



Development and Validation of a Questionnaire to Measure EFL Learners' Level of Self-Regulated Learning

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Introduction

In the past few decades, the construct of self-regulated learning (SRL) has found an important place in educational research, targeting learners' strategic behavior. The concept has spawned extensive research in various educational settings highlighting its significance by showing that not only are achievement differences among learners a function of the degree to which they are equipped with SRL processes, but also the processes involved in SRL enable learners with various proficiency levels to improve their academic learning and performance (Zimmerman & Schunk, 2011). More self-regulated learners are purported to be more motivated, efficient and resourceful. This suggests that if learners can develop a sense of self-regulation, they are more likely to persist with the task at hand in the face of competing motivations, distractions, and tendencies toward procrastination (Pintrich, 1999). Therefore, teachers and researchers in the domain of language learning have also been provoked to examine the role of SRL processes given that language learning is a daunting process during which learners face many challenges including the bulk of materials, tensions between social and learning goals, tempting distractions, etc., all of which interfere with second language (L2) learners' performance.

Taking into account the need to explore the role of SRL processes in successful language learning, the purpose of our study is to construct a comprehensive measurement device to enable stakeholders to develop a sounder understanding of factors that impede and/or promote L2 learners' SRL.

Review of the Literature

Interest into L2 learning strategies has been on the rise since the 1970s. Research on language learning strategies moved full steam ahead until the beginning of the new millennium aiming at pushing forward the theoretical understanding of language learning strategies, and exploring ways of empowering language learners to become more self-directed. However, by the mid-2000s, scholars had started voicing their concern about the definitional fuzziness of language learning strategies. For example, Dörnyei and Skehan (2003) contended the term learning strategies "has been used in far too broad a sense, including a

number of different things that do not necessarily belong together” (p. 610). Similarly, Tseng, Dörnyei, and Norbert (2006) noted there is “no coherent agreement on exactly what the defining criteria for language learning strategies are” (p. 80). As a result, Dörnyei (2005) suggested the field be superseded by the notion of SRL from general education. In its diverse conceptualizations, SRL is deemed to be a broad multi-componential construct. Having reviewed numerous models and definitions of SRL, Pintrich (2000) encapsulated the overlapping features which cut across these definitions as follows:

an active, constructive process whereby learners set goals for their learning and then attempt to monitor, regulate, and control their cognition, motivation, and behavior, guided and constrained by their goals and the contextual features in the environment. (p. 453)

Though the transferability of SRL to the domain of L2 learning has been demonstrated (Tseng et al., 2006), a recent systematic review (Rose, Briggs, Boggs, Sergio, & Ivanova-Slavianskaia, 2018) of the studies on the learners’ strategic behavior conducted between 2010 and 2016 revealed many of them were unaware of SRL. Notably, Rose and her colleagues noticed the continuing dominance of the Strategy Inventory for Language Learning (SILL) (Oxford, 1990). Though the most popular self-administered questionnaire in L2 studies, SILL has been the source of much critique. The first criticism revolves around the classification of learning strategies. Second, the labels on the scale (ranging between *never* to *always*) denote the frequency with which learners use strategies, and consequently the scales on the SILL are not cumulative; that is, pooling all the scale items is psychometrically not justifiable (Tseng et al., 2006). Hence, although SILL could be usefully employed in the domain of teaching methodology, its use for research purposes is contentious (Dörnyei & Ryan, 2015).

The Present Study

The goal of this study is to develop and validate the Self-Regulated Language Learning Questionnaire (SRLLQ) to measure undergraduate EFL learners’ strategic behavior. To this aim, the researchers (1) propose a model of SRL, develop the perceived SRL questionnaire, test the reliability and validity of the scale using the internal consistency coefficient and Exploratory Factor Analysis (EFA); and (2) compare the fit of the SRL model with that of two alternative models using Confirmatory Factor Analysis (CFA).

Theoretical Framework

For the sake of developing the SRLLQ, we used Zimmerman’s definition of SRL. Zimmerman (1989) describes SRL as a dynamic process wherein self-regulated learners are recognized to be “metacognitively, motivationally, and behaviorally active participants in their own learning process” (p. 329). This definition is primarily rooted in the social cognitive theory of self-regulation (Bandura, 1997). Accordingly, an investigation of SRL should take into account the role of cognition, metacognition, behavior, and motivation dimensions. In order to ensure comprehensive coverage of the SRL concept, we integrated these four factors with Zimmerman and Moylan’s (2009) cyclical phase model of SRL.

Trying to be selective, researchers decided to include 14 sub-scales or processes representing the four dimensions. Two sub-scales were selected to represent the cognitive dimension. *Task strategies* assist learning by developing a systematic process for reducing a task into its specific components and then addressing these essential parts. *Self-instruction* refers to the overt or covert self-directed description of the steps involved in the course of executing a task.

In this study, we opted for the following metacognitive processes. *Goal setting* refers to specifying the specific outcomes of learning or performance that one expects to attain. *Strategic planning* refers to elaborating an action plan by choosing or constructing the learning strategies or methods that are appropriate for the accomplishment of a particular goal. *Metacognitive monitoring* refers to the informal

mental tracking of the process being followed, and *self-evaluation* refers to the comparison of performance outcome with a standard or goal (Zimmerman & Moylan, 2009).

We decided to include four behavioral processes in our study. *Time management* involves initiatives such as estimating time requirement for the tasks and having a viewpoint of all the aspects of the task being performed (Wolters, Benzon, & Arroyo-Giner, 2011). *Help-seeking* involves student-initiated attempts to solicit assistance when learning or performing a task (Zimmerman, 1989). *Self-recording* refers to creating formal structured records of learning processes or results. *Environment structuring* involves altering the physical surrounding to make it conducive to learning.

Five sub-scales were addressed in the motivational dimension. *Self-efficacy* refers to “beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” (Bandura, 1997, p. 3). *Outcome expectation* is construed as personal beliefs about the anticipated outcomes of actions in the future (Schunk & Zimmerman, 2006). *Causal attribution* refers to the explanations about the sources of personal success or failure in a task. *Goal orientation* is concerned with the learners’ belief about the purposes and reasons of their learning. *Task interest* refers to “one’s liking or disliking a task because of its inherent properties rather than for its instrumental qualities in gaining other outcomes” (Zimmerman & Moylan, 2009, p. 301).

Participants

A sample of 1114 undergraduate EFL learners (496 females and 618 males) majoring in various fields participated in the different steps of questionnaire development. The participants’ age range was 18 to 22 and their proficiency level ranged from beginner to advanced. Respondents included 12 for the initial piloting, 457 for the EFA, and 645 for the CFA.

Questionnaire Construction

Stage one: Questionnaire development

The first step in developing a questionnaire is to identify what concepts should be included in it (Dörnyei & Taguchi, 2010). For this study, the related literature on SRL and the existing models were carefully scrutinized. Since this concept has not been frequently adopted in EFL studies, the researchers had to consult research conducted in the field of psychology, too. As a result of these reviews, 14 processes were selected (as mentioned in Theoretical Framework above). Next, we examined the existing SRL questionnaires for relevant items. Furthermore, our examination included those instruments which exclusively tap one of the above-mentioned processes (e.g., self-efficacy, goal orientation). This way, many items of the pool were adapted from the established measuring devices. In the case of certain components, new items were designed by the researchers. As a result, we incorporated a total of 130 into the questionnaire, adopting a 7-point Likert scale anchored only at endpoints: 1 (*not at all true of me*) and 7 (*very true of me*). The initial list of items was then independently scrutinized by ten experts in English language teaching and two experts in the field of psychology who read each statement and coded them as *essential*, *necessary*, or *not relevant*. Consequently, the number of items was reduced to 68.

Finally, the items were presented to a sample of respondents who were characteristically similar to the target sample. A panel of 12 students from the University of Technology in Tehran volunteered to take part in a round-table meeting with the first researcher to discuss the items. Based on the comments, researchers decided to omit four items from the list.

Stage two: Questionnaire validation

The most important type of evidence in support of the validity of a questionnaire is provided by construct validity. The most common framework for gathering information in support of the construct

validity of a survey is factor analysis. In the present study, the data were analyzed by the two categories of factor analysis, that is, EFA and CFA.

Uncovering the SROLLQ's factor structure. The first step in the validation of the scale was to run EFA on the 64 items of the first version of the SROLLQ. Since EFA is not capable of handling nested factor solutions, separate EFA analyses were run for each dimensions. Principal Axis Factoring (PAF) was used for factor extraction. In each case, the decision as to the number of factors to be extracted was based on the previous literature, the Scree plot, and Parallel Analysis. In addition, the factors were rotated through the Promax technique as the factors measured by the scale are assumed to be correlated (see Brown, 2015).

Prior to the main EFA analyses, the factorability of the correlation matrix was checked through Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. The examination of the initial correlation matrix and the related factorability indices revealed that for the four dimensions the Bartlett's sphericity test was significant at $p < .001$ and the KMO indices were well above the minimum required level: .89, .81, .78, and .90 for metacognition, cognition, behavior, and motivation dimensions, respectively.

Metacognition. Several PAF and Promax rotations revealed that three factors may be extracted which can explain 47 percent of the variance in the data (see Table 1).

TABLE 1
Factor Loadings for the Metacognition Dimension

Factor	Item	Factor		
		1	2	3
Metacognitive monitoring and self-evaluation	S4	.690		
	S54	.646		
	S19	.554		
	S29	.427		
Strategic planning	S37		.686	
	S35		.615	
	S44		.330	
Goal setting	S61			.762
	S51			.408

Cognition. PAF along with Promax rotation were applied several times. After the deletion of a couple of items, a two-factor structure seemed to hold in the data, explaining 35 percent of the variance (see Table 2).

TABLE 2
Factor Loadings for the Cognition Dimension

Factor	Item	Factor	
		1	2
Task strategy	S3	.728	
	S52	.628	
	S18	.601	
	S16	.442	
	S62	.425	
	S46	.379	
Self-instruction	S6		.679
	S1		.645
	S39		.355

Behavior. Frequent PAF analyses followed by the Promax rotation revealed that four factors can be extracted, explaining 39 percent of the variance (see Table 3).

TABLE 3
Factor Loadings for the Behavior Dimension

Factor	Items	Factor			
		1	2	3	4
Environmental structuring	S32	.725			
	S31	.586			
	S21	.307			
Help-seeking	S33		.630		
	S36		.445		
Self-recording	S12			.798	
	S17			.548	
Time management	S38				.534
	S47				.435
	S9				.429
	S8				.310

Motivation. The factor analysis revealed that a five-factor solution best captured the factorial structure of the data (see Table 4). The five factors explained about 56 percent of the variance in the data. As for the cross-loaded item 7, it was decided that the item be allotted to factor 2 with which it has a higher loading.

TABLE 4
Factor Loadings for the Motivation Dimension

Factor	Item	Factor				
		1	2	3	4	5
Self-efficacy	S57	.902				
	S58	.842				
	S5	.596				
	S25	.555				
	S20	.544				
Outcome expectation	S43		.822			
	S30		.782			
	S59		.682			
	S7		.567	.323		
Task interest	S60			.944		
	S53			.719		
	S41			.430		
Causal attribution	S14				.950	
	S50				.532	
Goal orientation	S15					.756
	S45					.519
	S48					.305

The result of keeping items with loadings higher than .30, and deciding on the complex factors (i.e., items with loadings on more than one factor) was the eventual retention of 46 items.

The internal consistency of each dimension was estimated based on the respondents' answers, ranging from .68 (behavior dimension with 11 items) to .89 (motivation dimension with 17 items) with .74 (cognition dimension with 9 items) and .84 (metacognition dimension with 9 items) in between. The Cronbach alpha for the whole questionnaire was found to be .92.

Testing the hypothesized models. After the initial inspection of the factorial structure of the different sections of the questionnaire, a model with 14 sub-scales probing the four dimensions of SRL was hypothesized. Next, several CFAs were conducted to find out whether a higher-order construct exists which can explain the variance of the 14 sub-scales. The CFAs were run on the data collected from a second sample comprising of 645 participants, using Mplus 7.11 (Muthén & Muthén, 1998–2010).

The first CFA models to be tested were the separate sections whose structure was probed into in the EFA phase. Hence, four separate CFAs were run for the cognition, metacognition, behavior, and motivation dimensions. The assessment of the fit of the individual models was based on the soundness of individual parameter estimates and the overall fit indices provided. Moreover, it was made sure that there were no out of bound or Heywood cases (see Kline, 2016). Mplus provides the following four fit indices: Model chi-square, Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), and Standardized Root Mean Square Residual (SRMR).

It should be noted that Mplus also reports the Tucker–Lewis index (TLI) but Kline (2016) warns against the use of this index as it is highly correlated with CFI. The model chi-square tests the “exact-fit” hypothesis for the model. Since almost all models are expected to diverge from the data to some extent, the chi-square index indicates poor fit in almost all cases.

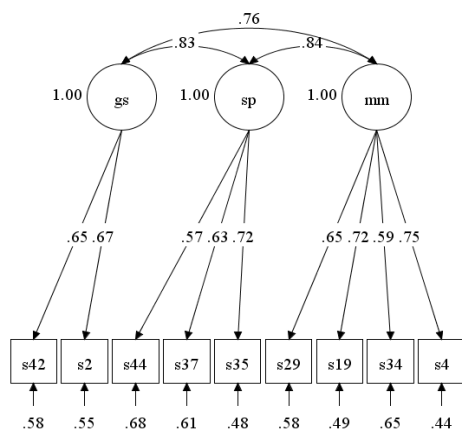
It is usually recommended (e.g., Brown, 2015) that RMSEA values should be less than .06 to indicate good fit. Usually, a 90% interval is also reported around the RMSEA. The upper bound of this interval should not be higher than .08. Moreover, the CFI must be higher than .90 and the SRMR should not exceed .08.

Table 5 displays the fit indices for the four dimensions. All factors seem to indicate good fit. An inspection of the individual parameter estimates revealed that all of them were logical and there were no out of bound estimates. Hence, it may be concluded the factors adequately fit the data.

TABLE 5
Fit Indices for the Initial CFA Dimensions

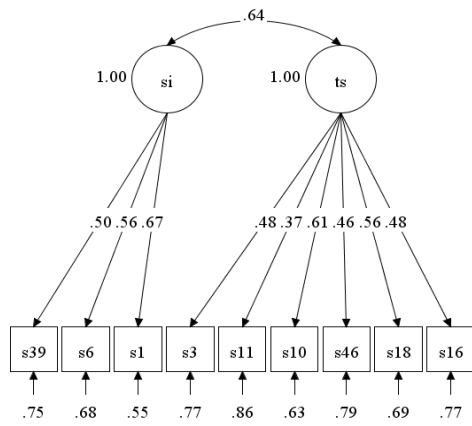
	Chi-square	RMSEA		CFI	SRMR
		Index	90 % interval		
Metacognition	43.301	.036	.018 - .053	.984	.028
Cognition	73.947	.055	.040 - .070	.920	.045
Behavior	79.394	.042	.029 - .055	.950	.038
Motivation	313.614	.055	.048 - .063	.932	.043

The path diagrams along with the relevant parameter estimates for each CFA dimension are reported in Figures 1-4.



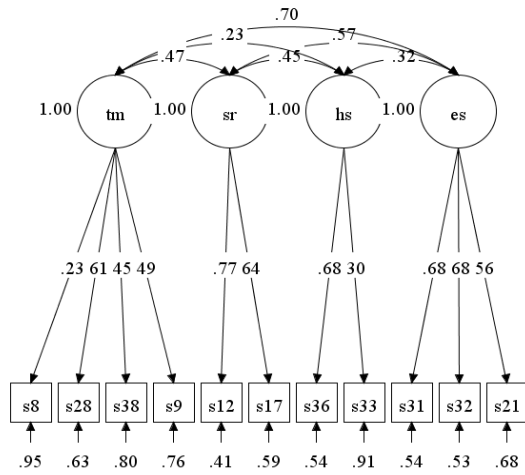
Note. gs = goal setting; sp = strategic planning; mm = metacognitive monitoring and self-evaluation

Figure 1. Path diagram for the metacognition dimension.



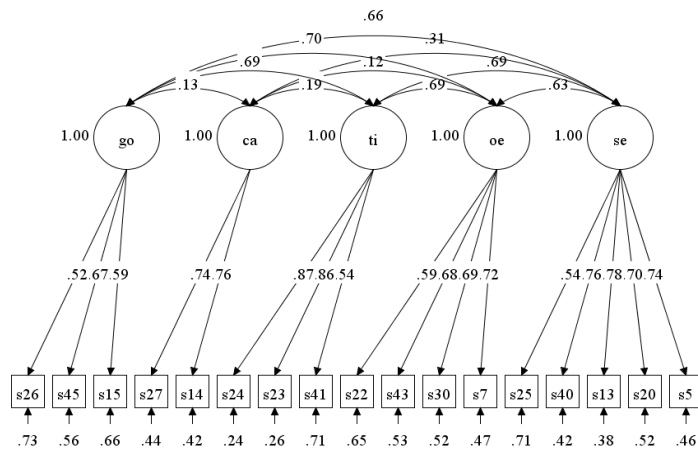
Note. si = self-instruction; ts = task strategies

Figure 2. Path diagram for the cognition dimension.



Note. tm = time management; sr = self-recording; hs = help-seeking; es = environmental structuring

Figure 3. Path diagram for the behavior dimension.



Note. go = goal orientation; ca = causal attribution; ti = task interest; oe = outcome expectation; se = self-efficacy

Figure 4. Path diagram for the motivation dimension.

After making sure that the individual dimensions have the required psychometric properties and that the factorial structure is in keeping with the expectations, the factors were combined in a single model. To this end, the following models were hypothesized and tested:

Model 1: A second-order CFA model of SRL with four factors. Founded on the literature, the researchers hypothesized that the 14 factors extracted formerly would be subsumed under four second-order correlated factors (i.e., cognition, metacognition, motivation, and behavior).

Model 2: A second-order CFA model of SRL with three factors. This model postulates that due to the proximity of the cognition and metacognition factors, their 18 items would merge to constitute a single second-order factor which would be correlated with motivation and behavior factors.

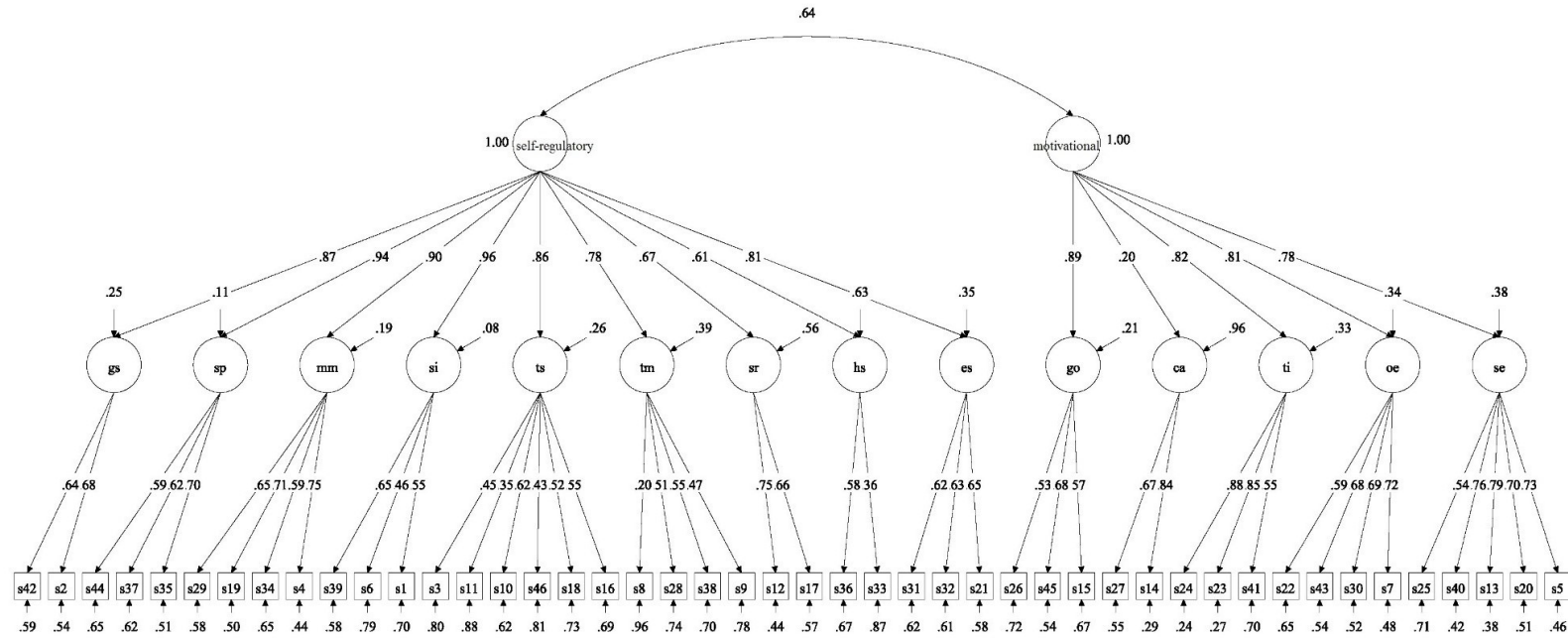
Model 3: A second-order CFA model of SRL with two factors. This model assumes that cognition, metacognition, and behavior factors are measuring the same second-order factor which is correlated with motivation factor.

In the case of the first two models, the analysis did not converge to an acceptable solution. The inspection of the Mplus output and the parameters revealed that the correlations matrix for the latent space was not positive definite and that all correlations among the cognitive, metacognitive, and behavioral factors were above 1.0. This indicated that the models were mis-specified. Hence, these three factors were combined into a single factor, namely Self-Regulatory Strategies. This resulted in a two-factor higher-order model with Self-Regulatory Strategies and Motivational Beliefs as the factors. The analysis of the third CFA model converged to an acceptable solution:

TABLE 6
Fit Indices for the 2-Factor Second-Order Model

Chi-square	RMSEA		CFI	SRMR
	Index	90 % interval		
1852.732	.047	.045 - .050	.908	.070

All in all, the third model indicates good fit. Also, the inspection of the individual parameter estimates indicated that all estimates are logical. The overall fit indices along with the absence of any out of bound parameter estimates indicate that the model fits the data well.



Note. gs = goal setting; sp = strategic planning; mm = metacognitive monitoring and self-evaluation; si = self-instruction; ts = task strategies; tm = time management; sr = self-recording; hs = help-seeking; es = environmental structuring; go = goal orientation; ca = causal attribution; ti = task interest; oe = outcome expectation; se = self-efficacy

Figure 5. Path diagram for the final two-factor CFA mode.

Discussion and Conclusion

The main goal of this study was to report on the development and validation of a self-report questionnaire, the SROLLQ, for measuring undergraduate EFL learners' degree of SRL. For this purpose, the instrument was developed and was put to test with a series of rigorous statistical analyses. The results of EFA corroborated the four hypothesized dimensions of SRL in language learning, that is, cognition, metacognition, behavior, and motivation. Subsequent CFAs showed desirable fit indices for a 2-factor second-order model involving 14 sub-scales. That is, for Iranian undergraduate EFL learners, the factorial structure of SRL entails a Self-Regulatory Strategies dimension – a collective name given to cognitive, metacognitive, and behavioral items – and a Motivational Beliefs dimension.

The significance of the findings of this study could be explained from two perspectives: theory and practice. Theoretically, the results represent an empirically validated framework for measuring Iranian EFL learners' strategic behavior in university setting. Moreover, the higher-order model confirmed in this study shows Self-Regulatory Strategies and Motivational Beliefs are correlated, giving credence to the argument that motivation is a prominent facet for developing self-regulated learners. After all, in the social cognitive model of SRL, motivation is an important construct as it plays a key role in “initiating, guiding, and sustaining student efforts to self-regulate their learning” (Zimmerman & Schunk, 2008, p. 2). Practically, SROLLQ in its present state serves as an instrument for pedagogical and research purposes. Learners, instructors, and researchers may calculate a mean for the whole questionnaire, or for either of its dimensions according to their needs. For pedagogy, undergraduate EFL learners can use SROLLQ as a self-assessment tool to develop a grasp of their SRL level in terms of Motivational Beliefs and Self-Regulatory Strategies. Of course, the 14 processes investigated in this study do not represent the comprehensive list of self-regulatory processes; however, the information obtained from this questionnaire could be used effectively by these learners to become effective self-regulators. In a similar manner, instructors can benefit from the diagnostic information provided by this questionnaire to assess undergraduate L2 learners' level of motivation and their strengths and weaknesses in terms of self-regulatory strategies. Upon discovering the processes which are less popular with learners, instructors can fine-tune their teaching program to provide assistance on the appropriate deployment of those processes. For research, this instrument obviates the need to outsource SRL questionnaires from other content domains, or to employ generic questionnaires like Motivated Strategies for Learning Questionnaire (Pintrich, Smith, Garcia, & McKeachie, 1991).

Despite SROLLQ has shown satisfactory validity and reliability indices, this should not exempt the developed questionnaire from replication studies. Validating a questionnaire is an ongoing process and we recommend other rigorous studies examine the convergent/divergent validity of this instrument. Consequently, to be able to make claims on the wider application of the instrument, the questionnaire needs to be tested on a variety of EFL learners in a multitude of contexts.

Finally, to arrive at a thorough understanding of a learner's degree of SRL, researchers need to complement the data obtained from SROLLQ by qualitative methods such as interviews, microanalytic measures, and think aloud protocols.

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