Re-evaluating the SILL in the postpandemic times

Zrinka Fiser (corresponding author)
Luka Pongračić
University of Slavonski Brod, Croatia

ABSTRACT: Theoretical frameworks categorize language learning strategies into direct (memory, cognitive, and compensation) and indirect (metacognitive, affective, and social) strategies used during English as a foreign or as a second language acquisition. With the shift to online learning during the COVID-19 pandemic, this study investigates if and how digital environments affected the use of such strategies. 279 non-English major students from Croatia participated in the research aiming to re-evaluate the Strategy Inventory for Language Learning (SILL). The exploratory analysis resulted in significant reduction to four new scales: cognitive, metacognitive, social, and a communication-oriented scale. The Wilcoxon signed-rank test was applied to test the correlation with the effect of the online learning setting during the pandemic and the findings implied that students who were exposed to online learning during the COVID-19 outbreak reported significantly less usage of all but the social LLSs.
The research findings underscore the importance of revising LLS assessment instruments and tailoring strategy instruction to the demands of online and hybrid learning contexts.
Keywords: language learning strategies, SILL, COVID-19, English language, LLS

Reevaluando el IEAI en tiempos pospandémicos

RESUMEN: Los marcos teóricos categorizan las estrategias de aprendizaje de idiomas en directas (memoria, cognitivas y de compensación) e indirectas (metacognitivas, afectivas y sociales) utilizadas durante la adquisición del inglés como lengua extranjera o segunda lengua. Con el cambio al aprendizaje en línea durante la pandemia de COVID-19, este estudio investiga si los entornos digitales afectaron el uso de dichas estrategias y cómo lo hicieron. Participaron en la investigación 279 estudiantes de Croacia que no eran especialistas en inglés, con el objetivo de reevaluar el Inventario de Estrategias para el Aprendizaje de Lenguas (IEAI). El análisis exploratorio resultó en una reducción significativa a cuatro nuevas escalas: cognitiva, metacognitiva, social y una escala orientada a la comunicación. Se aplicó la prueba de rangos con signo de Wilcoxon para probar la correlación con el efecto del entorno de aprendizaje en línea durante las pandemias, y los hallazgos implicaron que los estudiantes que estuvieron expuestos al aprendizaje en línea durante el brote de COVID-19 informaron un uso significativamente menor de todos los EAL excepto los EAL sociales.Los hallazgos de la investigación destacan la importancia de revisar los instrumentos de evaluación de estrategias de aprendizaje de lenguas y de adaptar la enseñanza de estrategias a las demandas de los contextos de aprendizaje en línea e híbridos.
Palabras clave: estrategias de aprendizaje de idiomas, re-evaluar, IEAI, COVID-19, idioma inglés

1. INTRODUCTION

The European Union (EU) promotes compatibility and harmonization among the higher education systems of its member states, which prompted Croatia to adopt the Bologna higher education reform. This reform requires higher education institutions (HEIs) to strengthen their English as a foreign language (EFL) program in order to enhance student mobility and employability within the European and global labour markets. In this context, the strategic use of various language learning strategies (LLSs) is considered an important factor in improving the effectiveness of EFL and English as a second language (ESL) acquisition.

To examine the use of LLSs in EFL and ESL learning, Rebecca Oxford (1990) developed the Strategy Inventory for Language Learning (SILL), which has since been widely applied in research across diverse learner groups and educational contexts (Chamot & O'Malley, 1994; Dörnyei, 2005; Oxford, 2017). A commonly accepted classification system categorizes LLSs into direct strategies (memory, cognitive, and compensation) and indirect strategies (metacognitive, affective, and social) (Cohen & Wang, 2018; Oxford, 1990, 2017). Although SILL remains one of the most frequently used instruments in LLS research, more recent studies have questioned the rigid distinction between direct and indirect strategies, advocating instead for self-regulated learning frameworks that better account for variation across learning contexts (Amerstorfer, 2016, 2018; Cohen, 2018; Cohen & Wang, 2018; Oxford & Amerstorfer, 2018; Pawlak, 2019; Tseng et al., 2006). The COVID-19 pandemic further transformed educational environments, introducing changes whose implications still require comprehensive investigation (e.g., Fišer, 2023a, 2023b; Jiang & Papi, 2021; Yang & Chanyoo, 2024). Moreover, research has demonstrated that learners' native languages also influence their use of LLSs, providing valuable insight into cross-linguistic variation in strategy deployment (e.g., Alhaysony, 2017; Andrade & Evans, 2015; Griffiths, 2018; Mizumoto & Takeuchi, 2018; Ortega & Iberri-Shea, 2021; Rahimi & Katal, 2012).

For example, Mizumoto and Takeuchi (2018) studied Japanese EFL learners and emphasized the role of cultural factors in metacognitive strategy use. Alhaysony (2017) examined Saudi Arabian learners and identified key differences in social strategy preference compared to Western EFL learners. Similarly, Andrade and Evans (2015) investigated strategy use among Spanish-speaking ESL learners in the United States, highlighting the importance of affective strategies in language retention. Rahimi and Katal (2012) explored Persian-speaking EFL learners and found that metacognitive and cognitive strategies were most used, indicating a preference for structured learning approaches. In contrast, Griffiths (2018) analysed Chinese learners' strategy use and observed a strong reliance on rote learning by heart, in line with East Asian educational customs. Additionally, findings of a study conducted in Latin America by Ortega and Iberri-Shea (2021) implied that students who spoke indigenous languages in addition to Spanish used more compensation strategies, perhaps as a result of cross-linguistic transfer effects.

These research findings point to the necessity of refining methodological approaches and assessment models in LLS research, given that strategy effectiveness varies across learning contexts and is influenced by linguistic and cultural factors. The diversity of learner pop-

ulations highlights the need for tailored strategy training, particularly in multicultural and multilingual educational environments that may have also been affected by the COVID-19 pandemic. Investigating how online education impacts not only learning outcomes but also the broader factors influencing the learning process is becoming increasingly important, even though the effectiveness of online learning in comparison to traditional classroom settings is still up for debate. The primary aim of this study is to assess the construct validity of the SILL and determine its suitability for application in contemporary educational settings. To achieve this, the authors conducted an exploratory factor analysis and applied the Wilcoxon signed-rank test to re-evaluate the instrument among Croatian non-English major university students, with the goal of determining whether the shift to online learning during the COVID-19 outbreak significantly influenced students' preferred use of LLSs. The findings are intended to inform the refinement of existing assessment instruments and support the development of more context-responsive measurement models.

2. THEORETICAL BACKGROUND

The effectiveness of EFL and ESL learning is often linked to a combination of LLSs and motivation (e.g., Chamot & O'Malley 1994; Dörnyei 2005, 2009; Gardner 1985; Larsen-Freeman & Anderson 2011; Oxford 1990, 2011, 2017; Ushioda & Dörnyei 2012), and both concepts have been widely discussed. While researchers may have differing opinions on their application, a common categorization differentiates between direct and indirect LLSs (Cohen & Wang, 2018; Oxford, 2017). A significant body of research has investigated LLSs, leading to the development of several theoretical models. Chamot and O'Malley (1994) identified three main LLS categories: cognitive, metacognitive, and social/affective. Cognitive strategies assist learners in analysing and synthesizing material, metacognitive strategies aid learners in structuring and evaluating their learning progress, and social/affective strategies are used in communicative situations (Larsen-Freeman & Anderson, 2011). Cohen and Dörnyei (2002) proposed an alternative model that categorizes language learning strategies based on their function and the degree of learner control. Their framework includes cognitive strategies (used for understanding and producing language), metacognitive strategies (used for planning, monitoring, and evaluating learning), social strategies (involving interaction with others), and affective strategies (related to emotional and motivational aspects of learning). They also emphasize the importance of self-regulation and individual differences in how learners choose and use LLSs, noting that strategy use is dynamic and dependent on the context. The framework used in this study is based on Rebecca Oxford's SILL model, a widely used instrument for assessing LLSs (Oxford, 1989), which divides strategies into six categories. In her earlier work, she classified LLSs into direct and indirect group of strategies. Direct strategies involve the mental processing of the target language and consist of memory strategies (used when learners attempt to store and retrieve information), cognitive strategies (used when learners utilize mental processes to comprehend and produce new language), and compensation strategies (used when learners try to make up for gaps in knowledge of the target language). Indirect strategies support language learning without direct engagement with the target language, and they include metacognitive strategies (used for organizing and assessing the learning process), affective strategies (used for regulating

learners' emotions, motivation, and attitudes), and social strategies (used for facilitating collaborative learning) (Oxford, 1990). Oxford (2011, 2017) emphasizes the inherently dynamic and context-dependent nature of LLSs, underscoring the need for continued empirical investigation. Her original taxonomies have been revisited and refined in subsequent research (Wang & Cohen, 2018). Although the SILL has achieved widespread adoption and validation, recent scholarship consistently advocates for the integration of complementary instruments and additional variables to capture a more nuanced and comprehensive representation of the language learning process.

Recent research has broadened the scope of LLS research by including learners from various linguistic backgrounds. For example, Suzuki and Takeuchi (2022) studied LLSs use among Japanese EFL learners and found that cultural and educational contexts significantly shape strategy preferences. Similarly, Ahmed and Asadullah (2023) examined LLSs adoption among Arabic-speaking ESL learners, revealing a strong reliance on cognitive and metacognitive strategies, possibly due to the linguistic proximity of Arabic to English. Furthermore, a large-scale study by García and Méndez (2024) explored the use of LLSs among Spanish-speaking EFL learners across different proficiency levels, emphasizing the importance of adaptive strategy training to better serve learner diversity. These findings indicate that LLSs are not applied uniformly but are rather influenced by learners' linguistic and educational backgrounds, highlighting the need for context-sensitive teaching approaches.

The COVID-19 pandemic also resulted in significant changes in education, requiring both teachers and learners to adjust to remote or online instruction. This shift necessitated the use of digital platforms such as Microsoft Teams, Zoom, and Skype, making learner-interface interaction a key factor in student engagement and satisfaction (Fišer, 2023a, b; Kuo et al., 2013). Self-regulated learning, encompassing metacognitive, motivational, and behavioral processes for managing one's own learning, plays a pivotal role in online learning contexts (Zimmerman, 1989). Fišer (2022) examined Croatian non-English major students to explore the impact of Microsoft Teams-based instruction on their EFL learning strategies. The study revealed that interaction with peers and instructors mitigated foreign language anxiety. Additionally, while students frequently utilized microphones, they tended to avoid webcams due to concerns related to self-presentation (Hartley, 1998; Wright, 2017). Recent re-examinations of Dörnyei's L2 Motivational Self-System Scale (Dörnyei, 2009, 2019) indicate that ICT integration during the pandemic may have influenced motivation in ESL/EFL learning, highlighting the need to update language learning methodologies (Fišer & Pongračić, 2025a, b).

To address these issues, the present study investigates the impact of the mandatory transition to online and distance EFL learning on the selection of LLSs among non-English major students in Croatian higher education institutions. The primary aim was to re-evaluate the widely employed SILL questionnaire through exploratory factor analysis and to examine the relationship between the derived scales and prior online EFL learning experience. The authors hypothesized that online EFL learning experience significantly shaped preferences for LLSs within self-regulated learning, resulting in emergent clusters distinct from those originally proposed in SILL.

3. Methodology

3.1. Participants

The study included 279 students engaged in non-English major studies in the Teacher Education program (TE group 37.3%), and Early and Preschool Education Undergraduate (ECEund group 34.9%) and Graduate (ECEg group 27.3%) programs at Croatia's University of Slavonski Brod (Table 1). Over 90% of the participants were women. The youngest participant was 18 years old, and the oldest was 56 years old; the majority were between the ages of 18 and 20 (25.4%) or 21 and 23 (38.4%).

Table 1. *Participants' socio-demographic descriptio*

Group	N	Year of study
TE	27	1st
TE	17	2nd
TE	18	3rd
TE	16	4th
TE	26	5th
ECEund	38	1st
ECEund	26	2nd
ECEund	35	3rd
ECEg	32	1st
ECEg	44	2nd
Total:	279	

3.2. Instrument

The research instrument consisted of two parts. The first section was designed to collect socio-demographic information: program and year of study, age, gender, years of learning EFL, experience with online EFL learning, secondary schooling, final English grades in secondary school, and experience studying the English language. The SILL scale version 7.0 for learners of EFL and ESL (Oxford, 1990) was the second part of the questionnaire, with five subscales followed by a five-point Likert scale: Memory (9 items), Cognitive (14 items), Compensation (6 items), Metacognitive (9 items), Affective (6 items), and Social (6 items).

3.3. Means of gathering and analysing data

Participants completed the questionnaire in paper format during scheduled EFL classes in the 2022/2023 academic year. Informed consent was obtained from all participants, and

anonymity was maintained throughout the study in accordance with ethical research guidelines. Data analysis was conducted using IBM SPSS Statistics, Version 21. The SILL instrument was subjected to exploratory factor analysis (EFA) to identify underlying dimensions of language learning strategies. Principal Component Analysis (PCA) was employed as the extraction method, followed by varimax rotation with Kaiser normalization to enhance interpretability of the factor structure. Consistent with established methodological recommendations, only items with factor loadings of 0.50 or higher were retained, ensuring statistical robustness and conceptual clarity (Osborne, 2014; Lloret et al., 2017).

All the tested items had salient loading with factor loading above 0.50 (Osborne, 2014; Lloret et al., 2017). The data set's eligibility for factor analysis was assessed using Bartlett's test of sphericity (Bartlett, 1954) and the Kaiser-Meyer-Olkin (KMO) measure of sample adequacy (Kaiser, 1974) (Table 2). The computed KMO values for the sample were 0.899, indicating that it was suitable and that the first criterion for factor analysis had been met (Hoelzle and Meyer, 2013; Kaiser, 1974; Lloret et al., 2017). Bartlett's sphericity test was likewise appropriate (p = 0), demonstrating strong correlations between items and the scale's factorability (Osborne, 2014).

Table 2. *Prerequisites for factor analysis*

KAISER-MEYER-OLKIN MEASURE OF SAMPLING ADEQUACY		.899
Bartlett's Test of Sphericity	Approx. Chi-Square	6436.38
	Df	1225
	Sig.	.000

4. RESULTS AND DISCUSSION

The determination of the optimal number of factors in exploratory factor analysis (EFA) was guided by multiple complementary criteria: eigenvalues, visual inspection of the scree plot (Figure 1), percentage of explained variance, theoretical considerations of dimensionality, and a minimum factor loading threshold of 0.50. Although Kaiser's criterion (eigenvalue > 1) remains a conventional benchmark, it has been widely criticized for its tendency to overestimate the number of factors, particularly in instruments with numerous items (Costello & Osborne, 2005; Fabrigar et al., 1999). To mitigate this risk and enhance the interpretability and stability of the factor structure, a stricter threshold of 1.4 was adopted in the present study. This decision was informed by the inflection point observed in the scree plot and aimed to eliminate factors contributing minimally to the total variance while retaining theoretically meaningful dimensions. Such an approach is consistent with best practices in psychometric research, which advocate for balancing statistical criteria with conceptual coherence (Henson & Roberts, 2006). By applying this criterion, the resulting factor solution demonstrated improved internal consistency and theoretical alignment, leading to the removal of twenty-one items that failed to meet reliability and loading requirements. This refinement process ensured that the final scales were both psychometrically sound and conceptually robust, thereby strengthening the validity of subsequent analyses.
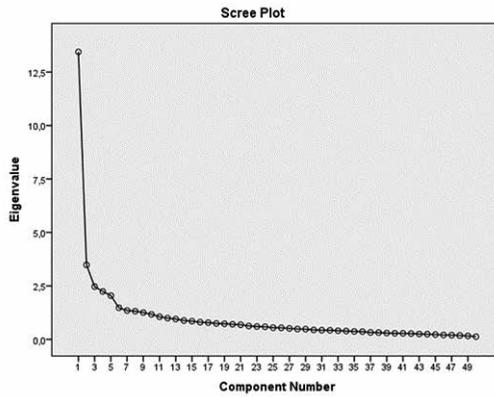
Figure 1. *Scree plot*

Table 3 displays the results of the rotational component matrix, which show the retained items with .5 or greater loading. The first factor had 14 items, the second had 7, and the third and fourth had 4 items.

Table 3. *Exploratory factor analysis results*

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
	S11 .616	S8 .516	S45 .572	S19 .545
	S13 .612	S31 .522	S46 .739	S20 .694
	S14 .690	S33 .690	S47 .641	S21 .497*
	S15 .670	S34 .759	S48 .770	S23 .683
	S16 .675	S35 .584		
	S17 .567	S37 .671		
	S27 .491*	S38 .666		
	S29 .674			
	S30 .544			
	S32 .494*			
	S36 .582			
	S40 .574			
	S49 .618			
	S50 .496			
Initial Eigenvalues	13.445	3.484	2.469	2.243

Note: *Marginal values

Despite a sufficient eigenvalue, all other factors were dismissed due to the small number of items and the validity. If all four factors were preserved as validated subscales, they would

account for 35.07% of the variance. Table 4 shows the individual contribution of these factors to the overall variance, while Table 5 shows their reliability measurements.

Table 4. *Total variance explained*

TOTAL VARIANCE EXPLAINED						
	Initial eigenvalue			*Rotation sum of the squared loading*		
Factor	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	13.445	26.889	26.889	6.995	13.990	13.990
2	3.484	6.968	33.857	4.647	9.294	23.283
3	2.469	4.939	38.796	2.971	5.942	29.225
4	2.243	4.485	43.282	2.924	5.848	35.072
5*	2.047	4.095	47.376	2.461	4.922	39.995
6*	1.476	2.951	50.328	2.218	4.436	44.431

Note: *Components discarded due to low number of retained items

Table 5. *Factor's reliability statistics*

RELIABILITY STATISTICS		
Factor	*Cronbach's Alpha*	*N of items*
1	.905	14
2	.859	7
3	.729	4
4	,740	4

To fulfil the study's objective of re-evaluating the original SILL scale within the context of Croatian non-English major students in the post-pandemic era, the four retained factors identified through exploratory factor analysis will be presented and examined in detail. Each factor will be discussed in relation to prior empirical findings and theoretical perspectives on the application of the SILL instrument. This approach enables a systematic comparison between the newly derived dimensions and the established SILL framework, thereby providing insights into potential shifts in language learning strategy patterns resulting from the transition to online and hybrid learning environments. Such an analysis not only contributes to the refinement of the SILL taxonomy but also addresses broader questions regarding the adaptability of language learning strategies in digitally mediated contexts.

4.1. Factor 1 Scale

Factor 1 (Table 6) represents the most heterogeneous dimension, comprising 14 items drawn from multiple original SILL subscales: Cognitive (S11, S13, S14, S15, S16, S17), Compensation (S27, S29), Metacognitive (S30, S32, S36), Affective (S40), and Social (S49, S50). Examination of the item content reveals a pronounced communicative and proactive orientation toward learning, characterized by strategies that foster self-confidence, self-regu-

lation, and interpersonal engagement. These include seeking opportunities for active speaking and listening, leveraging social interaction for support, and incorporating relaxation and enjoyment into the learning process.

When situated within the broader research landscape, Factor 1 demonstrates notable convergence with re-evaluated SILL models reported in Estonia (Saks & Leijen, 2016), Taiwan (Lee, 2023), and Slovenia (Danko & Dečman, 2019), all of which integrate cognitive, metacognitive, and social strategies into composite dimensions. However, the mixed composition of Factor 1 also underscores the selective omission of certain items from the original SILL framework. Specifically, four cognitive strategies (repetition and practice of unfamiliar words and pronunciation, re-reading, and avoidance of translation) were excluded, as were several compensation strategies (e.g., predicting interlocutor responses, using gestures, and inventing new words) and affective strategies.

These omissions align with prior findings suggesting that affective strategies exert a comparatively limited influence on language proficiency outcomes (Danko & Dečman, 2019). Furthermore, the conceptual profile of Factor 1 closely parallels the 'Obtaining and employing resources for naturalistic learning' dimension identified in the SILL-Greek adaptation (Papadopoulou et al., 2018). This scale emphasizes intrinsically motivated behaviours aimed at acquiring linguistic and cultural knowledge through self-regulated, socially interactive, and enjoyment-driven practices (Oxford et al., 2014; Papadopoulou et al., 2018). Collectively, these patterns suggest that the emergent Factor 1 reflects a shift toward integrative, resource-oriented strategies that prioritize authentic communicative engagement and learner autonomy in digitally mediated contexts.

Table 6. *Factor 1*

Item	Content	Original placement	Item loading
S11	I try to talk like a native English speaker.	CDS	.616
S13	I use the English words I know in different ways.	CDS	.612
S14	I start conversations in English.	CDS	.690
S15	I watch English language TV shows spoken in English or go to movies spoken in English.	CDS	.670
S16	I read for pleasure in English.	CDS	.675
S17	I write notes, messages, letters, or reports in English.	CDS	.567
S27	I read English without looking up every new word.	C	.491
S29	If I can't think of an English word, I use a word or phrase that means the same thing.	C	.674
S30	I try to find as many ways as I can to use my English.	M	.544
S32	I pay attention when someone is speaking English.	M	.494*
S36	I look for opportunities to read as much as possible in English.	M	.582
S40	I try to relax whenever I feel afraid of using English.	A	.574
S49	I ask questions in English.	S	.618
S50	I try to learn about the culture of English speakers.	S	.496

Note: *Marginal values

4.2. Factor 2 Scale

Factor 2 (Table 7) comprises the remaining metacognitive items (S31, S33, S34, S35, S37, S38) alongside one item from the original Memory Scale (S8). Unlike Factor 1, this dimension exhibits greater conceptual homogeneity, reflecting strategies primarily associated with structured, formal language learning contexts. Specifically, these items emphasize planning, goal setting, and self-monitoring, behaviours such as organizing study schedules, evaluating progress, and adopting strategies to become more effective learners. In contrast, the metacognitive items integrated into Factor 1 are more closely aligned with informal learning practices, such as spontaneous engagement and resource-seeking behaviours.

Comparative analysis with prior research indicates that Factor 2 closely parallels the 'Monitoring cognition for advancement' dimension identified in the SILL-Greek adaptation (Papadopoulou et al., 2018), which combines metacognitive and cognitive strategies aimed at deliberate performance monitoring, error detection, rehearsal, and progress evaluation. These findings underscore the enduring relevance of metacognitive strategies in digitally mediated learning environments, where self-regulation becomes critical for learner autonomy.

Further support for this interpretation emerges from studies conducted among EFL learners in online settings (Chang & Chang, 2014; Rahimi & Katal, 2012; Roy & Crab, 2014; Zhou & Wei, 2018), which consistently report frequent use of strategies analogous to those represented in Factor 2. Examples include noticing and correcting errors, maintaining attentional focus during multimedia input, reading with a specific purpose, selectively allocating attention, visualizing information, and employing digital tools to enhance comprehension. Collectively, these patterns suggest that Factor 2 encapsulates a cluster of strategies that facilitate structured, goal-oriented learning and cognitive monitoring, which are functions that appear increasingly salient in the context of remote and technology-enhanced language instruction.

Table 7. *Factor 2*

ITEM	CONTENT	ORIGINAL PLACEMENT	ITEM LOADING
S8	I review English lessons often.	Mem	.516
S31	I notice my English mistakes and use that information to help me do better.	M	.522
S33	I try to find out how to be a better learner of English.	M	.690
S34	I plan my schedule so I will have enough time to study English.	M	.759
S35	I look for people I can talk to in English.	M	.584
S37	I have clear goals for improving my English skills.	M	.671
S38	I think about my progress in learning English.	M	.666

4.3. Factor 3 Scale

Despite the reduced prominence of social interaction in online and distance learning environments, Factor 3 (Table 8) retains considerable significance, encompassing most items

from the original SILL Social Scale (S45, S46, S47, S48). In contrast, items S49 and S50 were integrated into Factor 1, forming a cluster of strategies that appear more closely associated with informal, non-institutionalized language learning contexts rather than structured classroom settings. The items within Factor 3 reflect strategies aimed at fostering interpersonal engagement and sociocultural awareness, such as seeking opportunities for conversation, asking questions, and learning about cultural aspects of the target language.

This interpretation aligns with findings from Slovenian research, which highlights the continued relevance of socially oriented strategies, including interacting with peers, practicing conversational skills, and leveraging cultural knowledge for language development (Danko & Dečman, 2019). Furthermore, Factor 3 demonstrates conceptual similarity to the 'Using resources in learning' dimension identified in the Greek adaptation of the SILL (Papadopoulou et al., 2018), which integrates socio-interactive resources (e.g., assistance from teachers, peers, and educational materials) with cognitive processes for conceptualizing linguistic input. This synthesis reflects a sociocultural-interactive approach to language learning, emphasizing the strategic use of available resources in both formal and informal contexts. Recent studies further corroborate the strong association between motivation, willingness to communicate, and the adoption of socially oriented strategies, particularly when supported by ICT tools (Almesaar, 2024; Fišer, 2023a, b, 2024; Fišer & Pongračić, 2025a, b; Li & Liu, 2021; Zhou, 2022; Zhou & Wei, 2018). These findings underscore the enduring role of social strategies in promoting engagement and communicative competence, even within digitally mediated learning environments.

Table 8. *Factor 3*

ITEM	CONTENT	ORIGINAL PLACEMENT	ITEM LOADING
S45	If I do not understand something in English, I ask the other person to slow down or say it again.	S	.572
S46	I ask English speakers to correct me when I talk.	S	.739
S47	I practice English with other students.	S	.641
S48	I ask for help from English speakers.	S	.770

4.4. Factor 4

Factor 4 (Table 9), by contrast, comprises four items (S19, S20, S21, S23) originally drawn from the Cognitive Scale. Although its reliability coefficient is modest (Cronbach's $\alpha = .740$), likely due to the limited number of items, the factor nonetheless represents a coherent cluster of cognitive strategies distinct from those in Factor 1. Specifically, Factor 4 reflects strategies focused on linguistic analysis and meaning construction rather than proactive communication. These include recognizing lexical and syntactic patterns, decoding meaning, and translating into the learner's first language. Such strategies suggest a more analytical and form-focused orientation toward language learning, emphasizing comprehension and structural understanding over interactive engagement. While narrower in scope, Factor 4 highlights the persistence of traditional cognitive strategies within the broader landscape of language learning

behaviours, particularly among learners navigating complex linguistic input in online settings.

Table 9. *Factor 4*

ITEM	CONTENT	ORIGINAL PLACEMENT	ITEM LOADING
S19	I look for words in my own language that are similar to new words in English.	CDS	.545
S20	I try to find patterns in English.	CDS	.694
S21	I find the meaning of an English word by dividing it into parts that I understand.	CDS	.497*
S23	I make summaries of information that I hear or read in English.	CDS	.683

Note: *Marginal values

4.5. Testing the hypothesis

To test the hypothesis that prior online learning experience affected the use of LLSs, the Wilcoxon signed-rank test was employed. Results indicate that students who reported participation in online learning during the 2020/2021 academic year (the period coinciding with the COVID-19 outbreak) demonstrated significantly lower usage of strategies associated with Factor 1 (z = −2.722, p < .01), Factor 2 (z = −4.200, p < .01), and Factor 4 (z = −2.292, p < .05) (Table 10).

Table 10. *The relationship between the online EFL learning in 2020/2021 and items of Factors 1, 2, and 4*

	ONLINE UNIVERSITY 2020/2021	N	MEAN	MEAN RANK	WILCOXON W	Z	P
Factor 1	yes	112	3.12	121.41	13598	- 2.722	.006
	no	161	3.41	147.84			
Factor 2	yes	114	2.76	113.71	12963	- 4.200	.000
	no	160	3.21	154.45			
Factor 4	yes	115	2.66	125.52	14434,5	- 2.292	.022
	no	161	2.93	147.77			

Similarly, students who engaged in online EFL learning during the 2021/2022 academic year reported a significant reduction in strategies measured by Factor 1 (z = −2.517, p < .05) and Factor 2 (z = −2.907, p < .01) (Table 11). These findings suggest that the experience of online learning exerted a negative influence on Croatian non-English major students' use of proactive and communicative strategies (Factor 1), metacognitive strategies (Factor 2), and, to a lesser extent, cognitive strategies (Factor 4). Notably, the social strategies represented by Factor 3 remained unaffected, indicating that learners continued to employ socially oriented behaviours despite the constraints of remote instruction.

Table 11. *The relationship between the online EFL learning in 2021/2022 and items of Factors 1 and 2*

ONLINE UNIVERSITY 2021/2022		N	MEAN	MEAN RANK	WILCOXON W	Z	P
Factor 1	yes	99	3.10	121,06	11985	- 2.517	.012
	no	174	3.39	146,07			
Factor 2	yes	99	2.82	119,03	11783.5	- 2.907	.004
	no	175	3.13	147,95			

The observed pattern diverges from previous research emphasizing the critical role of metacognitive strategies in online learning contexts (Chang & Chang, 2014; Fišer, 2022, 2023b; Lee, 2023; Rahimi & Katal, 2012; Roy & Crab, 2014; Zhou & Wei, 2018). This discrepancy underscores the need to revisit theoretical assumptions regarding LLS deployment in post-pandemic learning environments, with particular attention to the interplay between social and metacognitive dimensions across diverse instructional modalities.

5. CONCLUSION

The Strategy Inventory for Language Learning (SILL) has maintained its popularity due to its clear design and accessibility for both learners and researchers. However, concerns regarding its continued relevance in contemporary linguistic and educational research should not focus solely on the instrument or its classification system (Dörnyei, 2005; Tseng et al., 2006; Woodrow, 2005). Rather, they should consider the distinction between conscious and unconscious strategy use which is a key factor differentiating strategic from non-strategic learner behaviour (Amerstorfer, 2016, 2018; Cohen, 2012, 2014, 2018; Oxford, 2011, 2017; Oxford & Amerstorfer, 2018). Oxford (2011) cautions against conflating deliberate strategies with automatic skill-based actions, emphasizing that LLSs are teachable tools that learners actively select to support tasks such as storing, retrieving, and constructing linguistic knowledge. If learners are unaware of the strategies they employ, reliance on SILL alone becomes problematic, reinforcing calls for its integration with complementary instruments (Amerstorfer, 2018; Chamot, 2018; Gunning & Turner, 2018; Oxford et al., 2018).

The findings of this study indicate that the shift to online learning during the pandemic significantly influenced LLS use among Croatian non-English major students. The re-evaluation of SILL revealed a substantial restructuring, resulting in four distinct factors: a heterogeneous, communicative cluster (Factor 1), a metacognitive cluster (Factor 2), a social cluster (Factor 3), and a cognitive cluster (Factor 4). Compensation strategies appear to have diminished in relevance, while affective strategies were largely absent from the revised structure - an observation warranting further investigation across diverse learning contexts. Moreover, Wilcoxon test results demonstrated that prior online learning experience negatively affected the use of proactive, communicative, metacognitive, and certain cognitive strategies, while social strategies remained stable. These findings challenge earlier research emphasizing the centrality of metacognitive strategies in online learning (Chang & Chang, 2014; Lee, 2023; Rahimi & Katal, 2012), suggesting that the pandemic-driven digital shift may have altered learners' strategic preferences.

This study underscores the need to adapt LLS assessment tools to reflect evolving learning environments and learner behaviours. Strategy training should prioritize metacognitive and social dimensions while exploring how compensation and affective strategies manifest in technology-mediated contexts. Additionally, the persistence of social strategies highlights opportunities for leveraging interactive and collaborative features of digital platforms to sustain engagement and motivation. These insights contribute to the broader discourse on developing adaptive, context-sensitive models of LLS classification that better capture the dynamic nature of language learning in the post-pandemic era.

Several limitations should be acknowledged. First, the sample consisted primarily of female students enrolled in social sciences programs, which may limit generalizability to other disciplines or gender groups. Second, variations in online learning duration and instructional methods during the pandemic could have influenced strategy use, introducing potential confounding factors. Third, the study relied exclusively on self-report measures, which may not fully capture unconscious or automatic strategy use. To address these limitations, future research should employ mixed-method approaches such as interviews or think-aloud protocols, and conduct cross-validation across diverse cultural, disciplinary, and demographic contexts. Further investigation into compensation and affective strategies is particularly warranted, given their apparent decline in the revised SILL structure. Finally, exploring adaptive LLS interventions in digital learning environments could inform instructional practices that foster self-regulation and learner autonomy.

FUNDING INFORMATION

6. REFERENCES

Almesaar, O. (2024). L2MSS in the Saudi Arabian context: Item, scale, and external validity analysis. *Frontiers in Education, 9*, 1247701. https://doi.org/10.3389/feduc.2024.1247701

Amerstorfer, C. M. (2016). *Situated strategy use in cooperative learning: A descriptive case study of five learners of English as a foreign language*. [Doctoral dissertation], Alpen-Adria-Universität Klagenfurt, Austria

Amerstorfer, C. M. (2018). Mixing methods: Investigating self-regulated strategies in a cooperative EFL learning environment. In R. L. Oxford & C. M. Amerstorfer (Eds.), *Language learning strategies and individual learner characteristics: Situating strategy use in diverse contexts* (pp. 123-140). Bloomsbury.

Chang, C., & Chang, C.-K. (2014). Developing students' listening metacognitive strategies using online videotext self-dictation-generation learning activity. *The EUROCALL Review, 22*(1), 3-19. https://doi.org/10.4995/eurocall.2014.3636

Chamot, A. U. (2018). Preparing language teachers: New teachers become ready to teach learning strategies in diverse classrooms. In R. L. Oxford & C. M. Amerstorfer (Eds.), *Language learning strategies and individual learner characteristics: Situating strategy use in diverse contexts* (pp. 213-235). Bloomsbury.

Cohen, A. D. (2012). Strategies: The interface of styles, strategies, and motivation on tasks. In S. Mercer, S. Ryan, & M. Williams (Eds.), *Psychology for language learning: Insights from research, theory and practice* (pp. 136- 150). Palgrave Macmillan.

Cohen, A. D. (2014). *Strategies in learning and using a second language* (2nd ed.). Routledge.

Cohen, A. D. (2018). Moving from theory to practice: A closer look at language learner strategies. In R. L. Oxford & C. M. Amerstorfer (Eds.), *Language learning strategies and individual learner characteristics: Situating strategy use in diverse contexts* (pp. 31-53). Bloomsbury.

Cohen A. D., & Wang I. K.-H. (2018). Fluctuations in the functions of language learning strategies. *System*, *74*, 169–182.

Costello, A. B., & Osborne, J. (2005). Best practices in exploratory factor analysis: four recommendations for getting the most from your analysis. *Practical Assessment, Research, and Evaluation, 10*(7), 1-9. https://doi.org/10.7275/jyj1-4868

Danko, M., & Dečman, M. (2019). The strategy inventory for second language learning: tested, adapted and validated in the Slovenian higher education context. *ESP Today, vol. 7*(2), 207-230.https://doi.org/10.18485/esptoday.2019.7.2.5

Dorand, P. (2020). Analyzing Online Learning Satisfaction and Language Learning Strategies Use. *Journal of ICT, 2* (2), 39-48. http://dx.doi.org/10.13140/RG.2.2.20035.02086

Dörnyei, Z. (2005). *The psychology of the language learner: Individual differences in second language acquisition*. Routledge.

Dörnyei, Z. (2009). The L2 Motivational Self System. In Z. Dörnyei, & E. Ushioda (Eds.), *Motivation, Language Identity and the L2 Self* (pp. 9-42). Multilingual Matters.

Dörnyei, Z. (2019). Towards a better understanding of the L2 Learning Experience, the cinderella of the L2 Motivational Self System. *Studies in Second Language Learning and Teaching, 9*(1), 19-30. http://dx.doi.org/10.14746/ssllt.2019.9.1.2

Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods, 4*(3), 272–299. https://doi.org/10.1037/1082-989X.4.3.272

Fišer, Z. (2022). Could language learning strategies and affective filters be determinants of EFL proficiency during online learning setting?. In I. Petrušić (Ed.), *Proceedings COAST 2022* (pp. 539-549). Faculty of Management, Herceg Novi, Montenegro.

Fišer, Z. (2023a). The effects of using the Microsoft Teams application interface during an online EFL course. *In Esse: English Studies in Albania, 14*(1), 18-33.

Fišer, Z. (2023b). The Effect of Online Learning Setting on Motivation, Intended Effort, Emotional engagement, and language learning strategies among non-English majors in Croatia In: I. Karabegović et al. (Eds), *New Technologies, Development and Application VI. NT 2023. Lecture Notes in Networks and Systems, vol. 687*. (pp. 542-549) Springer: Cham. https://doi.org/10.1007/978-3-031-31066-9_60

Fišer, Z. (2024). How is the use of ICT shaping our intended effort for learning?. In: Karabegovic, I., Kovačević, A., Mandzuka, S. (Eds), *New Technologies, Development and Application VII. NT 2024. Lecture Notes in Networks and Systems, vol 1070*. Springer, Cham. https://doi.org/10.1007/978-3-031-66271-3_30

Fišer, Z., & Pongračić, L. (2025a). Re-evaluating the L2MSS Scale in the context of non-English major students. *Iranian Journal of Language Teaching Research 13*(1), 45-62. https://doi.org/10.30466/ijltr.2025.55206.2687

Fišer, Z., & Pongračić, L. (2025b). The effect of online learning setting on motivation to learn EFL among students of child education profession. *Knowledge Management & E-Learning, 17*(2), 225–239. https://doi.org/10.34105/j.kmel.2025.17.010

Gunning, P., & Turner, C. E. (2018). Young language learners in classroom contexts: The development of strategy assessment methods and tools. In R. L. Oxford & C. M. Amerstorfer (Eds.), *Language learning strategies and individual learner characteristics: Situating strategy use in diverse contexts* (pp. 259-286). Bloomsbury.

Henson, R. K., & Roberts, J. K. (2006). Use of exploratory factor analysis in published research: Common errors and some comment on improved practice. *Educational and Psychological Measurement, 66*(3), 393–416. https://doi.org/10.1177/0013164405282485

Jiang, C., & Papi, M. (2021). The motivation-anxiety interface in language learning: a regulatory focus perspective. *International Journal of Applied Linguistics,* 1-16. https://doi.org/10.1111/ijal.12375

Lee, J.-Y. (2023). Language learning strategies used by EFL students: Does their digital fluency matter? *Language Teaching Research.* https://doi.org/10.1177/13621688231166881

Li, T., & Liu, Z. (2021). Exploring effects of the second language motivational self system on Chinese EFL learners' willingness to communicate in English and implications for L2 education. *Journal of Higher Education Research, 2*, 169–177. https://doi.org/10.32629/jher.v2i4.404

Liu, M. (2024). Mapping the landscape of research on the L2 motivational self system theory (2005-2021): bibliometric and text network analysis. *System, vol. 120*, 103180. https://doi.org/10.1016/j.system.2023.103180

Oxford, R. L. (1990). *Language learning strategies: What every teacher should know.* Heinle & Heinle.

Oxford, R. L. (2011). *Teaching and researching language learning strategies.* Pearson Longman.

Oxford, R. L., & Amerstorfer, C. M. (2018). Introduction: The state of the art in language learning strategies and individual learner characteristics. In R. L. Oxford & C. M. Amerstorfer (Eds.), *Language learning strategies and individual learner characteristics: Situating strategy use in diverse contexts (pp. xxiii-xxxiv).* Bloomsbury.

Oxford, R. L., Lavine, R. Z., & Amerstorfer, C. M. (2018). Understanding language learning strategies in context: An innovative, complexity-based approach. In R. L. Oxford & C. M. Amerstorfer (Eds.), *Language learning strategies and individual learner characteristics: Situating strategy use in diverse contexts (pp. 5-29).* Bloomsbury.

Oxford, R. L., Rubin, J., Chamot, A.U., Schramm, K., Lavine, R., Gunning, P. & Nel, C. (2014). The learning strategy prism: per spectives of learning strategy experts. *System 43,* 30–4.

Papadopoulou, I., Kantaridou, Z., Platsidou, M., & Gavriilidou, Z. (2018). The SILL revisited in light of the S2R model of language learning. *The Language Learning Journal, 46*(5), 544-556.

Pawlak, M. (2021). Investigating language learning strategies: Prospects, pitfalls and challenges. *Language Teaching Research, 25*(5), 817-835. https://doi.org/10.1177/1362168819876156

Pawlak M., Oxford R. L. (2018). Conclusion: The future of research into language learning strategies. *Studies in Second Language Learning and Teaching, 8, 523–532.* https://doi.org/10.14746/ssllt.2018.8.2.15

Rahimi, M., & Katal, M. (2012). The role of metacognitive listening strategies aware ness and podcast-use readiness in using podcasting for learning English as a foreign language. *Computers in Human Behavior, 28,* 1153-1161. https://doi.org/10.1016/j.chb.2012.01.025

Roy, D., & Crabbe, S. (2014). Website analysis in an EFL context: Content compre hension, perceptions on web usability and awareness of reading strategies. *ReCALL, 27*(2), *1*31-155. https://doi.org/10.1017/S095834401400024X

Tseng, W.-T., Dörnyei, Z., & Schmitt, N. (2006). A new approach to assessing strategic learning: The case of self-regulation in vocabulary acquisition. *Applied Linguistics, 27,* 78-10.

Woodrow, L. (2005). The challenges of measuring language learning strategies. *Foreign Language Annals, 38*(1), 90-98.

Yang, L., & Chanyoo, N.: Motivational factors and intended efforts in learning East Asian lan-guages among Thai undergraduate students. *Theory and Practice in Language Studies, 12*(2), 254-262. https://doi.org/10.17507/tpls.1202.06

Zhou, Y., & Wei, M. (2018). Strategies in technology-enhanced language learning. *Studies in Second Language Learning and Teaching, 8,* 471–495. https://doi.org/10.14746/ssllt.2018.8.2.13