



SECOND LANGUAGE ACQUISITION FROM BEHAVIOURISM TO ARTIFICIAL INTELLIGENCE: A SYSTEMATIC REVIEW

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Abstract

Several decades of research into SLA have not yielded a single universally accepted theoretical framework to explain the complexities involved. The present systematic research paper seeks to synthesize and integrate dominant SLA theories, empirical findings, and ongoing developments in the field, and to identify the shortcomings of present research and future directions. methodology was conducted, which focused on analyzing peer-reviewed journal articles, scholarly books, and conference proceedings published from 2000 to 2025, and seminal texts that have been of critical importance to the SLA field. The collected data were then subjected to thematic analysis. Findings revealed that the learning process of a second language is multidimensional and influenced by a range of linguistic, cognitive, psychological, socio-cultural, and technological factors. Recent findings indicated that comprehensive input, meaningful interaction, learner output, motivation, corrective feedback, cognition, and learning context collectively contribute to successful second language learning. Moreover, computer-assisted language learning (CALL), mobile-assisted learning (MAL), and the use of artificial intelligence have an increasingly significant role in fostering personalized instruction, autonomy of the learner, and the development of authentic communication skills. Finally, the research paper highlighted the requirement for additional interdisciplinary and context-specific research, with a stronger focus on multilingual settings and developing countries. The research paper provided a synthesis of the present understanding of the field of SLA to the broader scholarly community and has practical applications for those involved in second language learning, education, and policy.

Keywords: *Applied Linguistics, Input Hypothesis, Interaction Hypothesis, Language Learning, Second Language Acquisition, Systematic Literature Review.*

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1. Introduction

SLA Second Language Acquisition SLA research has grown substantially and become the field of study that has the greatest impact on L2 pedagogy and on learners themselves. In the global, interconnected world, the movement of people between national boundaries, international education, increased globalized economy, expansion of the internet, communication technology, and widespread dissemination of English as an international language all contributed to greater demand for second language learning and teaching. In other words, an increasing awareness of how a second language is acquired becomes essential to scholars and practitioners in applied linguistics, language education, curriculum development, and public policy. While much has been achieved over several decades of inquiry, no single theoretical framework can provide a satisfactory explanation of SLA due to complex interactions between linguistic, cognitive, psychological, social, and technological factors. In the last half-century, SLA has been influenced by and, at the same time, impacted by various perspectives originating from general psychology. From its earlier beginnings under the banner of behaviorism, the interest has been extended to cognitivist, mentalist viewpoints, and recent sociocultural approaches to language acquisition. During the mid-20th century, when the first generation of linguists was studying how L1 is acquired, the behavioral school, inspired by learning psychology, came up with the idea that language is acquired through habit formation and conditioned stimulus-response-reinforcement. It means that L2 learning is the same as L1 learning, where the learners produce target language structures that are positively rewarded. In language teaching, this led to the development of such methods as the Audio-Lingual Method. But as with L1 acquisition, it is not convincing that the habit theory alone can explain the fact that the learner has already acquired creative aspects of the language that enable them to produce several entirely new grammatical sentences never heard in the language model they have been exposed to or to have a unique learning history in the class. Then, in contrast with habit theory, the cognitive and mentalist approaches to language acquisition emerged. The work by Noam Chomsky's transformational-generative grammar put forward his notion of an innate predisposition to language that has a "creative" aspect

and which predisposes human beings to learning and using language . DeKeyser, R. M. (Ed.). (2007)

Computer-Assisted Language Learning (CALL), Mobile-Assisted Language Learning (MALL), intelligent learning systems, and web-based language learning environments have created new spaces for second language learning and teaching. Studies in CALL and related fields investigate the pedagogical affordances of various digital tools and technologies and their impact on language learning, including vocabulary acquisition, pronunciation improvement, writing and speaking development, and learner motivation and autonomy. Dörnyei, Z., & Ushioda, E. (2021)

Considering the vast array of theoretical options and an overwhelming growth in the field, the need arises for a synthesis that can critically appraise existing knowledge, while pointing out the most up-to-date research directions. Several reviews have examined one or several SLA theories or a specific facet of second language acquisition; yet, none have so far managed to address both classical theories, modern cognitive and sociocultural frameworks, technological innovations, and new research evidence within a systematic review, which are the gaps addressed in this paper. Hence, this systematic research paper attempts to synthesize and critically appraise major theories, empirical findings, and recent trends in the field of Second Language Acquisition. This article therefore aims to contribute to SLA by providing a comprehensive critical research paper of the existing research to inform theory-based and practice-oriented investigations of second language acquisition

2. Literature Review

The field of Second Language Acquisition (SLA) has burgeoned to become one of the more influential areas within the broader field of applied linguistics, and its importance stems from both theoretical relevance and practical importance for language education. Over the past few decades, scholars have posited myriad theories to explain how L2 acquisition occurs. These theories vary in their assumptions about the processes of language learning, but they all agree that acquiring a language other than one's native tongue is an extremely complex and multifaceted process influenced by various cognitive, linguistic, psychological, social, and environmental factors. Thus, in recent times, SLA researchers have come to employ an increasingly multidisciplinary approach to their investigations of second language learning, drawing insights from linguistics, psychology, education, sociology, and neuroscience rather than limiting themselves to a single approach Gregg, K. R. (1984).

One of the earliest explanations of language learning emerged from the field of behaviorist psychology, which framed acquisition as a process of habit formation involving imitation, repetition, and reinforcement. Learners acquire language in this view by responding to environmental stimuli and learning correct linguistic behavior through

conditioning. The behaviorist perspective, strongly shaped by view that verbal behavior is a learned behavior like other forms of behavior acquired through the same learning mechanisms, has had a tremendous impact on the history of language teaching in the middle of the twentieth century, influencing, among others, the audio-lingual method, emphasizing habit formation through repetitive drills and memorize exercises, especially in terms of pronunciation. Izumi, S. (2003) The behaviorist influence has also been visible in formulation of the Contrastive Analysis Hypothesis (CAH), which hypothesized that the similarities and differences between L1 and L2 would determine the learning difficulty: The higher the similarity between the two systems, the easier the acquisition. Language elements that are similar in L1 and L2 should therefore be easy to acquire, whereas differences would be difficult to acquire, creating learning difficulty and therefore making more errors possible. Schmidt, R. (1990).

While CAH has been useful in the initial stages of foreign language pedagogy, research soon began to suggest that CAH had limitations in explaining numerous learner errors; errors that often seemed to occur independent of interference from L1 and, as it were, developed internally in the L2. This raised the possibility that SLA was not solely the product of habit formation. Another turning point in SLA was criticism of Skinner's explanation of language learning.

Chomsky argued that humans are capable of generating novel and grammatically correct utterances that they have never heard or learned before. Based on this, he hypothesized that children possess an innate linguistic capacity or an innate Universal Grammar (UG), which comprises underlying principles common to all human languages. Though developed primarily to explain L1 acquisition, UG has played a central role in SLA research by prompting SLA researchers to ask whether L2 learners retain any access to their UG during L2 acquisition. For four decades, research related to Universal Grammar has raised controversy. Chomsky, N. (1959).

While argues that access to UG remains for learners of all ages and across different learning environments, other researchers question its explanatory role in the adult L2 learning process, such as, who argues that explicit learning, practice, procedural memory, and cognitive skills acquisition have come to play an increasingly dominant role in the post-childhood learning process. Thus, in recent times, many cognitive linguists and SLA scholars have come to consider language acquisition to be the result of the interaction between general cognitive mechanisms and language experience instead of specific language modules. Among the most prominent frameworks for understanding second language acquisition is Krashen's Monitor Model, proposed in the early 1980s. Krashen posited five principles (the Acquisition-Learning distinction, the Natural Order of Acquisition, the Monitor Hypothesis, the Input Hypothesis, and the Affective Filter

Hypothesis) that work together to explain how SLA takes place. de Groot, A. M. B., & Kroll, J. F. (Eds.). (1997).

Krashen hypothesized that acquisition takes place when we are exposed to comprehensible input - that is, input that we can understand, yet which is just slightly ahead of our current level of ability. Krashen often summarized comprehensible input as. The Input Hypothesis has since been perhaps the most researched and debated in the SLA literature, with numerous studies finding positive correlations between comprehensible input and learner proficiency. Recent studies continued to emphasize the significant relationship between motivation, anxiety, and L2 learning, confirming this component of Krashen's work (Dörnyei & Ushioda, 2021). While Krashen's Monitor Model has had a powerful influence on the history of second language instruction and learning, the model has not been without its critics. For example, argues that the acquisition-learning distinction is poorly defined and lacks empirical validity, and points out a lack of empirical support for the Input Hypothesis. Other critics suggest that Krashen understates the roles of the Monitor and of language production and interaction in the learning process. McLaughlin, B. (1987).

However, in response to these criticisms, SLA researchers gradually began to focus on the role of interaction and communication in second language acquisition. For example, proposed the Interaction Hypothesis, which holds that conversational interaction provides rich opportunities for second language learning because during the conversation, learners negotiate meaning, request clarification, modify their language, and receive immediate feedback. According to Long (1996), interaction leads learners to 'notice' linguistic forms and facilitates processing of those forms, and negotiation of meaning may resolve communication breakdowns and allow learners to process linguistic data in ways that go beyond passively receiving comprehensible input. The interactionist account is supported by substantial empirical evidence.

Swain's Output Hypothesis is closely linked to Long's work. argues that comprehensible input alone is not sufficient to achieve full proficiency, as language learners also need to produce language, and output facilitates this process. According to Swain, language production makes it possible for learners to detect "gaps in their own knowledge" to test hypotheses about language structures, and thus, to develop grammatical accuracy and complexity. 'Speaking' as 'doing something' not only indicates learning, but can itself be a source of learning. Empirical studies confirm this. For instance, found that second language learners in a treatment group that produced language in the classroom with specific feedback made more grammatical progress than learners in a group who only focused on reception. Moreover, Loewen and claim that classroom-based activities requiring group work, writing, and talking, for example, enhance grammatical complexity and communicative skills. Vygotsky, L. S. (1978)

Yet another significant cognitive perspective was introduced by Noticing Hypothesis, which stresses the role of attention. According to learners cannot learn a new linguistic form if they do not 'notice' it in the input, and noticing represents the interface between the input and learning and a prerequisite for input to become intake (language input that is processed by the learner and can be acquired). There is a wide range of studies that demonstrate the role of attention and show that explicit attention can improve learners' ability to notice linguistic structures (e.g., attention during input enhancement and in the context of feedback) (Robinson, 2003). In other words, without noticing, language learning cannot take place.

3. Methodology

This study utilized a Systematic Literature Review (SLR) methodology to research and synthesize extant literature on second language acquisition (SLA) within the discipline of applied linguistics. It was determined that an SLR methodology was most appropriate, as the purpose of the study was to synthesize and critically evaluate previous theoretical and empirical work, rather than gather primary data from participants. Unlike a traditional narrative literature review, a systematic research paper involves a well-defined and transparent approach for searching for, selecting, evaluating, and synthesizing relevant studies, thus minimizing researcher bias and ensuring the trustworthiness of the review. Through the use of an SLR methodology, this study provides an overview of the evolution of theories of SLA, primary empirical findings in the area, novel technological trends, and future research directions. Robinson, P. (Ed.). (2003).

In initiating the review, a thorough search of the published academic literature on second language acquisition was conducted. Relevant publications were identified using reliable academic databases, digital libraries, scholarly books, peer-reviewed journal articles, conference proceedings, and other authoritative academic resources. Several search terms were used to identify relevant publications. These include second language acquisition, applied linguistics, language learning, language teaching, input hypothesis, interaction hypothesis, output hypothesis, universal grammar, sociocultural theory, cognitive approaches, motivation in language learning, corrective feedback, computer-assisted language learning (CALL), mobile-assisted language learning (MALL), and artificial intelligence in language education. The above search terms were combined, individually or with Boolean operators, to conduct comprehensive searches for all relevant material. Additionally, any book or journal that has "second language acquisition," "language learning theories," "learner variables," "classroom interaction," "language teaching practices," and "technology in language learning" in the title was considered part of this study. In terms of excluded studies, any article whose content did not center directly on SLA, anything related to first language acquisition, any book not rich enough in empirical findings, any journal article lacking clear methodological explanations, and any

other academic paper or book not of a peer-reviewed standard were deemed unsuitable. In addition to these criteria, all duplicate works and publications with similar conclusions were also eliminated. Each included work was read carefully to ascertain the primary research questions addressed, theoretical underpinning, methodology used, principal findings, and the overall contribution to the study of second language acquisition. Empirical findings from research were collected based on the themes of interaction, corrective feedback, motivation, the learner as an individual, and the impact of technology. Long, M. H. (1996)

Recent developments in the application of artificial intelligence and machine learning in the area were critically evaluated. Rather than describing the main themes of research in the field, this research paper provides a comparative analysis that identifies strengths and weaknesses of theoretical frameworks and highlights where the results from empirical studies converge or conflict. The interplay of cognitive, socio-cultural, and psychological variables and how they relate to L2 acquisition is examined. This study identified several trends in SLA: the movement from behaviorist models to cognitivist and constructivist models; the importance of both formal learning and acquisition through immersion; the emphasis on the role of input and interaction; and the more recent interest in sociocultural and cognitive processes as well as technological solutions. Some limitations should be acknowledged regarding this study. All research was included in the research paper only if written in English; studies not in the English language have not been addressed in this SLR. In addition, as this research paper was exclusively based on previously published works, all of the results are contingent on the existing body of literature available in SLA research.

4. Theoretical Framework

Second language acquisition (SLA) is an extremely interdisciplinary and multifaceted subfield of applied linguistics, and as such, there exists an equally wide variety of theoretical perspectives seeking to account for how humans acquire a language in addition to their mother tongue. This complexity of second language acquisition stems from the fact that many factors contribute to learning, including (1) linguistic factors, (2) cognitive, psychological, and affective factors, and (3) environmental factors (Kroll & Schafer, 1997). Given this complexity, a single theoretical paradigm is unable to capture the numerous forces driving second language acquisition.

In view of these multiple factors, an integrated theoretical approach, synthesizing several well-established SLA theories, has been used to frame this study. A recent research paper has revealed that these modern technological tools not only support input, interaction, and output but may also help in fostering more personalized and learner-centered SLA, often complementing and extending traditional theoretical approaches. Together, these theoretical paradigms will serve as the theoretical foundation of this study.

Instead of attempting to provide definitive evidence for or against one specific paradigm, the purpose of the research paper is to approach SLA from a more eclectically based perspective, considering each theory as providing valuable insight into distinct components of the learning process. The behaviorist perspective can contribute an emphasis on practice, whereas the UG approach stresses a native-like aptitude. Krashen's model highlights the crucial role of input and affective factors. Long and Swain's theories emphasize the significance of input, output, and interaction. Sociocultural Theory addresses the importance of interaction with others and environmental support. Cognitive approaches explain the mechanisms of learning.

5. Data Analysis and Discussion

A systematic analysis of the selected literature reveals the process by which the theory of Second Language Acquisition has undergone various theoretical shifts over the years to address different phenomena associated with second language learning. The studies cited above suggest that there is no single, all-inclusive theory that accounts for the process of second language acquisition; rather, second language learning arises out of the interplay between linguistic knowledge, cognitive abilities, social interaction, learner factors, context, and teaching instruction. The analysis goes on to suggest that the theoretical concerns in SLA, which were once centred on external input and context to language learning, have moved toward (but not excluded) issues of cognition and meaning-based interaction, agency of the learner, and support technologies. The ensuing discussion takes a critical look at the main theories that have been central to the field of SLA. Their strengths and limitations are analyzed in relation to the empirical data and research evidence.

5.1. Behaviorism: Language Learning through Habit Formation

One of the earliest theories explaining second language acquisition is behaviorism. Following Skinner's view (1957), learning a language can be simply viewed as a behaviorist action in which learners gain knowledge of the language through imitation, repetition, practice and reinforcement. That is, language learners are believed to habituate themselves to producing accurate language by the repeated utterance of the same structure and receiving some sort of reinforcement from teachers or their surrounding environment.

Analysis of the literature on the early studies indicated that foreign language teaching in the 1950s and 1960s was dominated by behaviorist principles, and the major focus of foreign language classroom instruction, like the audio-lingual approach, was on repetitiveness, memorization, pronunciation drilling, and pattern practice, aiming at developing language habits and fluency through continuous repetition. Indeed, some of the classroom-based research did report progress in pronunciation accuracy and memorization of certain sentence patterns by learners when repetition practice was applied consistently. Those results seem to support the idea that the behaviorist practice would

probably result in well-automatized responses in some aspects of the language during the first stage, for example, the learning of vocabulary and pronunciation practice. On the contrary, several limitations of the behaviorist principles were frequently cited throughout the research articles reviewed.

First of all, the ability of language users to create an original grammatically correct sentence that they have never uttered before is very difficult to explain by merely using habit formation theory. Most people can form new expressions by using the internalized grammatical system, not just by imitating memorized language forms. Moreover, numerous language researchers observed that most of the L2 learners committed the same sort of developmental error regardless of their L1, which demonstrates that there is an internal mental process for the SLA other than simple imitative behavior. Furthermore, research based on empirical data has revealed that extensive repetition exercises can develop structural accuracy and reduce the number of errors, but may not, as observed in some of the experimental studies, help in developing communicative skills.

Because communication in a real situation would demand from learners more problem-solving skills and spontaneous language production. Thus, even though behaviourism contributes greatly to early language education, the explanatory capacity of this theory is regarded as quite limited from the SLA research perspective. Yet its attention to practice and reinforcement does continue to influence contemporary language education, as for example, the application of spaced repetition and instant feedback of computer technology for teaching language, and more especially the training of pronunciation and vocabulary.

5.2. Universal Grammar: The Role of Innate Linguistic Knowledge

The inadequacy of behaviorism had motivated some researchers to search for the interior operations and processes underlying language learning. Universal Grammar theory, developed by Chomsky, has revolutionized linguistic studies since then, introducing the idea that all human beings are biologically endowed with an ability for language acquisition. Instead of seeing language as learned behaviors, Universal Grammar emphasizes that the linguistic knowledge learners acquire is built into the brain, and underlying principles are common to all languages in the world. Nevertheless, despite the significance in theory building, Universal Grammar is still one of the most controversial viewpoints in SLA research. The problem about the extent to which adult learners are able to access UG's universal constraints has been extensively studied, with inconsistent results obtained across different research papers. For some authors, evidence provided from the learner's interlanguage can be considered consistent with the claims of UG especially when they found that mature learners possessed grammatical rules beyond the input and could not have acquired through external learning processes alone, others assert that second language learning is predominantly reliant on learning the conscious awareness of

the formal properties of the target language rather than the UG, as they argue that with increasing age, adults come to rely more and more on explicit knowledge, strategies of learning and on the extensive language input they receive in L2 input. .

5.3. Krashen's Monitor Model: The Central Role of Comprehensible Input

Of the theories studied in this review, Krashen's Monitor Model continues to be a landmark theory in the field of applied linguistics. The literature analyzed here has shown time and again that Krashen's theory has had a profound impact on how languages are taught, with emphasis on the importance of communication over direct grammar instruction. The model argues that successful acquisition occurs mainly through interaction with the input – language that the learner can comprehend, yet contains just slightly beyond their current competence level.

From analysis of the research conducted, it appears that there is overwhelming evidence to support the need for comprehensible input. Learners who have been exposed to plenty of input, both spoken and written, have achieved better gains in vocabulary development, reading ability, listening skill, and communicative competence than learners in classes that emphasized the learning of grammatical forms. In this connection, most research studies would conclude that a learner's levels of language anxiety can be positively or negatively correlated to successful SLA in the same way that attitude or motivation levels are likely to be. Such studies would also emphasize that there is the importance of the learning environment, and this is certainly within the teacher's ability to control, and should encourage learner-centered teaching approaches which include support and collaborative learning. While this concept is very appealing in theory, it is difficult in practice for teachers to provide instruction that is exactly one level beyond each of their learners. The reality in any language classroom is that learners differ in their learning styles, their aptitudes, and their levels of proficiency, and the identification and matching of a learner's 'just beyond' level will require personalized delivery of input. Future trends in SLA have shown the potential of technologies like AI and digital media to deliver 'personalized' input.

In conclusion, the evidence in this study has demonstrated that Krashen's Monitor Model, with its focus on the importance of comprehensible input, learner emotions, and communicative interaction, remains a foundation of second language acquisition theory. This study has also revealed, however, that input alone does not completely explain how we learn new languages; rather, a multi-faceted approach involving cognitive, socio-cultural, and pedagogical influences is needed. Most significant recent theoretical influence in the area of SLA: Sociocultural Theory (SCT) developed from Vygotsky (1978). Whereas a traditional cognition perspective argues language development occurs within the individual mental processes, SCT suggests language learning takes place via social interaction and participation in meaningful activities culturally. The theory proposes

that language development is mediated by interaction with teachers, peers, parents, and other knowledgeable participants in the environment. The findings of the reviewed literature support collaborative learning and demonstrate that it is beneficial for second language acquisition rather than solitary learning. Evidence suggests that collaborative work, including pair work, group work, writing together, and classroom discussion, enhances learners' speaking fluency, acquisition of vocabulary, and communicative abilities more than when students work alone. Thus, language acquisition does not just occur through an individual, but social interaction in language learning is a crucial factor, as opposed to being seen as an individual. Some weaknesses in SCT can make studies inconclusive, such as focusing too much on classroom activities rather than on language processing mechanisms.

Research paper of previous research demonstrates that Cognitive approaches to SLA have gained prominence in recent years and that, in contrast to behaviorism, learners are conceived of as active manipulators of information rather than a blank slate upon which language is instilled by environmental forces. Second language learners acquire knowledge through perceptions, attention, memory, and problem-solving operations. Information in the target language is received as input, processed, transferred into long-term memory, and subsequently accessed during communication. Conscious attention on grammatical form, pronunciation, or word learning should take place before learners integrate the target structures or items into their productive skills. Research into instructional settings supports the importance of attention and suggests that activities designed to focus attention on a particular form have resulted in enhanced grammaticality and retention. This demonstrates that learning cannot occur unless the learners focus their cognitive attention on the linguistic information they receive. Working Memory: Learners with a greater capacity of working memory were found to have greater reading and writing ability, listened and processed the target language, had the largest receptive Vocabulary Size, and greater Grammatical Competence, as it is necessary for language learners to process more information simultaneously than normal ones.

5.4. Individual Differences in Second Language Acquisition

Arguably, the single most recurrent conclusion to be found in recent SLA literature has been about the salience of the role of individual differences in language learning. Indeed, as demonstrated by the literature included in this review, learners subjected to similar instructional inputs often demonstrate considerably different learning outcomes due to their differential motivation, aptitudes, levels of anxiety, ages, personality traits, learning strategies, and degrees of self-confidence. About such individual differences, motivation has been one of the most powerful and consistent predictors of success in language learning.

Educators have also stated that their key responsibility is to facilitate such motivations among their learners by providing a good environment, interesting activities, and encouraging feedback. Language anxiety is yet another important area of research in the present-day SLA literature and is often identified as one of the main causes of failure. Anxiety when dealing with a foreign language is prone to result in a reduction in the desire to speak and use the language in interaction with other speakers and, in the classroom context, to hinder verbal interaction with teachers and other classmates as well as to deter risk-taking in language use.

The research carried out in this respect has indicated that the classroom climate has a significant role in alleviating this anxiety. Therefore, it seems advisable to use activities conducive to building the classroom climate, such as collaborative learning among learners, positive reinforcement, and so on. Another individual factor that appears to have a direct impact on acquisition is language aptitude, particularly when it comes to the learning of syntax, pronunciation, or vocabulary. Dynamic Systems Theory is a closely related one that takes the perspective that L2 acquisition is a continuous process with several factors that interact. This framework suggests that language does not unfold in a straight line and is not predictable. Depending on learners' motivation, instructional effectiveness, exposure, social interaction, and cognition, periods of high gain, low gain, or even low decay are incorporated. The former focuses on the role of meaningful interaction, collaboration, and learning support in the learning of a second language, while the latter concentrates on the learning processes in which learners encode, store, retrieve, and automatize language knowledge. Studies of individual differences also pointed out the influence of motivation, anxiety, aptitude, learning strategies, and self-confidence on acquisition, and usage-based and dynamic views also show that language learning is an adaptive process and is constantly subject to modification based on experiences.

It also encompasses significant implications for the process of language teaching. The key elements involved in effective instruction include meaningful interaction, active learning experiences, direct instruction, ample opportunities for language production, collaborative learning, and supportive classroom practices. This holistic approach recognizes that SLA is multidimensional and more closely represents the complexity that is found in much of the current SLA research. The scholarly emphasis has thus shifted in recent years to using comprehensive instructional models that across the curriculum include considerations of the linguistic, cognitive, sociocultural, emotional, and affective dimensions of learning rather than one to the exclusion of others.

5.5. Emerging Trends in Second Language Acquisition

The development of digital technologies has revolutionized the teaching, learning, and research surrounding Second Language Acquisition (SLA), offering new opportunities for language instruction, acquisition, and research. Although a traditional

SLA theory centered on input, interaction, cognitive processing, and social participation, there is more and more attention paid to the role of technology (technology as a language learning auxiliary tool) in language learning. The recent development of Computer-Assisted Language Learning (CALL), Mobile-Assisted Language Learning (MALL), Artificial Intelligence (AI), virtual learning environments, and online collaborative platforms has radically changed the way learners learn second languages in a flexible, individualized, and communicative way. The results and findings of the systematic research paper and summary of recent research reveal that the role of technological innovations in the L2 writing classroom is not to revise existing Second Language Acquisition theories but to allow for the production of comprehensible input, meaningful interaction, learner output, and autonomous learning. In applied linguistics, then, emerging technologies have gained significance over the past few years, especially since the majority of academic institutions have resorted to online education.

Computer-Assisted Language Learning (CALL) is one of the biggest breakthroughs in modern education and has emerged as a vital area in the field of language instruction. As an auxiliary teaching aid, CALL has gradually grown into a complete teaching approach, incorporating materials based on multimedia technology, interactive software, information websites, and digital language communication tools into language teaching. The opportunities for exposure to real language provided by CALL are one of its greatest strengths in the classroom. Use of digital tools like online videos, videos on demand, podcasts, online dictionaries, engaging grammar activities, and virtual discussion forums helps students experience authentic language in context and use it for meaningful purposes. The feature of CALL environments that allows learners to experience a variety of accents, communicative contexts, and real-life language use makes it more effective for enhancing language skills and intercultural understanding than traditional textbooks.

But there are some obstacles that need to be overcome. According to the literature, using too many apps could lead to fragmented learning in terms of too many vocabulary items to master from the application or too many grammatical rules to be learned without pretexts for meaningful communication. Plus, there's the distraction that comes with having a smartphone and varying levels of self-discipline that can lower learning results. Thus, the researchers suggest that MALL is not an independent method of teaching but should be combined with traditional subjects and communication skills in a course.

5.6. Artificial Intelligence in Second Language Acquisition

The advent of Artificial Intelligence (AI) stands out as one of the most significant advancements in modern language teaching. Besides, several new technologies have been developed in recent years to create new opportunities for personalized language instruction, such as machine learning and NLP, which is used in natural language processing and speech recognition, and intelligent tutoring systems. AI tools can assess

student performance, provide feedback, adjust teaching methods, and offer targeted support tailored to individual learning styles. In contrast to traditional educational software, this type of AI can analyze student performance, give feedback and improvement suggestions, modify educational content and strategy according to individual needs, and give focused support.

Another key benefit of AI is customizing teaching to individual students. In the traditional classroom, it is frequently necessary to teach pupils at a single level with differing skill and mastery, learning styles, and backgrounds. AI systems are capable of doing this because they can adapt tasks, choose the right content, and suggest personalized practice tasks based on learner performance. Learning environments that are adapted to the learner's level increase the learning efficiency and also decrease frustration from the activity that is too easy or too difficult.

The systematic research paper also shows that AI promotes self-regulated learning, thereby aiding in learner autonomy. Initially, intelligent language-learning platforms keep track of learners' progress, suggest revision exercises, and give constant performance feedback, which helps them control their own learning process better. AI tools also generate analytics for teachers that can give them insights into students' limitations and help them plan teaching strategies.

Notwithstanding all these benefits, there are some ideas that have been expressed in the literature about the use of AI in language education, which are expressed as concerns. There are, however, some concerns that have been raised in the literature about the uptake of AI in language education. Consideration must be given to ethical issues that involve data privacy, algorithmic bias, academic integrity, and excessive reliance on algorithms. Online mode allows for both synchronous and asynchronous communication. Discussions with students, virtual presentations, breakout-room activities, and collaborative projects foster meaningful interaction among the students, and discussion boards, recorded lectures, and digital assignments offer students opportunities for independent learning. These features not only facilitate several major theories of SLA, including the promotion of comprehensible input, interaction, and language output, but they also facilitate collaborative learning.

Studies also show that online collaborative learning fosters the autonomy and intercultural competence of the learners. In international virtual exchanges, students engage with speakers from a wide range of linguistic and cultural groups, which serve as an opportunity to increase language proficiency and intercultural skills. Such authentic communication experiences are difficult to replicate within traditional classrooms.

However, there are issues in the literature, involving unequal access to technology, low levels of digital literacy, less interaction with the physical learner, and learners' reduced motivation in some online settings. Effective online instruction, then, must be

carefully designed, guided by the teacher and supported by the learner to keep everyone engaged and facilitate learning to communicate.

6. Conclusion

Second Language Acquisition (SLA) is an ongoing and important research field in Applied Linguistics with great implications for language education, multilingual communication, and global interaction. This systematic research paper aimed to compile, critically summarize, and weigh the most important theories, empirical evidence, and trends so far in SLA research, besides highlighting the successes, failures, and potential areas of future research. Likewise, Sociocultural Theory showed the important role of social interaction, collaborative learning, and cultural context in language learning, and cognitive approaches confirmed that attention, memory, information processing, and individual learner differences have a significant effect on language learning. Together, these theories provide a picture of L2 acquisition as a process that cannot be easily explained by a single theory, but multiple factors are involved in the interaction.

The research paper also draws attention to the ever-increasing role that technological innovation has been playing in language learning. With the recent advances of Computer-Assisted Language Learning (CALL), Mobile-Assisted Language Learning (MALL), Artificial Intelligence (AI), virtual learning environments, and digital learning platforms, a new scope of personalized instruction and immediate feedback, learning autonomy, and authentic communication has opened up. It is also a noteworthy observation of this research paper that the SLA studies are turning more and more interdisciplinary. This is a step towards recognizing the need for a blending of linguistic, psychological, educational, sociological, and educational technology issues in the successful acquisition of a language. It is thus argued in the research paper that comprehensive and integrated theoretical explanations are more useful in understanding the development of a second language than those theories that address only one variable. Though many significant advances have been made in SLA research, some important problems continue to exist. Based on the results of the review, further research along these lines: longitudinal research, research with an interdisciplinary scope, and research on the long-term effects of emerging technologies, such as artificial intelligence and adaptive learning systems, on second language development would be beneficial.

It is worthwhile to note that from a practical standpoint, the results of the present research paper have implications for language teachers, the creation of curricula, educational institutions, and educational policies. Language teaching should go beyond the grammar explanation approach and should offer learners plenty of chances to have meaningful interaction, to share their ideas, to understand comprehensible input or hear others' inputs, to be given or give constructive feedback, and to use real language. The use

of technology should be a strategic element to effectively engage learners, empower them to work independently, and also to support evidence-based pedagogical practices.

References

- Chomsky, N. (1959). Research paper on Verbal Behavior by B. F. Skinner. *Language*, 35(1), 26–58. <https://doi.org/10.2307/411334>
- de Groot, A. M. B., & Kroll, J. F. (Eds.). (1997). *Tutorials in bilingualism: Psycholinguistic perspectives*. Lawrence Erlbaum Associates.
- DeKeyser, R. M. (Ed.). (2007). *Practice in a second language: Perspectives from applied linguistics and cognitive psychology*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511667275>
- Dörnyei, Z., & Ushioda, E. (2021). *Teaching and researching motivation* (3rd ed.). Routledge. <https://doi.org/10.4324/9781351006743>
- Gregg, K. R. (1984). Krashen's Monitor and Occam's razor. *Applied Linguistics*, 5(2), 79–100. <https://doi.org/10.1093/applin/5.2.79>
- Izumi, S. (2003). Comprehension and production processes in second language learning: In search of the psycholinguistic rationale of the Output Hypothesis. *Applied Linguistics*, 24(2), 168–196. <https://doi.org/10.1093/applin/24.2.168>
- Krashen, S. D. (1982). *Principles and practice in second language acquisition*. Pergamon Press.
- Lado, R. (1957). *Linguistics across cultures: Applied linguistics for language teachers*. University of Michigan Press.
- Loewen, S., & Sato, M. (2018). Interaction and instructed second language acquisition. *Language Teaching*, 51(3), 285–329. <https://doi.org/10.1017/S0261444817000120>
- Long, M. H. (1996). The role of the linguistic environment in second language acquisition. In W. C. Ritchie & T. K. Bhatia (Eds.), *Handbook of second language acquisition* (pp. 413–468). Academic Press.
- McLaughlin, B. (1987). *Theories of second-language learning*. Edward Arnold.
- Ortega, L. (2009). *Understanding second language acquisition*. Hodder Education.
- Robinson, P. (Ed.). (2003). *Cognition and second language instruction*. Cambridge University Press. <https://doi.org/10.1017/CBO9781139524780>
- Schmidt, R. (1990). The role of consciousness in second language learning. *Applied Linguistics*, 11(2), 129–158. <https://doi.org/10.1093/applin/11.2.129>
- Skinner, B. F. (1957). *Verbal behavior*. Appleton-Century-Crofts.
- Swain, M. (1985). Communicative competence: Some roles of comprehensible input and comprehensible output in its development. In S. Gass & C. Madden (Eds.), *Input in second language acquisition* (pp. 235–253). Newbury House.

- Swain, M. (1995). Three functions of output in second language learning. In G. Cook & B. Seidlhofer (Eds.), *Principle and practice in applied linguistics: Studies in honour of H. G. Widdowson* (pp. 125–144). Oxford University Press.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
- White, L. (2003). *Second language acquisition and Universal Grammar*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511815065>