Journal of English Language Teaching and Applied Linguistics
ISSN: 2707-756X
DOI: 10.32996/jeltal
Journal Homepage: www.al-kindipublisher.com/index.php/jeltal

JELTAL
AL-KINDI CENTER FOR RESEARCH AND DEVELOPMENT

| RESEARCH ARTICLE

Investigating Language Learning Strategies Among Moroccan Learners: A Quantitative Study

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| ABSTRACT
This study explores the intricate relationship between English proficiency and the use of language learning strategies among Moroccan students. We analysed responses from 126 Moroccan design students' use of language learning strategies employing the Strategy Inventory for Language Learning (SILL). The findings highlight a significant effect of improved proficiency on language strategies' adoption, with more proficient learners using these strategies at higher frequency, particularly metacognitive, cognitive, and compensation strategies. Interestingly, affective strategies exhibited a curvilinear relationship, plateauing at moderate proficiency. The study underscores the importance of tailoring language instruction and curriculum design to help improve Moroccan students' English proficiency, especially when English is increasingly becoming popular. Our study is a part of a larger attempt that aims to investigate language proficiency differences between Moroccan students as a first step to democratize language learning.

| KEYWORDS
Language Learning Strategies, English Proficiency, Moroccan Design Students, SILL, Metacognitive Strategies, Affective Strategies, Learner Autonomy, Curriculum Design, Higher Education.

| ARTICLE INFORMATION
ACCEPTED: 01 January 2025 **PUBLISHED:** 05 February 2025 **DOI:** 10.32996/jeltal.2025.7.1.9

I. Introduction

It is intriguing how language learners can differ significantly in their achievement. Researchers have long attempted to break down the secrets behind successful language learning. Among the critical factors influencing language learning is language learning strategies. This paper defines language strategies as techniques or actions learners adopt to improve their proficiency (Oxford, 1990; Cohen, 1998). Since English as a medium of instruction may be a serious possibility in Morocco, research must help build a fertile ground where such a shift is inclusive (El Machichi & Brigui, 2025). Recent research highlights the importance of metacognitive, cognitive, and compensation strategies in driving language proficiency (Zou & Lertlit, 2022). However, there is a paucity of research on the differences between different proficiency levels in the Moroccan context (Bendaoud, 2024; El Aouri & Zerhouni, 2017; Seffar, 2014; Houssami & Benattabou, 2023; Nadif, 2024). This study addresses this gap by examining the relationship between English proficiency and the use of language learning strategies among Moroccan design students. Understanding strategies' use across proficiency levels is advantageous from theoretical and practical standpoints. It helps identify educational interventions at macro and micro levels that can foster effective language learning. Also, examining the intricacies of language strategy use provides valuable insights for all stakeholders, which can promote equitable language learning. Finally, studies on language learning might benefit the broader public directly by delivering actionable insights into the most effective strategies successful language learners adopt.

2. Literature Review

2.1 Definition & History of Learner Strategies

This paper understands learning strategies as techniques and approaches learners use to enhance their learning process. According to Cohen (1998),

> language learning strategies are processes consciously selected by learners, which may result in actions taken to improve the learning or use of a second or foreign language, achieved through the storage, retention, recall, and application of information about that language (p. 4).

The question of why some language learners are more successful than others has intrigued researchers globally. The fact that two learners, provided with similar conditions, can differ significantly in their language acquisition is a valuable topic of inquiry. The mid-1970s saw the initial steps of research into learning strategies, led by Stern (1975) and Rubin (1975), who sought to answer one question: what makes effective language learners effective? Learning strategies encompass four main areas (O'Malley & Chamot, 1990). Research into learning strategies aims to understand and examine the methods employed by successful language learners. This involves investigating complex, interconnected cognitive, metacognitive, social, affective, and effective learning strategies (Oxford, 1990). Insights gained in this field help identify the most effective strategies and discover ways to transfer them to learners, particularly those struggling, thereby enhancing their learning (Chamot, 1987). This, in turn, represents a shift from teacher-centred to learner-centred language learning as research begins to explore the learner's role in the learning process (Nunan, 1988). Learning strategies benefit from developments in cognitive psychology, a discipline that acknowledges that successful learners utilise common cognitive processes in learning nearly everything, not just language (Anderson, 1983).

Several classifications have emerged for learning strategies, mainly Weinstein and Mayer's Classification (1986), Rubin's Classification (1981), Schmitt's Classification (1997), Pintrich's Model of Learning Strategies (2000), and Carrell's Classification (1989). For this research, we briefly explore Oxford's Classification (1990).

The Oxford classification defines learning strategies as the techniques, behaviours, or actions learners employ to enhance their learning (Oxford, 1990). These strategies assist learners in storing, retrieving, and utilising information (O'Malley & Chamot, 1990). Consequently, learning strategies aim to make learning faster, easier, more effective, and more self-directed (Rubin, 1987). Oxford's framework categorises learning strategies into two types: direct and indirect. Direct strategies include memory, cognitive, and compensation (Zou & Lertlit, 2022). These strategies involve manipulating the target language; for example, learners may use mnemonics to transfer vocabulary from short-term to long-term memory (Rubin, 1981). Another component of direct strategies is the cognitive categorisation of language patterns (O'Malley & Chamot, 1990). Learners are also inclined to use compensation strategies, such as employing gestures to compensate for their limited ability to express specific messages in the language (Cohen & Chi, 2004). As the name suggests, indirect strategies facilitate learning without directly relating to the language. These comprise metacognitive strategies for evaluating and planning learning, affective strategies that help manage emotions and motivation, and social strategies for interacting with others in the target language (Chen Xiaotang & Zheng Min, as cited in Chen 2016).

2.2 Strategy Inventory for Language Learning (SILL) Survey Explained

Rebecca Oxford founded the Strategy Inventory for Language Learning (SILL) survey, which examines six main types of strategies: memory, cognitive, compensation, metacognitive, affective, and social strategies (Oxford, 1990). First**,** memory strategies are techniques used to store, retain, and retrieve new words. They are grounded in cognitive dual theory, which considers verbal and nonverbal processes equally crucial in human cognition.

> Paivio (1986) states, "Human cognition is unique in that it has become specialised for dealing simultaneously with language verbal and nonverbal objects and events. Moreover, the language system is peculiar in that it deals directly with linguistic input and output (in the form of speech or writing) while at the same time serving a symbolic function with respect to nonverbal objects, events, and behaviours. Any representational theory must accommodate this dual functionality" (p. 53).

Examples of memory strategies include using mnemonics, grouping vocabulary by themes, rehearsing lexicon to internalize it, and associating newly acquired vocabulary with personal experiences. This category of strategies is especially crucial during the early stages of language learning as learners need to build a lexical threshold. Second**,** cognitive strategies involve manipulating learning materials, such as summarising and reasoning exercises, and are also grounded in cognitive dual theory. Techniques such

as taking notes, translating words to L2, and analyzing language patterns are key cognitive strategies. This category of strategies helps learners improve their reading, writing, and speaking skills. Third, metacognitive strategies, which allow learners to plan, monitor, and evaluate their learning, are supported by constructivist theory, assuming learners construct their learning through observing patterns and forming and testing hypotheses (Schraw & Moshman, 1995). Effective learners tend to employ a mixture of these strategies, such as managing time effectively, setting specific learning goals, and reflecting upon their learning methods. This allows learners to become more autonomous and reflective. Fourth, social strategies, derived from sociocultural theory, view language learning as a socially mediated process where interaction between peers or teachers is pivotal (Oxford, 2011). These include practicing the language with native or more proficient speakers, seeking opportunities to communicate in the target language, and asking for more explicit feedback. Fifth, affective strategies underline the importance of controlling emotions such as stress and anxiety in language learning, benefiting from studies on the affective domain of second language acquisition (SLA) and highlighting the centrality of motivational and emotional aspects in language acquisition (Oxford, 1999). In this regard, good learners identify sources of FLA and constantly seek to mitigate them. In addition, affective strategies include techniques such as rewarding oneself, listening to music, and using positive affirmations to elevate one's confidence. This type of strategies help learners manage their emotions during the learning process. Finally, compensation strategies emphasise the learners' ability to compensate for communicative deficiencies in various settings (Dörnyei & Scott, 1997). Examples of these strategies include guessing the meaning of unfamiliar lexical items from context, asking for clarification, and using gestures to convey a message. These strategies ensure that communication occurs, even when speakers are not sufficiently proficient.

3. Methodology

Research Objective:

To investigate the learning strategies used in English language learning among Moroccan design students.

To investigate differences in English language learning strategies among Moroccan design students at different English proficiency levels.

Research questions:

1) What are the strategies commonly used by students at different levels of proficiency?

2) How do students at different proficiency levels employ learning strategies?

Research Hypothesis

Learners with higher proficiency levels use the six categories of learning strategies significantly more.

Research Instruments

This study adpts a quantitative approach using Rebecca Oxford's (1990) Strategy Inventory for Language Learning (SILL). Students were asked to answer the SILL survey. Researchers have extensively employed the SILL survey due to its ease of administration, and its potential to generate comprehensive profiles that describe strategy use across different contexts (Amerstorfer, 2018). Research has also highlighted this instrument's psychometric strength, which has been corroborated in multiple studies (Rose et al., n.d, 2017). The students answered the survey on a Likert scale of 5. We interpret the results according to Oxford (1990) as follows:

3.5 - 5.00 = High use of strategies
2.5 - 3.49 = medium use of strategies
1.0 – 2.49 = low use of strategies

Additional questions about students' demographics and self-assessed proficiency. Students assessed their language proficiency on a scale of five (1 = very low) and (5 = very high). Previous research has indicated that self-assessment, although under certain conditions, is a valid tool to measure language proficiency, especially among young adults, which is the sample population of this study (Brown et al., 2015). We interpret the results according to the following

1 – 2 = low proficiency
3 = moderate proficiency
4 – 5= high proficiency

Due to research constraints, we could not conduct a placement test for 126 research participants. Therefore, we decided to conduct a placement test for 51 research participants. We adopted the McMillan Readers (2019) placement test for this purpose. The test contains 70 multiple-choice questions. We carried out the test and the interpretation according to the instructions by McMillan Readers. The participants were given 30 minutes to complete the test. We interpreted as follows:

Table 1: McMillan Readers placement test rubric.

Item	Placement
1 – 6	Beginner
7 – 20	Elementary
21 – 34	Pre-intermediate
35 – 48	Intermediate
49 – 62	Upper Intermediate
63 – 70	Advanced

Note: An experienced teacher graded the test to ensure objectivity.

The results of the placement tests were compared to students' self-assessments to ensure that the latter is a valid research instrument in this case. First, we adjusted the placement test table to match a 5 Likert Scale according to the Common European Framework of Reference for Languages (CEFR).

Table 2: adjusted placement test rubric

Item	Likert Scale adjusted
1 – 20	1
21 - 34	2
35 - 48	3
49 - 62	4
63 - 70	5

Second, we run correlation and regression tests to ensure that the participants' self-assessment predicts their language proficiency. The correlation test reveals a strong relationship between the participants' self-assessment and actual proficiency, $r = 0.734$, $p < 0.001$ (table 3)

Table 3: Pearson's Correlations

Variable		Self Ass	Adjusted
1. Self Ass	Pearson's r	—	
	p-value	—	
2. Adjusted	Pearson's r	0.734	—
	p-value	< .001	—

The regression analysis confirms that self-assessment strongly predicts placement test scores based on the sample size provided (table 4). The proposed model ($M1$) explains 53.8% of the variance in placement test performance ($R2 = 0.538$) and reduces prediction error significantly (RMSE = 0.651) compared to the null model ($M0$, RMSE = 0).948). Therefore, we can reliably adopt

self-assessment as a reliable tool for our research purposes. Additionally, including a moderate proficiency level serves as a buffer zone to strengthen the comparison across low and proficiency levels by mitigating potential variability or misjudgements on the part of the research participants.

Table 4: Regression Model Summary - Adjusted

Model	R	R^2	Adjusted R^2	RMSE
M_0	0.000	0.000	0.000	0.948
M_1	0.734	0.538	0.529	0.651

Note. M_1 includes Self Ass

Research Participants

This research population comprises first- and second-year students at ArtCom Sup Casablanca, a Moroccan-accredited Higher Education School of interior and graphic design. The medium of instruction at the school is French, with English being taught as a secondary subject (ArtCom Sup, 2025). Students study interior and graphic design subjects in the first year; only in the second year can they opt for either graphic or interior design majors. 126 students participated in this study; 67% (n= 85) were females, and 33% (n = 41) were males. 59% (n = 74) are first-year students, while 41% (n = 52) were second year students. Most second-year students, 73% (n = 38), were interior design majors, while the rest, 27% (n = 14), were graphic design students.

4. Results

4.1 General Strategy Use: general view

Table 4 presents an overview of the language learning strategies' frequency of use reported by the research participants. The data indicates that this group of learners use all the strategies at a medium level, with metacognitive strategies ranking first (m = 3.49), cognitive strategies second (m = 3.30), followed closely by social strategies (m = 3.29). The data indicates that affective strategies were the fourth most used strategies (m = 2.92), followed by compensation (m = 3.16) and memory strategies (m = 2.83), ranking fifth and sixth, respectively.

Table 4: *General Strategy Use: general view*

Category Strategy	Samples	Mean Score	Std Deviation	Strategy Use Rank	
Memory Strategies	126	2.83	0.64	Medium Use	6
Cognitive Strategies	126	3.30	0.69	Medium Use 2	
Compensation Strategies	126	3.16	0.73	Medium Use 5	
Metacognitive Strategies	126	3.49	0.79	Medium Use 1	
Affective Strategies	126	2.92	0.80	Medium Use 4	
Social Strategies	126	3.29	0.85	Medium Use 3	

Note. This is a note about the table

a. Memory Strategies

Low proficiency participants recorded low use of memory strategies, while the rest of the groups exhibited medium use. Memory strategies' use increases incrementally at higher proficiency levels, with the low group scoring (m = 2.43; Std = 0.66), the

moderate group (m = 2.86; Std = 0.62), and the high group (M = 3.00; 0.56). Overall, the participants reported using memory strategies in the lower spectrum of medium use < 3.00.

Table 5: ***Memory Strategies***

Group	Mean Score	Std Deviation	Interpretation
Low	2.43	0.66	Low use
Moderate	2.86	0.62	Medium Use
High	3.00	0.56	Medium Use

Note. This is a note about the table

b. Cognitive Strategies

The difference in cognitive strategies is more pronounced than memory strategies (table 6). Low and moderate groups scored at different ends of the medium-use spectrum scoring (m = 2.67 & m = 3.31). The results indicate that higher proficiency learners use cognitive strategies significantly more than moderate and low groups (m = 3.78). The results also confirm the tendency for strategies to increase in tandem with proficiency improvement.

Table 6: ***cognitive strategies***

Group	Mean Score	Std Deviation	Interpretation
Low	2.596	0.791	Medium use
Moderate	3.303	0.543	Medium Use
High	3.779	0.471	High Use

Note. This is a note about the table

c. Compensation Strategies

Continuing the same tendency, higher-proficiency learners use compensation strategies more than moderate and low groups (table 7). High-proficiency groups reported (m = 3.55), which falls in the high-use threshold. Low and Moderate learners recorded (m = 2.69; m = 3.3), respectively.

Table 7*:* ***Compensation strategies***

Group	Mean Score	Std Deviation	Interpretation
Low	2.616	0.74	Medium use
Moderate	3.16	0.67	Medium Use
High	3.55	0.62	High Use

Note. This is a note about the table

d. Metacognitive Strategies

The same tendency is observed for metacognitive strategies; however, the moderate group's use of this category is within the high-use range, recording (m = 3.56). The differences are the biggest between high and low groups scoring (m = 3.84) and (m = 2.78), respectively.

Table 8: *metacognitive strategies*

Group	Mean Score	Std Deviation	Interpretation
Low	2.78	0.76	Medium Use
Moderate	3.56	0.71	High Use
High	3.84	0.69	High Use

Note. This is a note about the table

e. Affective strategies

Interestingly, affective strategies show a curvilinear relationship (table 9). The moderate group reported the highest use (m = 3.11), while low and high proficiency learners reported (m = 2.53; m = 2.86). This may suggest that high-proficiency learners' use of this category plateaus then declines as they become more aware of their learning process and decreases at higher proficiency levels (table 9.1).

Table 9: *affective strategies*

Group	Mean Score	Std Deviation	Interpretation
Low	2.46	0.74	Medium Use
Moderate	3.11	0.72	Medium Use
High	2.86	0.88	Medium Use

Note. This is a note about the table

Table 9.1: Affective strategies graph

f. Social strategies

Social strategies increase with improved proficiency (Table 10). Students with high proficiency reported high use of social strategies (m = 3.61, Std = 0.74), followed by moderate proficiency groups (m = 3.33, Std = 0.73) and finally, a low proficiency group (m = 2.86, Std = 0.71).

Table 10: Social strategies

Social Strategies	Mean Score	Std Deviation	Interpretation
Low	2.78	0.79	Medium Use
Moderate	3.30	0.84	Medium Use
High	3.61	0.74	High Use

Note. This is a note about the table

The descriptive statistics part has corroborated the tendency of language learning strategies at higher proficiency, except for effective strategies. High proficiency groups showed a high use across all the categories except for memory and affective strategies. The latter has exhibited a curvilinear relationship between proficiency and strategy adoption, as shown previously. Moderately proficient learners reported medium use of all the categories except for metacognitive strategies, where they reported high use. Low proficiency groups consistently scored in the low spectrum of medium use, except for memory strategies, where they scored just slightly below medium use (m = 2.43).

4.2 Statistical Comparisons across all the groups

While the previous section clearly outlined the distinction in strategies across all three proficiency levels, this distinction needs further breakdown through inferential statistics to test the research hypothesis that Moroccan design students' use of learning strategies increases with improved proficiency.

We employed the Shapiro-Wilk normality test (table 11) on each category strategy since one of the main goals of the present study was to check whether there are significant differences in strategies' use across the different proficiency levels. The following categories follow a normal distribution: memory strategies (p = 0.274), compensation strategies (p = 0.07), and affective strategies (p = 0.426). Non normally distributed data included cognitive strategies (p = 0.034), metacognitive strategies (p = 0.019), and social strategies (p = 0.011).

Table 11: Shapiro-Wilk Normality Test Results by Strategy Category

Strategy Category	Shapiro-Wilk W	p-value	Normality Conclusion
Memory	0.990	0.484	Normal Distribution
Cognitive	0.976	0.022	Non-Normal Distribution
Compensation	0.986	0.208	Normal Distribution
Metacognitive	0.974	0.017	Non-Normal Distribution
Affective	0.988	0.331	Normal Distribution
Social	0.978	0.042	Data not normally distributed

Note. Non-normal distribution, p < 0.05.

4.3 Memory Strategies

According to the normality test, memory strategies are normally distributed across all categories. We encountered issues employing ANOVA to study the differences between the three proficiency groups. Therefore, Bayesian ANOVA was used to statistically analyse the differences between the research participants in their use of memory strategies. The results indicate that English proficiency likely influences the frequency of using memory strategies. The analysis yielded strong evidence with a posterior probability *P*(*M*/data) = 0.92 (table 12), showing a 92% chance that proficiency levels explain strategy use. This corroborates the descriptive statistics of strategy use increasing with better proficiency.

Table 12: Bayesian ANOVA : Memory Strategies

Models	P(M)	P(M|data)	BF_M	BF_{10}	error %
How proficient is your English? (1 = very low; 5 = very high)	0.500	0.926	12.448	1.000	
Null model	0.500	0.074	0.080	0.080	0.015

A post hoc test was conducted to investigate the differences between the proficiency groups (table 13). The results indicate significant differences in memory strategies across low, moderate, and high-proficiency groups. For instance, the Bayes Factor (*BF*10, *U* = 31.678) shows very strong evidence that high-proficiency learners adopt these strategies more than low-proficiency learners. However, the numbers suggest weak evidence (BF10, U = 0.321) that high-proficiency learners use memory strategies more than the moderate group.

Table 13: Post Hoc Comparisons – Memory Strategies

		Prior Odds	Posterior Odds	$BF_{10, U}$	error %
Low	Moderate	0.587	5.870	9.993	3.730×10^{-7}
	High	0.587	18.608	31.678	2.625×10^{-7}
Moderate	High	0.587	0.189	0.321	0.019

Note. The posterior odds have been corrected for multiple testing by fixing to 0.5 the prior probability that the null hypothesis holds across all comparisons (Westfall, Johnson, & Utts, 1997). Individual comparisons are based on the default t-test with a Cauchy (0, r = 1/sqrt(2)) prior. The "U" in the Bayes factor denotes that it is uncorrected.

4.4 Cognitive Strategies:

Since cognitive strategies do not follow a normal distribution, a nonparametric test is suitable to investigate their use across proficiency levels. In our case, and since we had three groups, we employed the Kruskal-Wallis test. The results corroborate the tendency that strategy use increases with high proficiency levels with a test result of (Statistic, 37.354, p<.001) (table 14).

Table 14: Kruskal-Wallis Test, Cognitive Strategies

Factor	Statistic	df	p
How proficient is your English? (1 = very low; 5 = very high)	37.354	2	< .001

A post hoc test (Turkey HSD) was employed to investigate the differences between the individual groups (Table 15) . Expectedly, the largest differences were recorded between low-proficiency and high-proficiency groups with a mean difference of -1.183 (*t* = 7.519, p< .0010). Additionally, the comparison between low and moderate proficiency yielded a positive difference - 0.707 (*t* = -5.070, p <.001), with the latter group using cognitive strategies significantly more.

Table 15: Post Hoc Comparisons – Cognitive Strategies

		Mean Difference	SE	df	t	p_{tukey}
Low	Moderate	-0.707	0.139	122	-5.070	< .001
	High	-1.183	0.157	122	-7.519	< .001

Table 15: Post Hoc Comparisons – Cognitive Strategies

		Mean Difference	SE	df	t	p_{tukey}
Moderate	High	-0.476	0.123	122	-3.882	< .001

Note. P-value adjusted for comparing a family of 3 estimates.

4.5 Compensation Strategies

Since compensation strategies follow a normal distribution, we employed the ANOVA test to investigate the difference across the proficiency spectrum regarding compensation strategies. The results showed a statistically significant effect of proficiency on using compensation strategies, $F(2, 122) = 13.369$, $p < .001$, $\eta^2 = .092$ (Table 16). However, the results suggest proficiency explains only 9% of the variance in employing this language-learning strategy category.

Table 16: ANOVA - Compensation Strategies

Cases	Sum of Squares	df	Mean Square	F	p
How proficient is your English? (1 = very low; 5 = very high)	11.839	2	5.920	13.369	< .001
Residuals	54.020	122	0.443		

Note. Type III Sum of Squares

After establishing a significant effect of language proficiency on compensation strategies, post hoc comparisons were used to study the difference between proficiency groups. Again, the results substantiate that the more proficient learners are, the more they adopt compensation strategies. The high and low proficiency comparison recorded the largest difference, 0.935, $t(122) = 5.171$, $p < .001$. In contrast, the comparison between high and moderate proficiency groups showed a significant, albeit smaller, mean difference of 0.391, $t(122) = 2.777$, $p = 0.017$. Similarly, moderately proficient learners reported greater use of compensation strategies than the least proficient groups, with a mean difference of -0.543, $t(122) = -3.392$, $p = 0.003$. The results confirm that compensation strategies progress from low to high proficiency incrementally.

Table 17: Post Hoc Comparisons – Compensation Strategies

		Mean Difference	SE	df	t	p_{tukey}
High	Low	0.935	0.181	122	5.171	< .001
	Moderate	0.391	0.141	122	2.777	0.017
Low	Moderate	-0.543	0.160	122	-3.392	0.003

Note. P-value adjusted for comparing a family of 3 estimates.

4.6 Affective Strategies

Affective strategies normality test yielded a normal distribution across the category use. Therefore, we employed the ANOVA test to study the differences between low, moderate, and high-proficiency groups. The results indicated a statistically significant effect of language proficiency on affective strategies' use, $F(2, 122) = 6.17$, $p .003$, $\eta^2 = .092$ (table 18). However, the results indicate proficiency level only accounts for 9.2% of the variance in the use of strategies.

Table 18: ANOVA - Affective Strategies

Cases	Sum of Squares	df	Mean Square	F	p
How proficient is your English? (1 = very low; 5 = very high)	7.305	2	3.653	6.170	0.003
Residuals	72.225	122	0.592		

Note. Type III Sum of Squares

The Post Hoc comparisons corroborate the curvilinear relationship between language learning strategies and proficiency levels discussed in this research paper's initial descriptive statistics section (table 19). The comparison between low and moderate proficiency levels showed that moderate proficiency learners adopt affective strategies significantly more than low proficiency learners with a mean difference of -0.643, $t(122) = -3.47$, $p = .002$. Interestingly, the comparison between low and high-proficiency learners revealed no significant difference in using affective strategies, with a mean difference of -395, t (122) = -1.89, $p = .1476$. Similarly, data analysis revealed no significant relationship between language learning strategies across moderate and high proficiency learners, t (122) = 1.52, p = 285. The results corroborate the idea that strategies' use tends to plateau at moderate proficiency as learners become more proficient.

Table 19: Post Hoc Comparisons – Affective Strategies

		Mean Difference	SE	df	t	p_{tukey}
Low	Moderate	-0.543	0.160	122	-3.392	0.003
	High	-0.935	0.181	122	-5.171	< .001
Moderate	High	-0.391	0.141	122	-2.777	0.017

Note. P-value adjusted for comparing a family of 3 estimates.

4.7 Metacognitive Strategies

Shapiro Wilk test revealed that metacognitive strategies follow the non-normal distribution. Therefore, we employed Kruskal-Wallis to investigate differences across the proficiency levels and metacognitive strategies' use. The test showed significant differences across the proficiency levels, $H(2) = 22.81$, $p < .001$ (table 20). Dunn's Post Hoc comparisons confirm that the pattern of use of learning strategies improves at high proficiency levels (Table 21). High-proficiency learners use metacognitive strategies more than moderate proficiency levels, $z = -3.79$, $p < .001$. Additionally, the rank-biserial correlation reports a large size effect, $r_{rb = 0.549.}$ The comparison between high-proficiency and low-proficiency learners showed both a statistically significant difference z = -4.690, p < 00.1, and a strong size effect, $r_{rb = 0.694.}$ However, comparing high-proficiency and moderate learners yielded no significant relationship and a weak rank-biserial correlation, z = -1.801, p = 0.072 & $r_{rb = 216}$

Table 20: Kruskal-Wallis Test , Metacognitive Strategies

Factor	Statistic	df	p
How proficient is your English? (1 = very low; 5 = very high)	11.349	2	0.003

Table 21: Dunn's Post Hoc Comparisons – Metacognitive Strategies

Comparison	z	W_i	W_j	r_{rb}	p	p_{bonf}	p_{holm}
Low - Moderate	-2.217	43.630	62.913	0.302	0.027	0.080	0.053
Low - High	-3.369	43.630	76.682	0.543	< .001	0.002	0.002
Moderate - High	-1.801	62.913	76.682	0.216	0.072	0.215	0.072

Note. Rank-biserial correlation based on individual Mann-Whitney tests.

4.8 Social Strategies

Since social strategies follow a non-normal distribution, we employed Kruskal-Wallis to investigate further learners' differences in using this category across the proficiency levels. The results indicate that strategies differ between the proficiency groups: H(2) = 11.349, p = 0.003 (Table 22) . As expected, the Post Hoc comparisons (Dunn's test) indicate that high-proficiency learners employ social strategies significantly more than low-proficiency learners, z = -3.369, p < .00P. The size effect corroborates this tendency with $r_{rb = 543,}$ indicating large size effects. Similarly, moderately proficient learners tend to use social strategies more than students at the lower proficiency spectrum, z = - 2.217, p = 0.027. In addition, Biserial correlation results show size effects in this comparison, $r_{rb = 302.}$ The comparison between moderate and high-proficiency learners revealed non-significant results and weak size effects, z =−1.80, r_{rb} =0.216, p = .072 (table 23).

Table 22: Kruskal-Wallis Test, Social Strategies

Factor	Statistic	df	p
How proficient is your English? (1 = very low; 5 = very high)	11.349	2	0.003

Table 23: Dunn's Post Hoc Comparisons – Social Strategies

Comparison	z	W_i	W_j	r_{rb}	p	p_{bonf}	p_{holm}
Low - Moderate	-2.217	43.630	62.913	0.302	0.027	0.080	0.053
Low - High	-3.369	43.630	76.682	0.543	< .001	0.002	0.002
Moderate - High	-1.801	62.913	76.682	0.216	0.072	0.215	0.072

Note. Rank-biserial correlation based on individual Mann-Whitney tests.

4.9 Correlation Test:

While the statistical significance may reveal if the differences between the groups are unlikely to result from chance, correlation tests help capture the strength of said differences and whether they are practically relevant. This is especially important in second language acquisition (SLA) research, where such results may lead to practical implications. The main aim of this section is to study the correlation between language proficiency and strategy use.

We selected Pearson's and Spearsman's correlation tests based on the characteristics of the different categories' datasets. Pearson's correlation is suitable for parametric data. Pearson's correlation indicated the following results: first, there is a weak correlation between language proficiency and affective strategies (r = 127, p = 0.16). This confirms the previous descriptive and statistical tests, concluding that the use of affective strategies does not practically affect proficiency. Second, memory strategies also recorded a weak positive correlation between language proficiency and strategy use, r = 0.280, p = 002. Third, the correlation between metacognitive strategies and language proficiency is moderate, r = 401, p = .001.

Spearsman's test was used with the categories data that did not meet the normality assumptions. On the one hand. The results concluded that cognitive strategies showed a strong size effect across all language proficiency groups (ρ = 0.591, p = < 0.001), indicating a monotonic relationship between proficiency and strategy use. On the other hand, metacognitive strategies yielded a moderate correlation (ρ = 0.401, p = 0.001), which mirrors the general tendency for this type of strategy to increase in tandem with proficiency. However, such an increase is less pronounced. Finally, the correlation between social strategies and language proficiency falls slightly below the moderate threshold (ρ = 0.299, p < 0.001). This finding warrants further investigation.

Table 24: effect size interpretation

Corrolation (r & ρ)	Difference Magnitude	Interpretation
0.10 to 0.29	Small effect	A small, but noticeable difference
0.30 o 0.49	Medium Effect	The difference is meaningful and is practically relevant
>0.50	Large Effect	The difference is substantial and highly meaningful

Table 25: correlation test across all the categories

Strategy Category	Correlation Test	r/ρ (Effect Size)	p-value	Effect Size Interpretation	Significant (p<.05)
Memory	Pearson	0.280	p<.002	Weak	Yes
Cognitive	Spearman	0.591	p<.001	Strong	Yes
Compensation	Pearson	0.421	p<.001	Moderate	Yes
Metacognitive	Spearman	0.401	p<.001	Moderate	Yes
Affective	Pearson	0.127	P = 0.157	Weak	No
Social	Spearman	0.299	P <.001	Weak to moderate	Yes

Note. This is a note about the table

5. Discussion

5.1 Affective Strategies: a curvilinear relationship

The curvilinear relationship between language proficiency and learners' use of affective strategies presents an intriguing finding. This study has revealed that high-proficiency learners use affective strategies less frequently than moderate-proficiency learners. This finding correlates with previous research. For instance, KovacEvic (2018) investigated the relationship between language learning strategies and lexical complexity. The study found a weak correlation between lexical complexity and affective strategies, with students demonstrating more complex use of lexicon using this category of strategies less frequently (r = - 0.127, p = 0.157). Hong-Nam and Leavell's (2006) insights into learning strategies used by three proficiency groups, beginner, intermediate, and advanced, revealed a broader curvilinear relationship between learner strategies and language proficiency, with affective strategies being the least used across the board. This aligns with the current research findings, with moderate learners reporting the highest use of this category (*m* = 3.11), and in terms of overall strategies' use, as it was ranked fourth among the different categories (*m* = 2.92). Bremner (1999) attempted to study the correlation between the six strategies and language proficiency. His findings corroborate this current study, with a negative variation between proficiency and affective strategies use, i.e., more proficient learners were found to apply these strategies less frequently. These results indicate that learners use this category less as they become more confident speakers (Teimouri et al., 2019). Also, the Moroccan context may help explain why Moroccan students use these strategies less frequently. Despite its growing popularity, English is still a foreign language in Morocco; therefore, language use might be restricted to specific contexts where the speakers choose to communicate in English rather than in situations where there is an urgent need to communicate. Hence, there is less stress in using affective strategies. Additionally, we subscribe to Bremner's (1999) argument that this category may not qualify as learning strategies; they are features that mark a transitional phase from low to high proficiency learning (Bremner, 1999).

5.2 Language Learning Strategies in the Moroccan Context

Some researchers have tried to untangle the nuances of the language learning strategies employed by Moroccan learners. Bendaoud (2024) investigated the use of language learning strategies by Moroccan students of English. The author concluded that almost all strategies are highly used (Bendaoud, 2024). However, it should be noted that his sample population included students in semester six of English studies, and hence, their language proficiency should generally be higher than the current research's sample population, i.e., design students. Additionally, English remains a secondary subject for design students, which might explain why English department students use learning strategies significantly more. Bendaoud concluded that there was a moderately positive correlation between language learning strategies and academic achievement. However, Bendaoud (2025) shows a problematic issue while interpreting the correlation results in the study, characterizing weak correlations as moderate, whereas r = 0.10 to r = 29 falls within a weak correlations framework, Bendaoud (2024) states:

> "In this study, there was a moderate positive linear correlation between the use of language learning strategies and academic achievement, with a correlation

> coefficient of r (294) = .12 and p = .06. Further analysis revealed that metacognitive, affective, and social strategies were moderately and positively correlated with academic achievement, with correlational coefficients of r (294) = .12 and p = .06. In particular, affective strategies had a correlation coefficient of r (294) = .21 and p = .05, as did social strategies (p,30)."

R = .21 is a statistically weak correlation (Cohen, 1988). A proper interpretation of Bendaoud's research suggests a weak correlation between academic achievement and affective strategies, corroborating our findings. As for social strategies, our findings differ from Bendaoud's, where we noted a weak correlation; their research concluded with a moderate correlation. The contexts of each sample population may again explain the differences, i.e., design studies where French is the medium of instruction vs. English studies where students' field revolves around English.

Seffar (2014) investigated the use of language learning strategies by Moroccan EFL students. Her findings corroborate the general tendency of participants to use learning strategies at a medium level. However, unlike Seffar's findings, our data concluded that High-proficiency learners use all learning strategies except for affective and memory categories. Our findings corroborate El Aouari and Zerhouni's (2017) study on Moroccan science students' use of learning strategies, confirming a medium level of use across all categories overall. However, this research adds another layer to their contribution by delving into variations in strategies' use across different proficiency levels. For instance, we highlighted an inverse relationship between the participants' use of social strategies, i.e., where the more proficient groups scored high, their counterparts in the low proficiency scored low.

In contrast to the results of this study, Houssami and Bentatabou (2023) investigated the use of learning strategies among Moroccan post-graduate students. Their research included that student used different strategies at high levels, except for social strategies, which were at medium levels. These differences can be attributed to two main factors. First, the sample population of their study was comprised of post-graduate students, while this study's population comprised undergraduate students. Second, Houssami and Bentatabou (2023) used an adapted version of the SILL survey, while this study used the original version to ensure validity and reliability.

5.3 Cognitive, Metacognitive, and social strategies.

Except for the affective strategies discussed above, this study corroborates the tendency of language strategies to increase in tandem with improved proficiency. Previous research concluded similar results. Alfarisy (2022) studied Indonesian students' use of language learning strategies. His finding showed that learners used strategies in this order: metacognitive strategies, cognitive strategies, and social strategies, which is similar to our research findings with metacognitive strategies first (m = 3.49), cognitive strategies (m = 3.30), and social strategies (m = 3.29). Tahery, et al (2020) also corroborate the same tendency with roughly the same order of use. Fakhruddin et al. (2024) discuss the correlation of learning strategies in English language proficiency. They concluded a positive correlation between language proficiency and using metacognitive and cognitive strategies. This current study has found that metacognitive strategies have shown the strongest difference magnitude between high and low-proficiency learners. This mirrors the findings of Habók and Magyar (2017), who found a positive correlation between metacognitive strategies and foreign language (i.e., English marks).
Social strategies present an intriguing finding. While the comparison between low and high proficiency yielded a large effect (r = .554), the analysis revealed no significant relationship between moderate and high proficiency groups. The correlation test across the proficiency groups revealed a weak correlation (r = .299). This tendency might be attributed to the nature of self-assessment and the biases accompanying it (Oscarson, 2009). Alternatively, this finding suggests that social strategies are an outcome of language proficiency rather than a predictor, i.e., for students to use these strategies more, they need to achieve better proficiency.

5.4 Implications

This research has attempted to provide a nuanced analysis of Moroccan design students' use of Language Learning Strategies (LLS). After completing the nitty gritty analysis part, it is time to link theory to practice. Since the data have indicated the most significant differentiators across the three language proficiency groups are in this order: metacognitive, social, and cognitive strategies, we recommend the following.

Metacognitive, cognitive, and social strategies should be integral to curriculum development. Project-based learning is one way to incorporate metacognitive skills into curriculum design effectively (Wang, Gao, & Chen, 2024) This approach emphasizes the need to plan recursive milestones where learners plan, monitor, and reflect on their own learning. We suggest designing task-based learning journals tailored to specific students' needs. For instance, the following journal (appendix 1) was designed for first-year interior design students. The journal adopts task-based learning broadly by emphasizing learner autonomy, setting clear

learning goals, and planning. Additionally, the journal emphasizes the role of reflection and feedback in the learning process. While the proposed journal is not a model to be replicated, it serves as an example that can inspire educators to tailor their practices to help learners develop stronger metacognitive skills.

Research in Morocco has shown that autonomous learning approaches foster better use of language learning strategies. Mohamed Ezzaidi (2020) conducted experimental study on how autonomous learning (AL) improved baccalaureate students' use of different language learning strategies, especially when coupled with consistent and systematic implementation on the part of instructors.

These research findings hint that a considerable number of Moroccan design students report high proficiency in English. This treasure trove may warrant more research and experimentation from all stakeholders. Literature has shown that methods such as peer-assisted learning (PAL) and community language learning (CLL) positively affect language learning (Fuchs et al., 2000; Richards & Rodgers, 2001). This paper is a call to action to foster language clubs and more collaborative language learning tools across Moroccan higher education institutions. However, such endeavors must consider safeguarding and inclusivity to benefit the maximum number of participants,

Finally, the recent rapid development of Artificial Intelligence (AI) offers an unprecedented opportunity to harness AI's power to democratize language learning. Developers, researchers, and educators have at their disposal tools that can provide individualized techniques that help the rich myriads of language learners worldwide (Intellectsoft, 2025).

5.5 Limitations

While this has attempted to provide an insightful analysis of Moroccan design students' language-learning strategies, it still has limitations. First, while the Likert scale of 1 – 5 validly measures students' self-assessed proficiency, self-reporting may not be ideal and can introduce other factors, such as confidence. We studied the validity and reliability of self-assessment for our case, whereby we concluded that self-assessment was suitable for our research design. However, more objective language assessment measures could render more reliable results. Second, this research study's usable sample population is (n = 126). While it provides valuable insights, more significant samples are needed to conclude more generalizable results. Third, this research has not employed qualitative methodology. Future research could benefit from qualitative research instruments to gain better insights into learning strategies, especially considering the current research findings where social strategies showed high variability among each research participant.

6. Conclusion

This study is a systematic attempt to explore language learning strategies (LLS) among Moroccan students. The results indicate intricate dynamics between English proficiency and strategy adoption. This research underscores a significant, albeit varied, relationship between language learning strategies and English proficiency, highlighting a monotonic relationship between the two variables, especially in metacognitive, cognitive, and compensation strategies. Interestingly, affective strategies allude to a curvilinear adoption pattern, peaking at moderate proficiency before declining slightly when students become more proficient. Our findings corroborate the hypothesis that more proficient learners employ a broader range of language strategies with higher frequency, namely in metacognitive strategies, reflecting that successful language learners tend to maintain control over their language learning processes consciously. However, our findings suggest that while language learning strategies have a significantly strong effect when comparing low- and high-proficiency learners, the differences are less pronounced when comparing moderately proficient learners with the most proficient ones. Furthermore, this study provides more insights into English language strategies employed by students whose current programs are mainly in the French language. Therefore, they do not have much formal contact with the English language. This is especially important in Morocco, where English is increasingly becoming important. Finally, this study has attempted to provide a robust statistical analysis of language learning strategies' usage across proficiency levels, which may provide actionable and theoretical insights for future research.

Funding: This research received no external funding
Conflicts of Interest: The authors declare no conflict of interest.
ORCID iD : 0009-0003-1424-1307

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Appendix

Appendix 1:

Phase One: Inquiry

1- Research a space (online or from your surroundings) that you think has bad interior design. Stick the pictures below.
2- Describe the interior design and the ergonomics of the place.
3- Identify the main areas that can be improved in the space you have chosen. (Consider the elements of design, lighting, and ergonomics.

Phase Two: Planning

1- Objectives

Think about three areas that you can improve in this space. Define clear objectives for your project.
Sample Objective: I want to improve the interior design of the living room.

Define your main objectives with this work.

Objective One:

Objective Two:

Objective Three:

2- Planning

1- What are the steps you will take to reach your objectives?

2- What resources do you need to complete the project?

3- Prototype
Sketch a brief prototype (prototypes) for the areas you plan to improve (You DO NOT need to make a professional sketch)

4- Reflection 

Reflect on the prototype you made and ask a classmate for feedback.
What are the strengths of your project? What can you change/ improve?

Phase 3: Final Project

Sketch the final version of your project (Remember, it DOES NOT need to be professional!)

Presentation

Think about how you will present your project in front of an audience. Use the following prompts to prepare.

- Who is my audience?
- Briefly, outline the main ideas you want to present.
- Which questions do you expect the audience to ask you?

- Think about the introductory pitch.
- How much time do I need?
- Do I need visual aids in my presentation?

Notes:

Use this section to take notes

Language

Use this section to note down new language (new words, for example)

Feedback
Prof Feedback:

Strengths	
Weaknesses	
Suggestions	

Self-Reflection: what did you learn from this experience?