

Learning Transfer in English as Additional Language: Literature Study on Teaching Mechanisms and Learning Conditions

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Abstract

The present article explores effective teaching mechanisms and essential learning conditions considered to promote knowledge transfer in the context of English as an Additional Language (EAL). Two systematic literature searches were conducted—one which targeted teaching mechanisms and the other which aimed at learning conditions both reinforcing EAL knowledge transfer. From an early set of 281 articles derived from five selected academic databases, 40 met the inclusion criteria and, after the application of exclusion criteria, they were analyzed in depth. The Content and Language Integrated Learning (CLIL) approach appeared as an especially promising framework for EAL instruction, with Hugging and Bridging identified as pivotal teaching mechanisms assisting transfer. Learning conditions considered to strengthen transfer included authenticity, collaboration, and reflective practice. These findings are combined into an instructional design model for EAL transfer, with practical guidelines discussed for EAL classroom implementation.

Keywords: Learning Transfer, Near and far Transfer, Hugging and Bridging, English as Additional Language, Content and Language Integrated Learning

1. Introduction

English as an Additional Language (EAL) refers to English learners whose first language is not English, who often come from diverse linguistic, cultural and educational backgrounds (Demie & Lewis, 2018; Hall, 2018), and who have various levels of EAL mastery. Research on

knowledge transfer (e.g., Cumming, 2022; Radovic et al., 2021; Alexandrowicz, 2020; Tinkler et al., 2019) proposes that continuous learning occurs when students are directed to connect new knowledge with existing learning across contexts. As regards EAL instruction, James (2006) underpins the fact that one of its profound aims is to facilitate learners in applying classroom knowledge to real-life situations. One such example of class learning implementation to life like events, practiced in an EAL lesson, can be students' engagement in an English conversation regarding democratic systems especially when visiting a different country. In relation to knowledge transfer, Salomon and Perkins (1989) also described the renowned phenomenon of Transfer Paradox, underlying that transfer of knowledge is not automatic; rather, it requires intentional teaching and contributive learning conditions (Perkins & Salomon, 1988). This literature review aspires to evidence which mechanisms and conditions are most effective in enabling transfer in EAL learning environments.

In connection to knowledge transfer from educational to real life contexts as well as to the aforementioned Transfer Paradox, this literature review identifies both *teaching mechanisms* and *learning conditions* that conduce to the occurrence of transfer, leveraging studies by, initially, Salomon and Perkins (1988) and later on by Gilmore (2007), Morrison and Navarro (2012), James (2014), Green (2015), Dukewich and Vossen (2015), Leberman, McDonald and Doyle (2016), Jacomard and Kuuse (2016), Scharf et al. (2017), and Tseng and Yeh (2019). Specifically, it asserts that effective EAL instruction depends on the integration of teaching mechanisms with appropriate learning conditions to foster transfer from CLIL-based lessons towards various academic disciplines and/or the actual world. This perception sets the premises of an instructional design model for fostering transfer in EAL, which is presented later in the article. Following section outlines the theoretical framework of this literature review, including the notions of near and far transfer (subsection 1.1.), teaching mechanisms (1.2.), the CLIL approach (1.3.), and our research questions (1.4.).

1.1. Near and Far Transfer

Perkins and Salomon (1992) distinguished between *near* (or *low-road*) and *far* (or *high-road*) transfer. They defined near transfer as the application of new knowledge in similar, closely related environments. In contrast, far transfer requires the implementation of learning in different or less familiar contexts, often demanding deeper cognitive endeavor. Mentioned researchers defined positive transfer as the situation in which prior learning enhances performance in a novel but different context, whereas negative transfer occurs when performance is impeded (Perkins & Salomon, 2012) in that new environment of application. Literature emphasizes that combining various teaching mechanisms increases the likelihood of positive transfer. Similarly, learners often acquire related more easily than unrelated languages, while students' linguistic and cultural differences can sometimes cause circumstances of language interference during EAL acquisition (Bai & Qin, 2018).

1.2. Teaching Mechanisms for Transfer

Two far ranging categories of teaching mechanisms, namely *Hugging* and *Bridging*, are expected to actualize learning transfer. They also conform with low-road and high-road transfer, respectively. *Hugging* aims at practicing skills similar to original learning environments, triggering drilled responses. For instance, an EAL teacher might use web 2.0 tools (e.g., h5p, Socrative, Learning Apps or other) to empower linguistic (vocabulary/grammar/syntax) awareness. Sequential discussion of quiz results in online discussion forums, in blended/online programs, are anticipated to advance collaborative practices (Hollister et al., 2022).

In contrast to the *Hugging* teaching mechanism, *Bridging* entails deeper cognitive involvement through abstraction (i.e., keeping the general elements of new learning) and generalization (i.e., visualizing alternative applications of new knowledge). In the context of the activity described above, teachers might choose to ask students to create a quiz and insert their own devised language activities, which they will later discuss online or face-to-face in class. This task requires students to ‘bridge’ (connect) prior knowledge with new learning, most probably through peer collaboration. It should be noted, at this point, that both *Hugging* and *Bridging* mechanisms can be applied in face-to-face, blended, or totally online learning environments—for instance, including video conferencing (Hollister et al., 2022; Gherhes et al., 2021).

1.3. The CLIL Approach to EAL Education

Content and Language Integrated Learning (CLIL) is a renowned, acknowledged and effective approach in additional language education. It involves teaching content—such as Geography or History—through a different language from that normally used for school teaching, providing a purposeful and stimulating setting for language acquisition (Coyle, 2005; Marsh, 2002). Originally devised for very specific disciplines like Mathematics (a "hard" CLIL version), the approach has unfolded into a newer model (a "soft" CLIL type) more aligned with EAL instruction. This softer kind of CLIL highlights cross disciplinary topics and general content fields, using English to explore various themes rather than teaching traditional subject matter itself (McDowell, 2020). Softer CLIL-based EAL instruction enables students to explore life like topics such as climate change or public health from various academic perspectives while concurrently developing their English language skills (Zeeshan et al., 2022). The rich context created through the soft CLIL approach to EAL teaching reinforces the cognitive adaptability required for far transfer, placing it as a fundamental component of the instructional design framework suggested in this study.

1.4. Research Questions

To empower knowledge transfer, EAL instruction must assist students in applying knowledge across various fields—from the classroom to wider academic or real-life contexts. Keeping this objective in mind, the study explores both effective teaching strategies and learning conditions deemed necessary for transfer. The main research questions are:

1. *Which teaching mechanisms should be integrated in EAL instruction to facilitate knowledge transfer?*
2. *Which learning conditions should be incorporated in EAL instruction to promote knowledge transfer?*

The following sections will elaborate on the method used to select and examine relevant literature. Findings are presented in two results sections respectively—one addressing teaching mechanisms and the other learning conditions, both in combination with related factors for transfer. The article concludes with a proposed instructional model and a discussion of guidelines for EAL practice.

2. Method

This literature study applied qualitative research methods, specifically a bibliographic survey and a document analysis to explore existing knowledge on transfer in English as Additional Language (EAL). In contrast to grounded theory, our analysis of literature did not follow the inductive approach of generating theory directly from data. Instead, a thematic focus on teaching mechanisms and learning conditions for transfer was decided in advance, based on prior research and enabling the identification of related factors for transfer (Torraco, 2016, p. 12). By applying this focus on our literature study, each article was selected and analyzed on the way and extent to which it addressed teaching mechanisms, learning conditions or related factors for transfer, and findings were classified according to these predetermined categories. When findings related to more categories, these findings were allotted to each for within category comparison. The systematic literature review was conducted in two parts: one search on EAL knowledge transfer and teaching mechanisms (subsection 2.1.) and a second search on EAL knowledge transfer and learning conditions (subsection 2.2.). Finally, our literature review study analyzed in more detail forty selected articles, of which one half focused on teaching mechanisms (and related factors), and another half focused on learning conditions (and related factors) that facilitate knowledge transfer. For the list of forty articles that were finally selected and studied in detail, see Appendix 3 “List of selected and reviewed articles”.

2.1. Search on Learning Transfer and Teaching Mechanisms

To locate relevant studies addressing knowledge transfer and teaching mechanisms, five major electronic databases were searched: EBSCO, ERIC, PsycINFO, Scopus, and JSTOR. The

following keywords for searching relevant literature were used: "Learning Transfer", "Training Transfer", "Near Transfer", "Far Transfer", "Online Learning", "EAL", and "Teaching Mechanisms". In addition to the database search, a technique known as bibliographic branching was also exploited. This technique involved the analysis of the reference lists of initially selected publications to identify further relevant sources (Andrés, 2009). Furthermore, inclusion criteria for article selection were: (a) The publication of the selected articles should fall between 1995 and 2024, and (b) Articles should contain empirical data on transfer and instructional practices. Two underlying studies were included although they had been published before 1995: Baldwin and Ford (1988) on transfer in professional training environments, and Salomon and Perkins (1989) on teaching mechanisms. There was only one exclusion criterion in this case: Articles which focused exclusively on knowledge transfer in the workplace, without reference to teaching practices, were excluded (see Table 1). The primary database literature search rendered 121 potentially relevant articles from these five, well-known databases. An additional 57 were identified through bibliographic branching, resulting in a combined total of 178 articles. After applying inclusion criteria, 21 articles were maintained. One article was excluded based on the sole exclusion criterion, leaving 20 articles for a more comprehensive analysis.

Table 1. Articles retrieved on teaching mechanisms and EAL learning transfer

| Databases searched | Articles identified after search | Articles identified after inclusion criteria | Articles identified after exclusion criteria |
|--------------------------------|---|---|---|
| EBSCO | 50 | 10 | 10 |
| ERIC | 11 | 2 | 1 |
| PsychInfo | 14 | 4 | 4 |
| Scopus | 31 | 1 | 2 |
| JStor | 15 | 1 | 4 |
| Initial search | 121 | 18 | 21 |
| Bibliographic branching/survey | 57 | 3 | 1 |
| Total | 178 | 21 | 20 |

2.2. Search on learning Transfer and Learning Conditions

A similar protocol was followed for the second literature review, which focused on learning conditions likely to strengthen EAL transfer. The same five databases were searched using the following group of keywords: "Learning Transfer", "Training Transfer", "Near Transfer", "Far

Transfer", "Online Learning", "EAL", and "Learning Conditions". Inclusion criteria remained the same. Nonetheless, a different exclusion criterion was applied: articles on learning conditions for teaching content subjects (e.g., Biology) in languages other than English were excluded (see Table 2). The preliminary search traced 69 articles, with an additional 34 retrieved through bibliographic branching. After applying inclusion and exclusion criteria, 20 articles were sustained for a more thorough analysis.

Table 2. Articles retrieved learning conditions and EAL learning transfer

| Databases searched | Articles Identified after search | Articles Identified after inclusion criteria | Articles Identified after exclusion criteria |
|--------------------------------|---|---|---|
| EBSCO host | 7 | 3 | 3 |
| ERIC | 24 | 3 | 2 |
| PsychInfo | 9 | 3 | 7 |
| Scopus | 15 | 6 | 6 |
| JStor | 14 | 3 | 3 |
| Initial search | 69 | 18 | 21 |
| Bibliographic branching/survey | 34 | 3 | 1 |
| Total | 103 | 21 | 20 |

3. Results

Both literature searches and document analyses have yielded some findings on teaching mechanisms (subsection 3.1.) and learning conditions (subsection 3.2.). Based on these main findings, an Instructional Design model for EAL transfer will be presented (subsection 3.3.).

3.1. Findings On Teaching Mechanisms for EAL Learning Transfer

A detailed analysis of twenty selected studies rendered relevant findings regarding effective teaching mechanisms, considered to empower knowledge transfer in English as Additional Language (EAL) learning environments. These findings are organized into two principal areas: retrieved teaching mechanisms that promote transfer (third level section 3.1.1.), and related factors that support such transfer when applying these mechanisms (third level section 3.1.1). For a summary, see Appendix 1 "Findings on teaching mechanisms for EAL Transfer" and Appendix 3 "List of selected and reviewed articles".

Researchers have underpinned the fact that knowledge transfer is a complex procedure entailing both task-specific and generalizable knowledge and skills. These conduce respectively to learning performance in familiar and less familiar learning contexts (Kirschner & Van Merriënboer, 2008). Academics who have overtly, over the years, criticized contextualized, highly specific learning, such as Opfer and Thomson (2008), and Brent (2011), underscore the necessity for instructional approaches that advocate abstraction (i.e. application of general elements of new learning to different contexts) as well as wider applicability. Learners should be urged to visualize how their learning can be applied across various contexts to facilitate transfer.

3.1.1. Teaching Mechanisms Promoting Learning Transfer

Teaching mechanisms must both integrate low-road transfer, grounded in repetitive practice, and high-road transfer which involves metacognitive practices (Salomon & Perkins, 1989). James (2024) further elaborated on transfer across contexts, highlighting the differences in purpose, topic, time, and setting expected to play a preeminent role in the occurrence of knowledge transfer. Recent work by Shurovi et al. (2025) also underlined the significance of learner motivation in adjusting to novel situations as when students are interested in interacting by means of an additional language for study, job or travel related purposes. Hugging and Bridging, primarily studied in EAL contexts by James (2014), have been designated as vital mechanisms for the occurrence of knowledge transfer (Grossman & Salas, 2011) through techniques like setting an expectation (Hugging) for the use of an additional language as well as applying that new learning in a different context such as in travel (Bridging). Further studies include Kassab's (2021) empirical analysis of English for Specific Purposes (ESAP) student writing, which showed frequent near transfer but limited evidence of far transfer. Similarly, Benton and Saunders (2018) found that the implementation of Hugging and Bridging techniques in Math classes, for instance, improved students' commitment and nuanced understanding.

Hugging entails the creation of opportunities for students to continually engage with new knowledge through authentic, problem-based tasks. Techniques include teacher-facilitated discussions, peer discussion forums, and modeling the use of real-world examples (James, 2006). Hugging exploits the utilization of the lower levels of Bloom's Taxonomy namely *Remembering* (recalling prior knowledge), *Understanding* (interpreting new ideas), and *Applying* (using prior knowledge in familiar settings). *Bridging*, conversely, urges learners to purposefully abstract and generalize knowledge. This includes imagining novel applications for existing learning, comparing new with familiar situations, and recognizing language patterns or connections. Digital tools such as video sharing, multimedia platforms, and social media can enhance these procedures by situating learning in different, future-focused contexts (Haleem et al., 2022).

Generalization, a technique discussed by Bereiter (1995) and James (2006; 2014), was discovered to be particularly effective in assisting EAL students' transfer knowledge from Content and Language Integrated Learning (CLIL) contexts to other subjects and real-life applications (Holton et al., 2010). Effective generalization typically begins with presenting concepts in multiple, varied contexts, and often incorporates the use of *analogy* to bridge prior and new knowledge through the discovery of similarities and differences between them (Bereiter, 1995). In addition, metacognitive practices, which engage learners in planning, monitoring, reflecting, and evaluating their progress, are meant to contribute to far transfer. *Bridging*, therefore, aligns with Bloom's higher-order cognitive levels namely Analyzing (breaking down information, identifying relationships), Evaluating (criticizing or justifying decisions), and Creating (generating new outputs based on integrated knowledge).

3.1.2. Related Factors Influencing Teaching Mechanisms for EAL Learning Transfer

Some related factors were revealed in alignment with teaching mechanisms for knowledge transfer in EAL learning environments. These factors comprise learner characteristics, instructional strategies, content and contextual influences.

Learner Characteristics. A profound student related factor is the ability to transfer previous learning to new and less familiar contexts (Fauth & Gonzalez, 2021). Three studies (Marini & Generaux, 1995; Barnett & Ceci, 2002; Cecilio-Fernandes et al., 2024) recognized learners' self-efficacy, their belief to succeed in specific tasks, as significantly contributing to knowledge transfer.

Instructional Strategies. Instructional practices essentially influence transfer results. Effective teaching strategies entail stimulating *understanding* over memorization, especially when working on real-world tasks in collaborative settings (Grossman & Salas, 2011; Green, 2015; Leberman, McDonald & Doyle, 2016). Use of *multiple learning contexts*—both in and outside the classroom—has been rendered as crucial for advancing transfer (Chang & Garcia, 2023; James, 2014; Bransford & Schwartz, 1999). For example, Dhawan (2020) emphasized how collaborative and blended learning environments, such as forum discussions, facilitate generalization skills by encouraging exploration and interaction.

Content and Contextual Factors. The nature of what is being transferred (content) and the setting in which transfer occurs (context) were found as vital related transfer factors as well. They were noted in several studies (Cecilio-Fernandes et al., 2024; Brion, 2022; Ozverir et al., 2017; Fauth & Gonzalez, 2021). The use of *situated learning*, integrating EAL tasks in real-life contexts, has been indicated to increase pertinence and practicality (Lobato, 2006). Additionally, instructional designs which provide *authentic materials* (Brion, 2022; Green, 2015; Burke & Hutchins, 2007) consider *cultural relevance* (Ford & Weissbein, 1997). Some encourage *problem-based* and *experiential learning* (Radovic et al., 2021) as especially

effective in establishing knowledge transfer. A particularly impactful technique is *explicit modeling*, in which teachers clearly demonstrate desired knowledge and skills (Okunlola, 2023).

3.2. Findings on Learning Conditions for EAL Transfer

A detailed analysis of the twenty selected articles on learning conditions for EAL knowledge transfer revealed some important learning conditions and related factors. These conditions and factors can range from contextual and instructional factors to learning and content characteristics. For a summary, see Appendix 2 “Findings on learning conditions for EAL Transfer” and Appendix 3 “List of selected and reviewed articles”.

3.2.1. Learning Conditions Supporting EAL Transfer

Two essential learning conditions consistently retrieved from the review were: a) *Task Authenticity* according to which learning tasks must be relevant and mirror real-life applications (Anagnostopoulou et al., 2023; Gilmore, 2007; Herrington, 2006) and b) *Reflection* which promotes the idea that deep thinking through self-monitoring and self-regulation empowers the cultivation of metacognitive skills thus fostering learning transfer (Oxford, 1997; Coleman et al., 2024; Rothe & Schöneburg-Lehnert, 2022). Reflection also plays a pivotal role in improving learner autonomy and performance. James (2014) placed emphasis on the value of metacognitive practices such as planning, monitoring, and evaluating within collaborative contexts. When peers share and discuss reflections, that encourages critical thinking and facilitates knowledge transfer (Radović et al., 2021).

Collaboration is another profound element of knowledge transfer according to literature. Based on Greeno’s (1998) theory of *situativity*, learning occurs, not in isolation, but, through social interaction. Students can construct meaning when conversing with others, making collaboration a powerful provider of transfer. Kirschner and Kwok-Wing (2007) further stress the benefits of co-constructing knowledge in collaborative teacher-student and peer environments.

3.2.2. Related Factors with Learning Conditions for EAL Learning Transfer

Researchers (Grossman & Salas, 2011; Leberman, 1999; Bereiter, 1995) have pinpointed the fact that learning environments and learner features can alongside mold transfer outcomes. Our analysis confirmed this assertion by deriving from literature the following related factors.

Authentic Materials and Assessment. Real life content and performance-based assessments (e.g., simulations, collaborative presentations) assist students in applying knowledge in meaningful ways (Jacomard & Kuuse, 2016; Gulikers, Bastiaens & Kirschner, 2006) through their involvement with events they will encounter in the real world.

Socio-Cultural Factors. Students can benefit from diverse social environments where communication with peers and teachers enhances commitment in learning and therefore in work contexts later in real life (Alexander & Murphy, 1999; Greeno & Hatano, 1999; Volet, 1999). Organizational engagement to strengthen learning through administrative encouragement, peer feedback, or mentoring also became crucially evident (James, 2024).

Supportive Systems and Motivation. Effective transfer is assisted by systems that encourage new learning, offer feedback, and provide opportunities for peer collaboration (Broad & Newstrom, 1992; Kirkpatrick, 1994; Green, 2015). Motivation from managers or colleagues plays a central role in bolstering and sustaining transfer (James, 2024).

Task-Based Language Teaching (TBLT). Several studies (Baralt & Gomez, 2017; Pica, 2005; Sanchez, 2004) placed emphasis on the value of task-based approaches, where students collaborate on meaningful projects to construct knowledge, an approach shown to enhance transfer outcomes (Hauschild-Mork & Dailey, 2017; Kabilan et al., 2011; Hollister et al., 2022).

3.3. Framework for Fostering Transfer in EAL

Based on the findings of this review, an instructional design model has been designed to promote rich learning/knowledge transfer in EAL contexts (see Figure 1).

The framework highlights the essential teaching mechanisms, *Hugging* and *Bridging* (represented in blue), alongside foundational learning conditions such as *authentic tasks*, *reflective practice*, and *collaborative settings* (shown in pink). Literature suggests that *rich transfer*, interweaving both *low-road* (near) and *high-road* (far) transfer, is most effectively achieved when these mechanisms and conditions are deliberately matched.

Additional impactful factors related to teaching mechanisms (in green) and learning conditions (in orange) were discovered across the reviewed studies. These include learner characteristics, instructional design features, and contextual or socio-cultural supports. All these components contribute to a set of *instructional guidelines* (in yellow), which form the core of the model. This integration supports a holistic approach to fostering transfer in EAL learning environments. When teaching mechanisms like *Hugging* (e.g., drill practice, active engagement) and *Bridging* (e.g., metacognitive reflection, abstraction) are paired with conditions such as authentic learning tasks and peer collaboration, the likelihood of effective and sustainable EAL learning transfer increases significantly (Larsen-Freeman, 2013; Merriam & Caffarella, 1999).

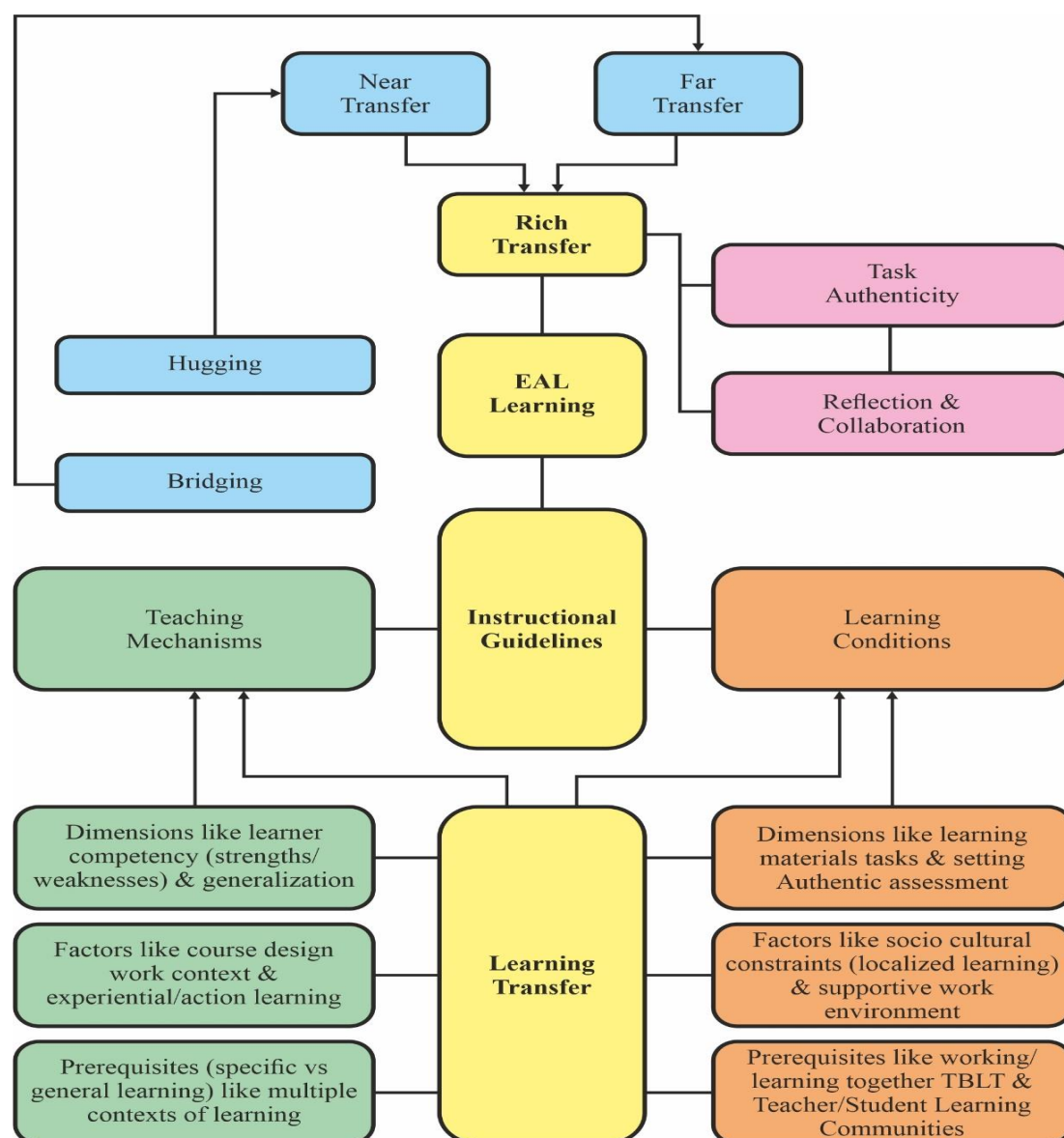


Figure 1. Instructional Design model for EAL Transfer

4. Conclusion and Discussion

4.1. Conclusion

The present literature review examined significant *teaching mechanisms* and *learning conditions* required to foster *rich transfer* in EAL education. A total of forty studies were reviewed, twenty focusing on teaching mechanisms and twenty on learning conditions for transfer in EAL contexts, which also revealed most important related factors. Following main findings could be identified.

Rich transfer in EAL requires the intentional integration of Hugging (low-road) and Bridging (high-road) strategies. These include varied practice, analogy, modeling, and problem-solving.

Effective learning environments are characterized by task authenticity (Herrington, 2006), metacognitive reflection and collaborative engagement which promote self-regulation/self-monitoring and transfer across settings (Coleman et al., 2024). Instructional practices that back up transfer include the design of authentic tasks, space for reflection, and the creation of socio-culturally reactive learning environments. Peer feedback, real-world application, and problem-solving were highlighted as key teaching techniques.

4.2. Discussion

The reviewed literature confirms that both Hugging and Bridging mechanisms are crucial, together with other related factors discovered in literature, for successful EAL learning transfer (e.g., Okunlola, 2023; Leberman et al., 2016). These teaching mechanisms seem particularly effective in the context of the CLIL (Content and Language Integrated Learning) approach to EAL teaching, which mingles language learning with subject content. Strengthening learning conditions containing *task authenticity*, *collaboration*, and *reflection* were evidenced, especially for the assimilation and application of new knowledge across contexts (Radović et al., 2021).

Integrative framework. The EAL Instructional Design Model integrates findings on these mechanisms and conditions, offering a comprehensive framework for both online and blended learning environments. Key components of the aforementioned EAL model also include: Multiple learning contexts (Generalization vs. situated learning); Experiential/Action learning; Managerial factors (e.g., supportive work context to apply transfer training); Learner features (e.g., efficiency/strengths/weaknesses); Collaborative learning environments (e.g., Communities of practice); Authentic learning materials, tasks and settings; and Metacognitive practices (e.g., Reflection/Self-Regulation/Self-Monitoring).

Limitations. This review holds some limitations that future research should address. Specifically, the range of search terms was limited. For example, the results which were derived when using “EAL” and “ESL” as keywords were restricted. The use of broader terms is likely to grasp relevant studies from related fields thus facilitating the potential occurrence of knowledge transfer. Additionally, CLIL was insufficiently represented in spite of showing powerful alignment with effective transfer strategies. Few studies actually addressed CLIL, which should have been used as a keyword in database searches to minimize the possibility of CLIL-related findings to be affected.

Recommendations. Drawing on the literature findings and the EAL Instructional Design Model presented, the following practical guidelines are proposed. First and foremost, the *reinforcement of prior learning* through the application of Hugging strategies (like repetition, modeling, and setting of expectations) to activate learners’ existing knowledge and connect it to new content (James, 2024, 2014, 2006). Second, the *use of generalization* (Bereiter, 1995),

mainly through analogy, exploration of similarities and differences, as well as by means of combining Hugging (e.g., matching techniques) with Bridging (e.g., applying abstract concepts) to assist learners in connecting current learning to future applications. Third, the *promotion of transfer across contexts* (Bransford & Schwarz, 1999) by encouraging learners to generalize knowledge through problem-solving tasks and cross-disciplinary connections (e.g., across school subjects or real-life tasks). Fourth, the *design of authentic and reflective learning tasks* through simulations, role-plays, and performance-based assessments. Integration of reflective activities that require learners to plan, monitor, and evaluate their learning is also suggested (Gilmore, 2007). Fifth, the *reinforcement of meta-cognitive development and collaboration* by means of employing peer interaction in dynamic learning communities where learners can reflect, share strategies, and co-construct knowledge (Kabilan et al, 2017). Sixth, the *provision of multiple learning contexts* by making learners capable of practicing in varied, real-world settings (e.g., workplace environments, online forums, collaborative projects) described by Baralt & Gomez (2017). Seventh and finally, the *incorporation of Socio-Cultural learning support* through the development of assistance-oriented systems including teachers, managers, and peer networks that scaffold learners' transitions and encourage transfer (Hauschild-Mork & Dailey, 2017).

Future empirical research should continue to explore how these teaching mechanisms and learning conditions comply with varied EAL and CLIL contexts. Towards completion of that goal, three experimental studies have already been conducted by authors to control for: Hugging and Bridging as teaching techniques (Anagnostopoulou et al, subm a); Optimal levels of task authenticity (Anagnostopoulou et al, 2023), and most effective levels of reflective practice (Anagnostopoulou et al, subm b). Despite that preliminary experimental findings align with this review, further implementation of teaching mechanisms, learning conditions and related factors across a larger variety of EAL learning contexts, essential for the effective occurrence of knowledge transfer especially within EAL teaching/learning environments, is needed.

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Zeeshan, K., Hämäläinen, T., Neittaanmäki, P. (2022). Internet of Things for Sustainable Smart Education: An Overview. *Sustainability* 14(7), 4293. <https://doi.org/10.3390/su14074293>

Appendix 1*Findings on teaching mechanisms for EAL transfer*

| | Selected articles |
|--|--|
| Teaching mechanisms | |
| Instructional strategies from an EAL perspective | James (2006) |
| Hugging and Bridging teaching mechanisms | James (2014) |
| Automatization (low-road to transfer) through drilled practice | Salomon & Perkins (1989) |
| Mindfulness (high-road to transfer) through techniques like abstraction | Salomon & Perkins (1989) |
| Related factors | |
| Generalization of learning | Bereiter (1995) |
| Socio-cultural dimension (e.g. situated learning) | Lobato (2006) |
| Learners' competency, strengths and weaknesses Feedback | Barnett & Ceci (2002) Marini & Generaux (1995) |
| Tasks using real content, contexts and assessments | Fauth & Gonzalez (2021); Ozverir, Osam, & Herrington (2017) |
| Instructional strategies like Hugging and Bridging in higher education courses | Green (2015) |
| Course design (real-life like content, work context) Similarities and differences between learning situations (analogy) | Burke & Hutchins (2007); Brion (2022); Ford & Weissbein (1997) Okunlola (2023) |
| Deep understanding through problem-solving, explicit modeling of new learning, experiential/action learning | Grossman & Salas (2011); Leberman, McDonald & Doyle (2016); Baldwin & Ford (1988) |
| Specific versus general aspects of learning | Alexander & Murphy (1999) |
| Multiple contexts of learning | Bransford & Schwarz (1999) |
| Learning Transfer and distances | James (2024) |

Appendix 2*Findings on learning conditions for EAL transfer*

| | Selected articles |
|--|--|
| Learning Conditions | |
| Authenticity of tasks | Gilmore (2007) |
| Collaboration (through cognitive processes) | Oxford (1997); Tseng & Yeh (2019); Rothe & Schöneburg-Lehnert (2022). |
| Meta-cognition (Reflection) | Coleman et al (2024); Scharff, Draeger, Verpoorten, Devlin, Dvorakova, Lodge & Smith (2017). |
| Self-Monitoring | Cecilio-Fernandes et al. (2024) Anseel, Lievens, & Schollaert (2009); Dukewich & Vossen (2015) |
| Self-Regulation | Morrison & Navarro (2012) |
| Related factors | |
| Learning environments (e.g. material, tasks and settings) | Jacomard & Kuuse (2016) |
| Authentic assessment through alternative techniques | Gulikers, Bastiaens & Kirschner (2006) |
| Socio-cultural factors (e.g. working together) | Greeno & Hatano (1999) |
| Limitations (e.g. localized vs contextualized learning) | Greeno & Hatano (1999) |
| Learner inclusion in program design | Greeno & Hatano (1999) |
| Supportive work environment | Greeno & Hatano (1999) |
| Construction of knowledge | (Hammond, 2017) |
| Learning with others through new instructional strategies | (Merriam & Leahy, 2005) |
| Task based Language Teaching (TBLT) vs typical language teaching | Baralt & Gomez (2017); Pica (2005); Sanchez (2004) |
| Teacher & Student Learning Communities | (Kabilan, Adlina, & Embi, (2011); Hauschild-Mork & Dailey (2017) |

Appendix 3

List of selected and reviewed articles

| | Teaching Mechanisms | | Learning Conditions |
|----|---|----|--|
| 1. | Alexander, P. A., & Murphy, P. K. (1999). Nurturing the seeds of transfer: a domain-specific perspective. <i>International Journal of Educational Research</i> , 31, 561-576. https://doi.org/10.1016/S0883-0355(99)00024-5 | 1. | Anseel, F., Lievens, F., & Schollaert, E. (2009). Reflection as strategy to enhance task performance after feedback. <i>Organizational Behavior & Human Decision Processes</i> , 110(1), 23-35. https://doi.org/10.1016/j.obhdp.2009.05.003 |
| 2. | Baldwin, T. T., & Ford, J. K. (1988). Transfer of Training: A Review and Directions for Future Research. <i>Personnel Psychology</i> , 41, 63-105. https://doi.org/10.1111/j.1744-6570.1988.tb00632.x | 2. | Baralt, M., & Gomez, J. M. (2017). Task-based language teaching online: A guide for teachers. <i>Language Teaching & Technology Forum</i> , 21(3), 28-43. https://doi.org/10.10125/44630 |
| 3. | Barnett, S. M., & Ceci, J. S. (2002). When and Where Do We Apply What We Learn? A Taxonomy for Far Transfer. <i>Psychological Bulletin</i> , (128)4, 612-637. https://doi.org/10.1037/0033-2909.128.4.612 | 3. | Cecilio-Fernandes, D., Sandars, J., Gianotto Oliveira, R., & Steenhof, N. (2024). Teaching for transfer of learning in health professions education: AMEE Guide No. 176. <i>Medical Teacher</i> , 1-9. https://doi.org/10.1080/0142159X.2024.2414823 |
| 4. | Bereiter, C. (1995). A dispositional view of Transfer. In A. McKeough, J. Lupart, & A. Marini (Eds.), <i>Teaching for Transfer: Fostering Generalization in Learning</i> (pp. 21-34). Lawrence Erlbaum. https://psycnet.apa.org/record/1995-98417-002 | 4. | Coleman, B., D., Bunch, J., C., Roberts, G., Israel, G, D., & Wysocki, A. (2024). The Effects of Reflection and Transfer on Students' Post-Course Retention While Learning Experientially. <i>Journal of Agricultural Education</i> , 65(1), 58-77. https://doi.org/10.5032/jae.v65i1.94 |
| 5. | Bransford, J. D., & Schwartz, D. (1999). Rethinking Transfer: A simple proposal with multiple implications. <i>Review of Research in Education</i> , 24, 61-100. https://doi.org/10.3102/0091732X024001061 | 5. | Dukewich, K. R., & Vossen, D. P. (2015). Toward Accuracy, Depth and Insight: How Reflective Writing Assignments Can Be Used to Address Multiple Learning Objectives in Small and Large Courses. <i>Collected Essays on Learning & Teaching (CELT)</i> , 8, 98-110. https://doi.org/10.22329/ce.lt.v8i0.4258 |

| | Teaching Mechanisms | | Learning Conditions |
|-----|--|-----|---|
| 6. | Brion, C. (2022). Culture: The Link to Learning Transfer. <i>Innovations in Practice</i> , 33(3), 132-137. https://doi.org/10.1177/10451595211007926 | 6. | Gilmore, A. (2007). Authentic materials and authenticity in foreign language learning. <i>Language Teaching</i> , 40(2), 97-118. https://doi.org/10.1017/S0261444807004144 |
| 7. | Burke, L. A., & Hutchins, H. M. (2007). Training Transfer: An Integrative Literature Review. <i>Human Resource Development Review</i> , 6(3), 263-296. https://doi.org/10.1177/1534484307303035 | 7. | Greeno, J. G., & Hatano, G. (1999). Commentary: alternative perspectives on transfer and transfer studies. <i>International Journal of Educational Research</i> , 31, 654-654. https://doi.org/10.1016/S0883-0355(99)00029-4 |
| 8. | Fauth, F., & González-Martínez, J. (2021). On the Concept of Learning Transfer for Continuous and Online Training: A Literature Review. <i>Education Sciences</i> , 11, 133. https://doi.org/10.3390/educsci11030133 | 8. | Gulikers, J. T. M., Bastiaens, Th. J., & Kirschner, P. A. (2006). Authentic assessment, student and teacher perceptions: the practical value of the five dimensional-framework. <i>Journal of Vocational Education and Training</i> , 58, 337-357. https://doi.org/10.1080/13636820600955443 |
| 9. | Ford, J. K., & Weissbein, D. A. (1997). Transfer of Training: An Updated Review and Analysis. <i>Performance Improvement Quarterly</i> , 10(2), 22-41. https://doi.org/10.1111/j.1937-8327.1997.tb00047.x | 9. | Hammond, M. (2017). Online collaboration and cooperation: The recurring importance of evidence, rationale and viability. <i>Education and Information Technologies</i> , 22, 1005-1024. https://doi.org/10.1007/s10639-016-9469-x |
| 10. | Green, J. H. (2015). Teaching for Transfer in EAP: hugging and bridging revisited. <i>English for Specific Purposes</i> , 37, 1-12. https://doi.org/10.1016/j.esp.2014.06.003 | 10. | Hauschild-Mork, M., & Dailey, R. (2017). Making it All Count: A Cross Disciplinary Collaboration Model Incorporating Scholarship, Creative Activity, and Student Engagement. <i>InSight: A Journal of Scholarly Teaching</i> , 12, 64-78. https://insightjournal.park.edu/wp-content/uploads/2020/01/5-Dailey-and-Hauschild-Mork.pdf |
| 11. | Grossman, R., & Salas, E. (2011). The Transfer of Training: What really | 11. | Jacomard, H., & Kuuse, S. (2016). Authenticity in the Language Classroom: A Case Study. |

| | Teaching Mechanisms | | Learning Conditions |
|-----|---|-----|---|
| | Matters. <i>International Journal of Training and development</i> , 15(2), 103-120. https://doi.org/10.1111/j.1468-2419.2011.00373.x | | <i>Journal of Education & Social Policy</i> , 3(2), 23-29. https://www.researchgate.net/publication/317545059 |
| 12. | James, M., A. (2024). Teaching for transfer Of second language learning: A proposed Research agenda. <i>Language Teaching</i> , 1-16. https://doi.org/10.1017/S0261444824000314 | 12. | Kabilan, M. K., Adlina, W. F. W., & Embi, M. A. (2011). Online collaboration of English language teachers for meaningful professional development experiences. <i>English Teaching: Practice and Critique</i> , 10(4), 94-115. https://eric.ed.gov/?id=EJ962608 |
| 13. | James, M., A. (2006). Teaching for Transfer. <i>ELT journal</i> , 60(2), 151-159. https://doi.org/10.1093/elt/cci102 | 13. | Merriam, B. S., & Leahy, B. (2005). Learning Transfer: A Review of the Research in Adult Education and Training. <i>PAACE Journal of Lifelong Learning</i> , 14, 1-24. https://www.semanticscholar.org/paper/Learning-Transfer%3A-A-Review-of-the-Research-in-and/e6db8d7b15ee11321e6d59d67729479d858112d0 |
| 14. | James, M. A. (2014). Learning Transfer in English-for-Academic purposes contexts: A systematic view of research. <i>Journal of English for Academic Purposes</i> , 14, 1-13. https://doi.org/10.1016/j.jeap.2013.10.007 | 14. | Morrison, B. R., & Navarro, D. (2012). Shifting roles: From language teachers to Learning advisors. <i>System Elsevier</i> , 40(3), 349-359. https://doi.org/10.1016/j.system.2012.07.004 |
| 15. | Leberman, S., McDonald, L., & Doyle, S. (2016). <i>The Transfer of Learning. Participants' Perspectives of Adult Education and Training</i> . Routledge. http://ndl.ethernet.edu.et/bitstream/123456789/29563/1/26..pdf | 15. | Oxford, R., L. (1997). Cooperative Learning, Collaborative Learning, and Interaction: Three Communicative Strands in the Language Classroom. <i>The Modern Language Journal</i> , 81(4), 443-456. https://doi.org/10.1111/j.1540-4781.1997.tb05510.x |
| 16. | Lobato, J. (2006). Alternative perspectives on the | 16. | Rothe, J., & Schöneburg-Lehnert, S. (2022). |

| | Teaching Mechanisms | | Learning Conditions |
|-----|--|-----|---|
| | transfer of learning: History, issues, and challenges for future research. <i>Journal of the Learning Sciences</i> , 15(4), 431-449. https://doi.org/10.1207/s15327809jls1504_1 | | Near and far transfer in the flipped mathematics classroom: student's evaluation of learning activities. <i>Twelfth Congress of the European Society for Research in Mathematics Education (CERME12)</i> . Bozen-Bolzano, Italy. https://hal.science/hal-03748979v1 |
| 17. | Marini, A., & Genereux, R. (1995). The challenge of teaching for transfer. In A. McKeough, J. Lupart, & A. Marini (Eds.), <i>Teaching for transfer: fostering generalization in learning</i> (pp. 1-20) Mahwah, NJ: Lawrence Erlbaum. https://awspntest.apa.org/record/1995-98417-001 | 17. | Pica, T. (2005). Classroom Learning, Teaching, and Research: A Task-Based Perspective. <i>The Modern Language Journal</i> , 89(3), 339-352. https://doi.org/10.1111/j.1540-4781.2005.00309.x |
| 18. | Okunlola, J., O. (2023). Learning Transfer in the Workplace: An Insight into the Missing Link in the Education and Training of Employees. <i>Studies in Learning & Teaching</i> , 4(2). https://doi.org/10.46627/silet.v4i2.241 | 18. | Sanchez, A. (2004). The Task-based Approach in Language Teaching. <i>International Journal of English Studies</i> , 4(1), 39-71. https://revistas.um.es/ijes/article/view/48051 |
| 19. | Ozverir, I., Osam, U. V., & Herrington, J. (2017). Investigating the Effects of Authentic Activities on Foreign Language Learning. <i>Educational Technology & Society</i> , 20(4), 261-274. https://www.jstor.org/stable/26229222 | 19. | Scharff, L., Draeger, J., Verpoorten, D., Devlin, M., Dvorakova, L. S., Lodge, J. M., & Smith, S. (2017). Exploring metacognition as support for learning transfer. <i>Teaching & Learning Inquiry</i> , 5(1), 78-91,92. https://doi.org/10.20343/teachlearningqu.5.1.6 |
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