's typical intellectual development, avoid having unreasonable expectations, and, ultimately, provide stimulating learning settings that are commensurate with the age of each learner.

2.2.2 Cognitive Load Theory

Sweller, Ayres, and Kalyuga (2011) developed the Cognitive Load Theory (CLT), which offers a conceptual framework for how working memory limits change during learning activities. The theory puts forward that three types of cognitive load exist: intrinsic, extraneous, and germane (Sweller et al., 2011). Intrinsic load is the material complexity itself that relies on prior knowledge and interactivity of the elements of information. Second, extraneous load is the manner in which

instructional material is presented; poor instructional design can put excessive loads on working memory and disrupt learning. Third, germane load is the cognitive effort required to build and automate schemas that directly contribute to learning (Sweller et al., 2011). In order to promote optimal use of cognitive resources and enhance learning, CLT highlights that an effective teaching design should be focused on managing intrinsic load, minimizing extraneous load, and optimizing germane load.

As noted earlier, application of Cognitive Load Theory focuses on minimizing extraneous load while optimizing germane load to enable effective learning (Sweller et al., 2011). Strategies for minimizing extraneous load include the transmission of unique, non-bloated instructional content, deletion of unnecessary information, and structuring of verbal and visual information so that it takes use of the brain's dual-channel processing capability (Sweller et al., 2011). In order to achieve a high germane load, instructional strategies will encourage the practice of schema building and automation via procedures such as worked examples, scaffolding practice, and the gradually reduced guidance while students become proficient (Sweller et al., 2011). CLT also draws attention to the limited working memory capacity, particularly in beginner learners, and the necessity of breaking down tasks from easier to more difficult and providing sufficient practice opportunities (Sweller et al., 2011). Teachers can design lessons based on cognitive architecture by using these methods, leading to more efficient learning and improved long-term retention.

2.2.3 Second Language Acquisition Cognitive Theories

Lightbown and Spada (2013) provide a comprehensive overview of Second Language Acquisition (SLA) theories, emphasizing certain aspects such as learning context, learner attributes, and cognitive processes. They highlight how things outside the learner's control, such as access to interaction, quality of input, and receipt of feedback, play a significant role in second language

growth (Lightbown & Spada, 2013) Additionally, learner-internal factors, including age, motivation, and aptitude, are identified as key variables that interact with the learning environment to affect outcomes. From this perspective, information processing is central, and language acquisition is a process of gradual, cognitively driven change dependent on attention, noticing, and practice. Feedback is also considered crucial because it directs learners' attention to linguistic errors, allows for adjustments to be made, and facilitates increasing accuracy in the use of language over time (Lightbown & Spada, 2013). The cognitive approach in SLA is characterized as an active interaction of mental processes and instructional conditions.

Barry McLaughlin's *Theories of Second-Language Learning* (1987) presents a cognitive explanation of second language learning in terms of the mental processes involved in the process of learning. Central to McLaughlin's perspective is the Information Processing Theory, whereby language acquisition is explained as a transformation from effortful, controlled processing to automatic, fluent processing (McLaughlin, 1987). According to the theory, learners employ working memory and conscious attention to process language input during initial learning phases. However, as they develop greater proficiency over time, their capacity reduces the cognitive effort necessary for production and understanding due to the fact that the use of language becomes automatic with proper exposure and practice (McLaughlin, 1987).

McLaughlin also focuses on attentional resources in SLA, where students learn optimally with controlled attentional load practice because they only have a limited capacity to process input. His work distinguishes between declarative knowledge, or conscious awareness of rules of language, and procedural knowledge, that results in spontaneous and fluent use of language in communication (McLaughlin, 1987). This distinction is significant for what it reveals about how

language learning includes both conscious rule learning and the acquisition of automatic use of language through practice.

Related to this is Robert DeKeyser's *Practice in a second language: Perspectives from applied linguistics and cognitive psychology* (2007), where he presents Skill Acquisition Theory as one of the leading cognitive psychological theories of second language acquisition. Language learning, following this theory, is a question of moving from declarative knowledge, or conscious awareness of the rules of language, to procedural knowledge, where the use of language is automatic and fluent (DeKeyser, 2007). The Skill Acquisition Theory maintains that the shift from controlled to automatic processing is brought about by extensive, intensive practice. DeKeyser (2007) emphasizes the importance of deliberate practice, which he characterizes as focused, structured, and repetitive attempts at improving specific aspects of performance. He also draws attention to the crucial role of feedback, which provides learners with immediate input to reformulate and adjust their use of language. The theory also explains individual variability, such as working memory capacity and aptitude, which can impact the rate and success of acquiring skills (DeKeyser, 2007). Overall, Skill Acquisition Theory provides a systematic account of second language proficiency attainment by practice, attentional focus, and gradual automatization of skills.

Together, the cognitive theories presented in this chapter complement each other in providing a better image of learning in second language acquisition and elementary education. Educational theories place heavy emphasis on readiness development, active learning, and control of mental effort through effective instructional design. At the same time, SLA theories place heavy emphasis on attention, practice, feedback, and increment automatization in learning through languages. These theories are complementary and are solidly aligned closely with the key

principles of Brain-Based Learning, advocating for learner-centered instruction that respects cognitive development and optimizes brain functioning. Understanding these cognitive foundations provides essential guidance for teachers to design more effective, engaging, and supportive learning environments.

2.3 Reading Comprehension Models & Strategies

Second language (L2) reading comprehension is a complex cognitive and educational process that has garnered significant attention in applied linguistics and language education research. Not only does the successful teaching of reading require an understanding of the cognitive processes involved in reading a text, but it also demands the use of evidence-based pedagogical practices that enable learners to engage with a variety of text types and purposes. Recent findings emphasize the value of explicit strategy instruction for reading comprehension in EFL settings. Matamala and Muñoz (2024) found that teaching cognitive and metacognitive strategies have a positive effect on learners' reading comprehension in English, with cognitive strategies showing a stronger impact. The authors suggest that this difference may be related to factors such as learners' linguistic proficiency, task type, and level of autonomy, reinforcing the importance of guided and structured strategy use in reading instruction. This approach focuses on theoretical models of reading comprehension, specifically the bottom-up, top-down, and interactive models, which provide a foundation for developing teaching strategies to enhance learners' reading proficiency.

The bottom-up model emphasizes hierarchical text processing, from letter and word recognition to incrementally progressing towards meaning construction. The model theorizes that comprehension is constructed from the lowest unit of language to the highest-level units, with each level relying on the completion of the previous one (Walter, 2004). Word reading, decoding, and

other bottom-up skills are fundamental during the early stages of L2 acquisition, as these skills must be automatic to enable cognitive capacity for higher-level comprehension. Walter (2004) points out that automatic lexical access and fluency in word recognition are essential conditions for meaningful and effective interpretation, as evidenced by the observation that readers must recognize at least 95% of a text's words in order to read it comfortably.

In contrast, the top-down approach views reading as a process that is driven by prior knowledge, expectations, and predictions of the reader. Instead of focusing solely on textual features, readers actively construct meaning and make predictions by integrating background knowledge and textual cues. This model, popularized by Goodman (1967), presents the reader as a hypothesis tester who interprets meaning by drawing on experiences and context, frequently extracting meaning from the text rather than analyzing it in its entirety. Nevertheless, empirical studies have long established that experienced readers do not rely exclusively on top-down strategies but rather process texts fully and automatically (Walter, 2004). Therefore, a purely top-down approach is insufficient to explain the entire process of reading.

To overcome the limitations of each of the individual models, the interactive model of reading has gained widespread acceptance. This model proposes that reading comprehension results from the simultaneous interaction between both bottom-up and top-down processes (Rumelhart, 1977; Stanovich, 1980). In this approach, decoding and comprehension are interdependent: readers draw on both textual information and background knowledge simultaneously to construct meaning. Walter (2004) favors this model, mentioning that the reader's purpose, for example, scanning for specific information, skimming for general meaning, or engaging in intensive reading for deeper understanding, may influence the extent to which either processing method is employed.

Nunan (2003) situates reading comprehension within a task-based pedagogical framework, which is grounded in these theoretical foundations. He argues that reading should be viewed as an interactive process that involves the application of strategies, purposeful engagement, and integration with other language abilities rather than just as a passive intake of information. Nunan emphasizes that proficient readers employ a variety of strategies, including skimming, scanning, predicting, and monitoring, and that L2 learners must be explicitly taught each of these techniques. He also highlights the importance of metacognitive awareness, encouraging learners to reflect on their reading objectives, select suitable reading strategies, and monitor their own comprehension. Additionally, he emphasizes the importance of metacognitive teaching in helping learners read unfamiliar texts and become self-sufficient readers.

Furthermore, it is essential to recognize that learners must be equipped with cognitive resources that enable them to monitor their understanding, adjust their reading strategies, and read with a specific sense of purpose, which is why teaching students how to apply strategies enhances a more adaptive and independent reading approach. Therefore, for the purpose of helping students become more aware of their reading habits and areas for improvement, these strategies should be taught and modeled in the classroom rather than being left to develop implicitly (Nunan, 2003).

Providing learners with access to authentic materials and a diverse range of text types can significantly improve their ability to apply reading strategies in meaningful contexts. Such exposure allows students to connect what they are reading to authentic uses and cultural experiences, which supports deeper engagement with texts. This not only allows learners to use bottom-up and top-down processes naturally but also promotes motivation and confidence. Additionally, the integration of extensive reading activities into the curriculum further improves reading fluency by enabling students to read for personal interest and enjoyment without the

constant pressure of assessment (Walter, 2004; Nunan, 2003). In this way, reading instruction becomes a holistic process that emphasizes both linguistic competence and learner autonomy.

Teaching reading effectively also demands understanding the stages that shape the reading process. These stages are usually divided into three: pre-reading, while-reading, and post-reading. Each one of these main phases plays a specific role in guiding learners from initial engagement with a text to a more profound comprehension and understanding. Lesson planning based on these stages helps students activate prior knowledge, process information purposefully, and develop their understanding beyond the text itself.

The pre-reading stage is the foundation for building comprehension skills. During this phase, learners are prepared to interact with the text with activities such as predicting content, discussing key vocabulary, or relating the topic to their own experiences. Activation of background knowledge during this stage is crucial for second language reading since it helps students connect what they already know with the new information they will be reading about (ISP Nation, 2009). Effective pre-reading activities can include brainstorming, examining titles or images, discussing guiding questions, or completing semantic maps. This initial engagement stimulates learners, encouraging their curiosity, and establishing a clear purpose for reading.

During the while-reading stage, students are more actively engaged with the text. Here, the focus is not just on decoding but also on creating meaning. This stage entails the application of comprehension strategies, including skimming, scanning, identifying main ideas, and making inferences. Teachers can assist the learners by providing guiding questions, organizing information in charts, or asking them to annotate while reading. According to Grabe and Stoller (2011), in order for learners to build both accuracy and fluency, this stage needs to prioritize the simultaneous development of fluency and comprehension. Diana Betts (2024) describes comprehension as the

outcome of reading, and what we try to attain when teaching students; furthermore, it is essential that learners are encouraged to read with a purpose, whether it is to find specific information, comprehend opinions, or critically evaluate the arguments of the author.

The last stage is post-reading, which involves students reflecting on the information they have just read, and plays a crucial role in checking comprehension, building concepts, and encouraging critical thinking. Activities after reading should enable students to make their understanding more personal and more meaningful, and this can be achieved by incorporating tasks related to discussing, summarizing, responding to comprehension questions, or relating the content to the learners' personal lives or other texts. Greller (1981) believes that the reading process should not end with the last line of the text, but instead that it should open a door to analysis, interpretation, and further linguistic practice. Additionally, post-reading activities can involve vocabulary reinforcement, writing opinions, or more creative tasks, such as rewriting the ending or role-playing.

Overall, breaking down reading instruction into pre-reading, while-reading, and post-reading stages provides a methodical but adaptable approach that supports comprehension and student involvement. The effective implementation of each one of these stages increases the likelihood that students will feel motivated and confident, and will view reading as a purposeful and meaningful activity rather than as a passive assignment.

2.4 Chilean MINEDUC Guidelines (B1-level)

According to the national curriculum for English, primary objective is to develop students' proficiency in textual structures and vocabulary through engagement with spoken and written texts. These texts are linked to themes from other subjects to help students build interdisciplinary

knowledge and develop a broader understanding of the world. English as a subject seeks to help students to understand and use specific terminologies encouraging regular exposure to informative, literary and technical texts which may help and prepare students for higher educations and give them the competences to face the professional world. These aims are reflected in the learning objectives (OAs) for 11th grade, which emphasize the development of fluency and comprehension in both oral and written communication, as well as the promotion of critical thinking, cultural awareness, and identity construction through English. The national curriculum also briefly addresses the recommended methodological approach that is recommended to be applied to the classroom: task-based teaching. This approach, which is also implemented in countries like Japan, Finland and Spain, promotes greater students' autonomy and it also supports the development of decision-making skills through meaningful tasks and activities.

2.4.1 Standards of Reading Comprehension and Cognitive Development

The following table illustrates the number that identifies the learning objective, set for 11th grade students, and its description.

Table 4

Learning Objectives for Chilean EFL 11th Grade Students.

OA	Students are expected to:
OA 01	Comprehend main information from spoken and written texts related to their inquiries and interests, with the purpose of knowing the way other cultures behave in said contexts.
OA 02	Produce brief and clear spoken and written texts related to students' interests and inquiries, with the purpose of expressing a critical stance while respecting other perspectives.

OA 03	Make use of their English knowledge on the comprehension and production of brief and clear spoken and written texts, with the aim of building a critical stance on contexts related to their interests and inquiries.
OA 04	Produce and comprehend with fluency brief and clear spoken and written texts on communicative situations that involve other worldviews and their own, with the purpose of interacting and creating awareness of their own identity.

Note. Adapted from Programa de Estudio INGLÉS 3° medio (2021) *Unidad de Currículum y Evaluación* Ministerio de Educación. MINEDUC.

According to the National Curriculum for 11th grade students, it can be noticed that the reading skill is being incorporated throughout all units, indicating its great importance for the students' development. For that reason, it is urgent to reinforce more thoroughly this receptive skill. The table also illustrates the abilities students are expected to develop throughout the educational learning process, such as being able to understand main information from spoken and written texts, related to their interests and inquiries, with the purpose of facilitating learning from diverse cultural perspectives. (OA1).

The curriculum further specifies that students will apply their English knowledge to comprehend and produce oral and written texts, to build an opinion on contexts related to their interests and inquiries (OA3).

Then, it is stated that oral and written texts will be fluently produced and comprehended in communicative situations that involve other versions of the world and their own, with the purpose of interacting and reflecting on their own identity (OA4).

The national curriculum explicitly mentions cognitive and metacognitive strategies, including the development of critical thinking skills that consider both students' own perspectives

and those of other cultures. However, it falls short in its practical implementation. When examining the class-planning, it becomes very difficult to identify where these BBL strategies are actually being applied.

Additionally, other key components of BBL which are mentioned in the curriculum as important factors, are absent from the incorporation of the student's book. Strategies such as emotional and motivational factors are important in the learning process. The curriculum does not incorporate storytelling activities, nor does it incorporate gamification. Besides, the national curriculum makes very little use of strategies to engage with spatial memory.

While the curriculum emphasizes communicative skills and interaction development, it is equally important to enhance reading ability through approaches that move beyond the traditional methods prevalent in Chilean EFL classrooms.

2.5 Assessment for Learning and Brain-Based Learning

Assessment for Learning (AFL) is a student-focused practice that utilizes ongoing assessment to facilitate and improve learning (Black & Wiliam, 1998). Rather than simply measuring attainment, AFL involves the gathering of evidence of student understanding to inform instruction and provide constructive feedback. Its primary purpose is to promote student achievement by encouraging continuous reflection and active engagement in the learning process (Hattie, 2009). This section explains the theoretical foundations of AFL and elaborates on how formative assessment practices can be extended further with the help of principles of Brain-Based Learning.

2.5.1 Assessment for Learning: Theoretical Foundations and Classroom Impact

The foundation of Assessment for Learning (AFL) is the idea that evaluation should be used to improve the learning process rather than only gauge student achievement. The original paradigm for AFL was created by Black and Wiliam (1998), who demonstrated how formative assessment practices might really improve educational standards when applied properly. According to their research, regular, informal evaluation is crucial for providing prompt feedback, enabling teachers to modify their lesson plans, and enabling students to assess and control their own learning. According to Black and Wiliam (1998), some of the main features of AFL include allowing students to self-evaluate, clarifying learning objectives, and involving students in class discussions to improve comprehension.

The contribution of AFL to raising student performance has been later confirmed by large-scale empirical studies. Hattie (2009), in a summary of over 800 meta-analyses on student achievement, identifies feedback as having a high impact on learning. His finding is that positive feedback, when provided immediately and clearly, can result in high levels of learning gain. Additionally, the effectiveness of feedback rises when learners actively participate in their own learning (Hattie, 2009). In order to develop deeper learning and engagement in students, classroom practices should consider AFL strategies, such as clear success criteria, careful questioning, and immediate feedback loops.

In the classroom, the use of AFL is equivalent to ongoing cycles of assessment, feedback, and teacher adjustment. Teachers use a range of strategies—questioning, observing, peer review, and self-assessment—to gather evidence of learning as it happens. This approach reorients the assessment from a summative conclusion to a formative process that informs instruction and learning. The classroom impact of AFL is achieved through greater student motivation, more

responsive teaching, and a greater stress on progress rather than performance per se (Black & Wiliam, 1998; Hattie, 2009).

2.5.2 Brain-Based Approach to Formative Assessment

Brain-focused strategies for formative assessment prioritize aligning assessment strategies with the way the brain best learns. Marcia Tate (2016) pushes for formative assessment strategies that engage natural thought processes, fostering both engagement and retention. According to Tate, successful formative assessment goes beyond ensuring correctness; it engages students in learning through strategies that foster emotional connection, student engagement, and multisensory experience. As Tate (2016) delineates, "Assessment is a continuous, ongoing, and differentiated process to meet the needs of students" (p. 10), emphasizing the necessity of tailoring assessment to address different learning needs. By employing movement, novelty, and social interaction, formative assessments have the potential to capture attention and increase understanding.

Tate (2016) also stresses lowering threat levels in classrooms since stress and anxiety hinder the brain from processing and storing new information. Formative assessments enable the development of a learning environment that is friendly, where students can freely experiment and get constructive feedback in brain-compatible classrooms. Repetition is also core in Tate's model; by repeating content through various and interactive formative assessment activities, teachers can reinforce neural pathways and cause long-term retention (Tate, 2016). On a broader note, brain-based formative assessment is all about designing classroom practice that not only calculates learning, but also strengthens it actively by respecting the way the brain automatically absorbs information.

Teachers can have many opportunities to monitor understanding, remedy misconceptions, and reinforce significant ideas by using specialized assessment techniques before, during, and after

instruction. Research on assessment in language education emphasizes the need to move beyond decontextualized and static evaluation methods. Zohrabi and Nasirfam (2024) state that alternative and formative assessment approaches, characterized by a continuous use of authentic and adaptable tasks, support more effective instruction and align assessment with real-life language use. This supports learners' readiness for communicative demands beyond the classroom and makes it possible for assessment to be an active and ongoing aspect of training rather than merely being at the completion of a learning loop. With real-world examples of how to engage students at every stage of the teaching process, the following table examines the potential applications of formative assessment techniques in the pre-, while-, and post- stages of a lesson.

Table 5 shows lesson stages, their focus, and examples of strategies and activities, for each stage, proposed by Tate (2016).

Table 5

Brain-Compatible Formative Assessment Strategies and Activities Based on Lesson Stages

Lesson Stage	Focus	Examples of Strategies and Activities
Pre-stage	Activate prior knowledge and set learning goals.	<ul style="list-style-type: none"> • K-W-L Charts • Writing on the Wall • “Know/Don’t Know” Activity • Entrance Slips
While-stage	Monitor understanding and adjust instruction.	<ul style="list-style-type: none"> • Choral Responses • Finger Feedback • Pair-Share Discussions • Project-Based Learning

Post-stage	Reinforce learning and reflect on progress.	<ul style="list-style-type: none"> • Role Play • Drawings • Gamified Reflections • Frayer Model

Note. Adapted from Tate, M. L. (2016). *Formative Assessment in a Brain-Compatible Classroom: How Do We Really Know They're Learning?*. Learning Sciences International.

Combining the Assessment for Learning (AFL) concepts established by Black and Wiliam (1998) and Hattie (2009) with the Brain-Based Learning (BBL) methods outlined by Tate (2016) provides a comprehensive approach to improving teaching and learning results. AFL focuses on using continuous, purposeful evaluation to promote student engagement and development, while BBL enhances these approaches by aligning assessments with how the brain processes, retains, and applies information. As demonstrated by the formative assessment approaches compiled in Table 4, assessment can be actively included before, during, and after stages to optimize participation and reinforce learning. This alignment ensures that assessments function as both measurement tools and meaningful, brain-compatible opportunities for improved understanding and long-term memory.

2.6 Coursebook analysis for reading activities:

Throughout the analysis of the 11th grade students' book *Create Your Own Future* to design new and more appealing and effective reading comprehension tasks, it became apparent that some existing activities lack correlation with each other. Although MINEDUC (2023) mentions that the focus for this grade looks for developing communicational, thinking, productive and receptive skills, there is still room to search for improvement and not leave behind new strategies for reading activities.

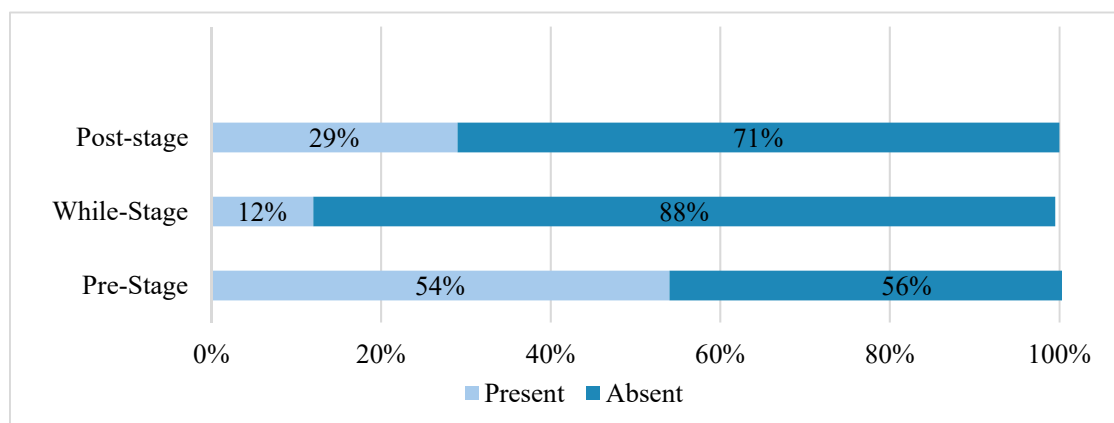
Moreover, reading comprehension tasks often lose focus on the main topic, the specific skill to be developed, and the logical sequence of activities.

When analyzing the reading-focused lessons, there was an interest in understanding whether this insufficiency was observable in only one stage of the lesson sequence or across multiple stages.

The following graphic provides a clear comparison of the presence or absence of the BBL stages found in each stage of the reading comprehension lesson.

Figure 2

Percentage of lessons per stage with Brain-Based learning present and absent.



Note. Data derived from Table 8.

Once all units were divided into pre-, while-, and post-reading stages, it was found that the while- and post-stages showed the greatest tendency to lack coherence. This becomes evident when tracing the lesson progression from the pre-stage: the while-stage often lacked connection with the preceding stage. Similarly, the post-stage frequently shifted away from the while-stage's topic or theme, or in some cases, focused on grammatical structures introduced later in the unit.

By way of example, unit 4, Lesson 1, from 11th grade students' textbook, illustrates these design shortcomings. While the lesson opens effectively with brainstorming about "trends" to activate prior knowledge, the while-reading stage reveals significant gaps. After reading and answering questions, students must define vocabulary from the text—yet these words receive no prior introduction, and the lesson provides no indication that definitions are later verified. This approach leaves essential vocabulary learning unsupported. In figure 3 the original lesson plan can be observed.

Figure 3

Lesson 1 from Unit 4

The image shows a page from a textbook with two main sections of questions and a collection of example sentences. In the top right corner, there is a green box labeled 'BDA' and a white box labeled 'U4_ACT_4 to 6'. The questions are numbered 3 and 4, with sub-questions a, b, and c. The example sentences are in purple boxes with modal verbs highlighted in bold.

3. According to the article:

- How are Vine and TikTok similar? How are they different?
- What was so new about Vine?
- Does the author think that TikTok is better than Vine? Do you agree? Why/Why not?

4. Analyse the sentences and answer:

- How does the tone shift between them?
- What do the words in bold from the sentences below and the text mean?

A Vine **must be** six-seconds long.

We **ought not to compare** Vine and TikTok since both are entertaining.

TikTok **has to** keep evolving to remain popular.

You **shouldn't try** that trend.

Note: Image taken from Brahm, J. (2023). *Student's Book High School English 3-4*. Unidad de Currículum y Evaluación, Ministerio de Educación; Santillana del Pacífico S.A.

At some point in the lesson, a grammar point is introduced, which contains a grammatical mistake: the modal verb “Should” is written as “Sould”. If the modal verbs are not checked together and students only get the information from the book, they are at risk of continuing to use the word incorrectly.

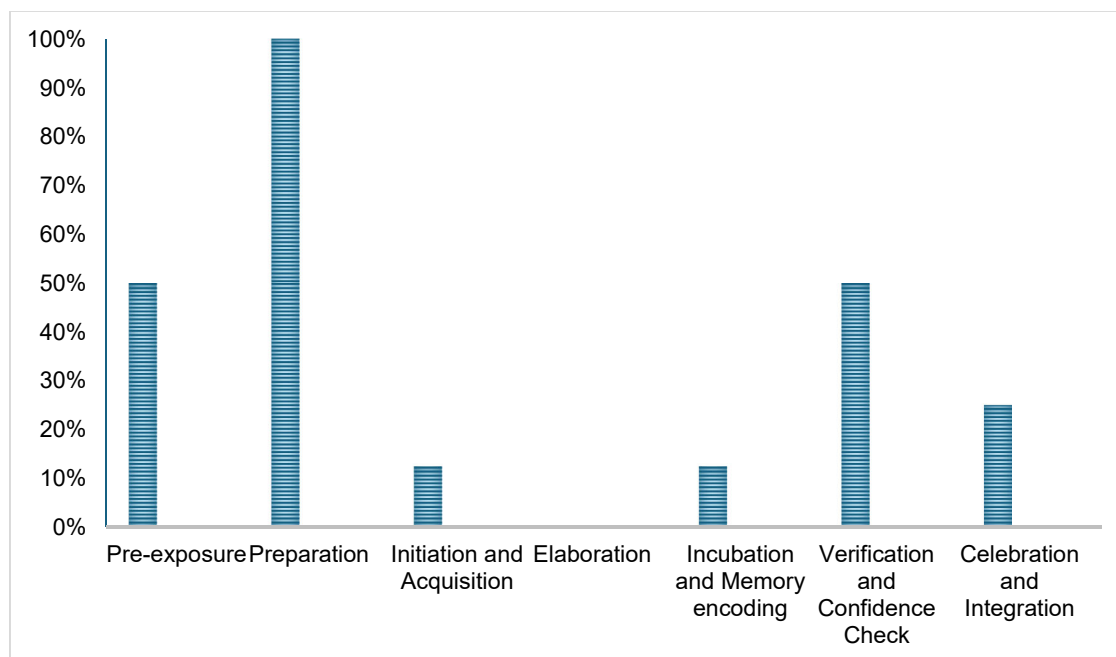
Lastly, in the post-stage, it is asked to use these modal verbs (keeping in mind they were never explained, neither said in which cases we can use them) to create sentences, and to also write them in negative form. Best practices in language teaching emphasize the progressive introduction of new information to avoid overwhelming learners. Since Chilean students typically have Spanish as their first language, instructional design should avoid presenting too many new concepts simultaneously.

As a closing activity, students are asked to create a trend in groups and present their ideas. Again, the main theme of "Trends" resurfaces, but the grammar point is abandoned, despite this being an ideal opportunity to integrate both elements. Finally, providing students with a broad range of options when introducing a new topic may not be suitable, as learners require more structured guidance at this stage.

2.6.1 Textbook stages and BBL principles:

After analyzing each activity in the 8 reading lessons from the book, “Create Your Own Future”, and evaluate them using Jensen’s approach of “The 7 Stages of Brain-Based Planning”, we compiled the following information corresponding to each stage and the percentage of inclusion in these lessons:

Figure 4: *Percentage of Brain-Based learning present in the Chilean 11th grade coursebook.*



Note. Data derived from Table 7.

Beyond these quantitative findings, qualitative analysis reveals significant pedagogical limitations. Pre-reading activities, while including brainstorming and prediction strategies, demonstrate two critical weaknesses: lack of connection to learners' personal experiences and excessive repetition across lessons, with only superficial topic variations differentiating otherwise identical tasks.

While-reading tasks focus predominantly on vocabulary and grammar rather than comprehension, rarely achieving the cognitive depth Jensen advocates. Post-reading stages offer more variety, with half including reflective discussion, yet provide insufficient time for incubation and memory encoding.

To Saavedra (2001), education based on the brain involves two important commands: To design enriching and appropriated experiences that are similar to learners' lives, and to ensure that

students' process the experience in such way to boost the possibility to extract the meaning of it.

In this case, both commands are not being applied optimally.

CHAPTER III: ORGANIZATION OF THE BOOKLET

To design Brain-Based Learning (BBL) lesson plans that enhance reading comprehension, it is crucial to establish a direct connection between the 7 stages of lesson planning and the 12 brain principles that are present in each one. By linking each stage with each principle, we are able to align the theory together with practice and later application. Also, it is important to engage different parts of the students' brain to make it compatible with the classroom experience. The book used for this analysis and improvement is the 2023 edition of the English coursebook "Create Your Own Future" by MINEDUC for Chilean EFL students in 11th grade. The units selected together with their names and themes are illustrated in table 6.

Table 6

11th Grade units from "Create Your Own Future"

Unit	Theme
Unit 1: What makes us succeed?	Discuss and debate about success, competition, collaboration, and acts of kindness.
Unit 2: Why is media literacy important?	Discuss the critical significance of discerning and evaluating the information sourced from online platforms and social media.
Unit 3: How do languages shape our world?	Discuss and debate about language, different worldviews, culture, and non-verbal communication.
Unit 4: What impact do trends have?	Discuss and debate about social media, fashion, trends, and their influence on us and our society.

In table 7, a correlation between the brain-based learning stages and the 12 principles is made. This, in order to simplify what aspects are relevant to pay attention to and to make sure that

during the lessons, with a focus on BBL, they comply with at least one of the principles proposed by Jensen.

Table 7

Relation between Brain-Based Lesson Stages and the 12 Principles.

BBL Stage	Relevant BBL Principle
1. Pre-Exposure	<p>N°3: Engage attention through novelty or emotional connection and present core learning content.</p> <p>N°4: The search for meaning occurs through patterning.</p> <p>N°7: Learning involves both focused attention and peripheral perception.</p>
2. Preparation	<p>N°3: Engage attention through novelty or emotional connection and present core learning content.</p> <p>N°5: Emotions are critical to patterning.</p> <p>N°11: Learning is enhanced by challenge and inhibited by threat.</p>
3. Initiation and Acquisition	<p>N°1: The brain is a parallel processor.</p> <p>N°2: Learning engages the entire physiology.</p> <p>N°4: The search for meaning occurs through patterning.</p> <p>N°9: We have at least two types of memory: spatial and rote.</p>
4. Elaboration	<p>N°6: Every brain simultaneously perceives and creates parts and wholes.</p>

	<p>N°10: The brain best understands and remembers when facts are embedded in context.</p> <p>N°12: Each brain is uniquely organized.</p>
5. Incubation and Memory Encoding	<p>N°8: Learning always involves conscious and unconscious processes.</p> <p>N°9: We have at least two types of memory: spatial and rote.</p> <p>N°10: The brain best understands and remembers when facts are embedded in context.</p>
6. Verification and Confidence Check	<p>N°9: We have at least two types of memory: spatial and rote.</p> <p>N°11: Learning is enhanced by challenge and inhibited by threat.</p> <p>N°12: Each brain is uniquely organized.</p>
7. Celebration and Integration	<p>N°5: Emotions are critical to patterning.</p> <p>N°6: Every brain simultaneously perceives and creates parts and wholes.</p> <p>N°12: Each brain is uniquely organized.</p>

Table 7 illustrates the alignment between Jensen's (2008) seven BBL stages and the 12 brain-based learning principles, demonstrating how these principles can be systematically integrated within each stage.

Reading lessons traditionally follow pre-, while-, and post-reading stages. Table 8 organizes BBL stages within this framework to provide a practical lesson planning structure.

Table 8

Relation between the reading stages and the BBL lesson stages.

Reading stage	BBL Stage (Jensen, 2008)
Pre-	<ol style="list-style-type: none"> 1. Pre-Exposure 2. Preparation 3. Initiation and Acquisition
While-	<ol style="list-style-type: none"> 4. Elaboration 5. Incubation And Memory Encoding
Post-	<ol style="list-style-type: none"> 6. Verification and Confidence Check 7. Celebration and Integration

Table 8, as mentioned above, illustrates the link between the traditional stages of reading comprehension, pre-reading, while-reading and post-reading, and the seven stages of Brain-based learning (BBL) proposed by Eric Jensen (2008). Firstly, in the pre-reading stage, learners are prepared to cognitively and emotionally engage with the text, and to prepare the brain for new input. This aligns with the BBL stages of Pre-exposure, Preparation, and Initiation and Acquisition, since during these phases students are gradually introduced to the topic, activating prior knowledge and establishing learning goals. For example, activities like brainstorming, creating predictions, or setting purposes for reading promote curiosity and establish connections, making the brain more receptive to new information.

Secondly, the while-reading stage encompasses the Elaboration, and Incubation and Memory Encoding Brain-based learning stages, since in the former stage students must actively engage with the text by identifying key ideas, and constructing meaning, which directly relates to deepening their understanding of the text and reflect on it, the main ideas of the Elaboration and the Incubation and Memory Encoding stages.

Finally, the post-reading stage aligns with the BBL stages of Verification and Confidence Check, and Celebration and Integration. At this point, students reflect on what they have learned, evaluate their understanding, and apply their knowledge in meaningful ways. For instance, activities that involve designing, producing, or creating, as well as tasks related to questioning, unguided reflection, and discussions help verifying comprehension and give students a sense of closure and achievement, reinforcing long-term learning.

This integration of reading instruction with BBL stages provides a structured but flexible framework that maximizes students' engagement and comprehension, while also considering their cognitive processes, helping teachers to deliver a more effective lesson that is compatible with how students learn best.

Table 9 refines this framework by integrating Jensen's BBL stages with Sousa's reading strategies and Tate's formative assessment activities. The activities in the booklet are designed accordingly to this.

Table 9

Application of Brain-Based Strategies and Activities in Pre-, While-, and Post-Reading Stages.

Reading Stage	BBL Lesson Stages (Jensen, 2008)	BBL Reading Comprehension Strategies (Sousa, 2024)	BBL Formative Assessment Activities (Tate, 2016)
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Pre-	<p>1. Pre-exposure:</p> <ul style="list-style-type: none"> • Post an overview of the new topic. • Teach learning-to-learn skills and memory strategies. • Encourage good brain nutrition. • Model and practice coping, self-esteem, and life skills. • Create a strong immersion learning environment. • Consider time-of-day brain cycles. • Discover students' interests and background. • Learners set their own goals. • Post many colorful peripherals. • Plan brain “wake-ups” every hour. • Plan movement-based activities. • State strong positive expectations, and 	<ul style="list-style-type: none"> • Activating prior knowledge (e.g., K-W-L charts, brainstorming). • Pre-teaching key vocabulary. • Using visual prompts (pictures, charts, video clips). • Predictive questioning (encouraging predictions based on titles/headings). • Setting reading objectives and goals. • Building context through discussion or storytelling. • Relating new material to personal experiences. 	<ul style="list-style-type: none"> • KWL Chart. • Expect Greatness. • What is your interest? • Ways of knowing. • Listen to the Music. • A picture is Worth a Thousand Words. • Entrance Slips. • Writing on the Wall. • Alphabet Book. • Three-Corner Preassessment. • I Know/ I Don't Know. • SQ3R Technique.
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	<p>allow learners to voice theirs.</p> <ul style="list-style-type: none">• Build strong positive rapport with learners.• Read your students' learning states, and make any adjustments. <p>2. Preparation:</p> <ul style="list-style-type: none">• Create realistic, immersive learning situations.• Provide the purpose of learning the topic.• Help students connect the topic to their own lives.• Use real objects, field trips, or guest speakers.• Let students express how the topic relates to them.• Provide a "hook," or a surprise to engage learners' emotions. <p>3. Initiation and Acquisition:</p> <ul style="list-style-type: none">• Provide concrete learning experiences.		
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	<ul style="list-style-type: none"> • Provide activities that employ multiple intelligences. • Assign creative group projects. • Add skits, ads, or school media productions. • Provide choices to match different learning styles. • A well-designed computer program can be helpful at this stage. 		
While-	<p>4. Elaboration:</p> <ul style="list-style-type: none"> • Provide an open-ended debriefing of the previous activity. • Tie things together. • Learners design an evaluation procedure or rubric for their own learning. • Learners explore the topic online or at the library. • Watch a video, slides, or theatrical 	<ul style="list-style-type: none"> • Chunking texts into manageable sections. • Guided reading with annotation or highlighting. • Think-alouds (teacher modeling of thought processes). • Reciprocal teaching (students alternate summarizing, 	<ul style="list-style-type: none"> • KWL Chart (Revisited). • Sponge it Up. • Levels of Questioning. • Choral Responses. • Opportunities to Respond. • Volunteers Versus Non-volunteers. • Wait for Me! • Wait Some More! • Help Is on the Way.

	<p>production on the topic.</p> <ul style="list-style-type: none"> • Stimulate small-group discussions. • Create individual or group mind maps. • Hold a school forum, debate, essay contest, or panel discussion. • Hold a question-and-answer period. • Have students do the teaching. <p>5. Incubation and Memory Encoding:</p> <ul style="list-style-type: none"> • Provide time for unguided reflection. • Learners keep a journal of their learning. • Learners pair to discuss the topic. • Provide stretching and relaxation exercises. • Provide a music-listening area. • Ask learners to discuss new learning with their family and friends. 	<p>questioning, clarifying).</p> <ul style="list-style-type: none"> • Using graphic organizers (e.g., story maps, cause-effect diagrams). • Pausing for clarification and summarization during reading. • Encouraging notetaking or margin comments. • Multisensory engagement (e.g., read-aloud combined with visuals). 	<ul style="list-style-type: none"> • How Do you know that? • Show Me. • Write it Down. • Quick Writes. • Responding Electronically. • Partner with Me. • Finger Feedback. • Help me, please! • Sticky Stuff. • It's all about the hands. • Draw It. • Move it! Move it! • Graphic Organizers. • Socratic Seminars. • Read it Closely. • Solve it! • Project-Based Learning. • What did I learn?
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Post-	<p>6. Verification and Confidence Check:</p> <ul style="list-style-type: none"> • Have learners present their learning to others. • Ask students to interview and evaluate each other. • Encourage students to write about what they've learned. • Have students demonstrate learning with a project. • Let students present a role-play, a skit, or a theatrical performance. • Quiz students (verbally and/or in writing). <p>7. Celebration and Integration:</p> <ul style="list-style-type: none"> • Have a class toast. • Provide sharing time. • Play music, hang streamers, and blow horns. 	<ul style="list-style-type: none"> • Summarization through verbal or written activities. • Reflection journals or learning logs. • Socratic discussions or debate. • Application projects (e.g., presentations, creative writing). • Retrieval practice (quizzes, quick-recall games). • Graphic organizers for reviewing key concepts. • Connecting the reading to broader themes or real-life situations. • Group discussions for clarification and reinforcement. 	<ul style="list-style-type: none"> • KWL Chart (Revisited). • Boggle. • Carousel. • Draw it! • Acrostic Topic Activity. • Act it out! • Toss Me the Ball. • Three-Two-One. • Jeopardy! • Frayer Model. • What's on the Test?
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	<ul style="list-style-type: none"> • Invite another class, parents, the principal, or community guests in to view projects. • Facilitate a class-designed and -produced celebration party. • Incorporate new learning in future lessons. If it's not important enough to refer to in the future, don't waste time on it to begin with. 		
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Table 9 illustrates a summary of the fundamental strategies associated with Brain-based lesson planning, reading comprehension, and assessment for learning, according to what has been stated previously by Jensen (2008), Sousa (2024), and Tate (2016) respectively. This table will serve as a guide to incorporate activities and strategies accordingly to all three stages of reading comprehension-centered lessons: pre-reading, while-reading, and post-reading.

3.1 Reading booklet: MIND & MEANING

The booklet *Mind & Meaning* represents the central pedagogical contribution of this thesis, addressing the need for more engaging, diversified, and cognitively aligned reading comprehension activities in the Chilean EFL setting. The booklet seeks to address the limitations identified during the analysis of the coursebook *Create Your Own Future* (2023) where reading

lessons relied heavily on traditional and repetitive activities that do not take into consideration learners' interests, emotional involvement, or diversity in cognitive styles. In contrast, *Mind & Meaning* suggests an alternative approach grounded on Brain-based Learning, offering a set of redesigned activities that enhance meaningful learning aligned with natural cognitive processes.

Responding to both theoretical foundations and documented classroom needs, this booklet provides a practical solution for 11th-grade reading instruction. It contains four units with three lessons each—a full academic year of materials.

The introductory section presents the theoretical framework and learning objectives underlying each unit. The student version contains all reading texts and activities, while the teacher edition includes corresponding pedagogical guidance and theoretical justification. Selected units offer alternative activities to allow instructional flexibility. A templates section at the end provides supplementary materials for easy reference.

CONCLUSIONS AND REFLECTIONS

Reading comprehension remains a crucial skill in the Chilean EFL context, not only because it enables access to academic content but also because it supports the development of critical thinking and independent learning. In the classroom, however, opportunities for student-centered and cognitively meaningful reading experiences are often limited and less likely to occur. This situation underscores the need to reconsider how reading is taught and to explore methodological approaches that better support how students naturally learn. For this reason, improving the quality and relevance of reading instruction becomes an essential task for educators. Additionally, reading was selected as the focus of this project because it is the most consistently represented skill in MINEDUC textbooks; even lessons that emphasize other skills frequently incorporate reading passages. This prominence confirms the central role of reading comprehension in EFL learning and its influence on students' general language growth.

The analysis of the MINEDUC textbook *Create Your Own Future* revealed a gap between national curriculum intentions and the pedagogical practices suggested by the material. Although reading activities occupy an important place in the book, most of them rely on repetitive, traditional tasks that do not fully reflect how students naturally learn. This inconsistency becomes especially relevant considering that teachers heavily depend on these materials for planning. Consequently, a persistent challenge is revealed: teachers are expected to deliver dynamic, student-centered lessons, but the materials available often fall short in supporting such practices.

In response to this problem, the present thesis developed *Mind & Meaning*, a classroom-ready booklet that redesigns four textbook units through Brain-Based Learning (BBL). Grounded in the principles of Caine and Caine (1991), the instructional stages by Jensen (2008), the reading strategies described by Sousa (2024), and the formative assessment promoted by

Tate (2016), the booklet offers activities that integrate core BBL elements such as prior knowledge activation, collaboration, emotional engagement, multisensory input, and meaningful patterning. The contribution of this product lies not only in providing alternative activities but in bridging the gap between neuroscience-informed theory and everyday EFL pedagogy. In this sense, the project offers a resource that Chilean pre-service and in-service teachers can apply directly in their classrooms without requiring extensive additional training.

At the same time, the booklet was conceived as a flexible resource that acknowledges the diversity of Chilean classrooms. Its lessons are structured so teachers can adjust them according to their students' needs, school contexts, and personal teaching styles. This responsiveness aligns with a central principle of BBL, which recognizes that every learner has a unique cognitive profile, and that effective instruction must honor such individuality. Moreover, several of the strategies included may already be familiar to teachers; the booklet therefore not only offers new alternatives but also deepens understanding of why these practices are effective in EFL settings and how they can be intentionally applied within a brain-compatible framework. Rather than prescribing a rigid sequence, *Mind & Meaning* offers a flexible structure that teachers can adapt, extend, or simplify while remaining aligned with BBL principles.

Throughout the process of designing the booklet, we also developed a deeper understanding of how pedagogical decisions directly shape students' opportunities to make meaning. Working with BBL theory required us to reinterpret well-known classroom techniques through a lens that prioritizes purposeful organization and attends to learners' cognitive and affective processes, reinforcing our capacity to make informed instructional choices based on how students process and apply new information. In the end, this process

highlighted the importance of aligning classroom practices with how the brain naturally learns and positioned the design of *Mind & Meaning* as a formative stage in our development as future English teachers.

Overall, this project reaffirms that reading instruction does not need to rely solely on conventional comprehension questions or linear text analysis. By incorporating BBL strategies in lesson design, teachers can promote deeper engagement and more memorable learning experiences. The value of this project also lies in the pathways it creates for further development. Future initiatives could include expanding the booklet, piloting it in real classrooms to gather evidence of its impact, or using it as a resource for teacher training focused on BBL practices.

Finally, this research emphasizes the importance of continually updating pedagogical approaches in the EFL classroom. *Mind & Meaning* is offered not as a definitive solution, but as an invitation for educators to reflect, experiment, and innovate—keeping students at the heart of every instructional decision and ensuring that reading comprehension becomes not only a skill to be assessed, but a meaningful experience to be embraced.

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