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Abridged ACRA Scale of Learning Strategies for University Students

Jesús de la Fuente Arias*
Fernando Justicia Justicia**

* University of Almería
** University of Granada

Spain

jfuente@ual.es

justicia@ugr.es

ABSTRACT

Introduction. Our objective centered on validating an abridged version of the ACRA Scale with university students. The original ACRA Scale is an instrument designed to evaluate learning strategies, and is used extensively in the Spanish-speaking context. Nonetheless, both its size and its customary use at non-university levels prompted us to look into its possible adaptation and use at the university level, in a shorter format.

Method. We selected items from the original scale which describe techniques used by a majority of students. Additionally, we carry out descriptive analyses of these techniques, an exploratory factorial analysis of first and second order, and we calculate reliability indices. Finally, we evaluate external validity of the instrument by comparing it to the students' academic performance, using a multiple analysis of variance (MANOVA).

Results. Validity of the construct Abridged-ACRA Scale for University Students, as obtained by successive exploratory factorial analyses, shows a factorial structure different from the original instrument (ACRA Scales). The percentage of variance explained is considerable, with a smaller number of items. Reliability is acceptable, especially in the first two dimensions of the Scale. External validity of the abridged Scale is still able to discriminate different performance levels among university students.

Discussion. Results confirm the need and usefulness of subjecting instruments used in the professional practice of educational and school psychologists to empirical evaluation. This can provide very valuable information for adjusting, adapting or revalidating usefulness of instruments being used, as well as delimiting their usefulness in different contexts of application.

Keywords: Learning Strategies, Evaluation, Abridged Scale Validation, Exploratory Factorial Analysis, University Students.

Introduction

This paper forms part of a group of recent studies which we performed with university students and which center around the ACRA Scales (Roman and Gallego, 1994). In previous studies we became aware of the sensitivity of scale items for establishing relationships between learning techniques and performance, as well as quantitative differences in use of the former according to variables such as gender, age or the students' degree program (De la Fuente, Justicia, Archilla and Soto, 1998). From a more analytic perspective, using the same instrument, we proposed a profile which characterizes the majority of subjects as to their use of study techniques, and a profile of differences according to personal variables such as gender (Justicia and De la Fuente, 2001). Finally, after confirming the sensitivity of techniques for capturing study behaviors among university students, we set a more psychometric objective, carrying out an exploratory factorial analysis in a sample of university students, though with differential results than those found with the original instrument (Justicia and De la Fuente, 1999).

From this line of research we obtained important results concerning the instrument and its use among university students, having demonstrated in the above papers: (1) the small number of techniques being used by university students to any greater or lesser degree, implying that it is possible to ascertain a general profile of study behaviors in this population with fewer items; (2) the inadequacy of the original instrument's general factorial structure for ordering techniques used by university students in a sequence of acquisition, codification, recovery and support in managing information during academic learning.

For all these reasons, and based on our results, we proposed adapting the original instrument and developing an abridged version for university students, one which can give information quickly, concisely and reliably as to learning strategies and techniques used by students at this level. Our objective was not to evaluate what the student does based on what he is supposed to do, i.e. setting out from certain prior information-processing models; on the contrary, we wished to design an instrument which evaluates what that specific student does based on knowledge of what students at that educational level do when they are learning.

Method

Subjects

A sample of 866 students from the University of Almeria participated in this study, with an average age of 20.74 years (sd=3.54). Of these, 294 pupils were male and 554 female; 742 from the first two years of their degree program and 24 from years three and four; 534 were working toward undergraduate degrees and 331 toward graduate degrees; 599 had day classes and 267 had evening classes.

Instruments

1. Measurement of learning strategies. We used the instrument called ACRA Scales of Learning Strategies (Roman and Gallego, 1994). This self-reporting instrument, published in Spanish, is based on cognitive principles of information processing. It enables quantitative evaluation of various learning strategies used by students during their study activity, in its different stages, such as information acquisition, codification, recovery and support (Nisbet and Schucksmith, 1987). Validity and reliability indicators as reported by the authors are quite acceptable for samples of secondary students with whom the instrument was validated.

2. Measurement of academic performance. This was evaluated using the students' self- reported average mark from their university studies to date.

Procedure

The scales were completed by the students in a classroom situation, voluntarily and anonymously. Specifically, they were completed at a single session in the month of April, in a group-classroom situation.

Data analysis

First, we selected all items from the ACRA Scale for which a majority of university students reported using them often or very often, taking greater than 75% in academic use as our cut off. These results are expounded in another paper (De la Fuente, Justicia, Soto and Archilla, 1998).

Second, descriptive statistics were calculated, both for each item of the questionnaire and for each item's correlation with the total obtained for all of them. These analyses give us

a initial acquaintance with the behavior of each of the items comprising the new instrument.

Third, in order to study dimensionality of the construct, we made a first approximation through classic factorial analysis. But before this, as prerequisites, we used Bartlett's sphericity test and the KMO index by Kaiser-Meyer-Olkin (Kaiser, 1974). The former was used to check the hypothesis that the correlations matrix obtained is not an identity matrix, i.e., that there are significant inter-correlations between the variables which justify a factorial analysis. The KMO index, in turn, is used as a measure of sample adequacy, knowing that low values in this index make a factorial analysis unadvisable. Classic or exploratory factorial analysis was performed using the method of factorization of principal axes (Harman, 1976) and the method of factorization of principal components (Harman, 1980), both of which are included in the SPSS statistical package. In addition, we applied Varimax factorial rotation (Martínez Arias, 1995). We also analyzed correlations between factors of the factorial matrix rotated to the first order. Later on, we performed a second order factorial analysis, in order to confirm the existing factorial structure. Additionally, we checked correlations between newly-appearing factors.

After developing the definitive factorial structure, we calculated Cronbach's alpha reliability coefficient, both for the instrument as a whole and for the different subscales, thus obtaining an indicator of internal consistency. Furthermore, in order to establish an external validation criterion for the instrument, we performed an ANOVA between the total use of learning strategies (dependent variable) and the level of academic performance (dependent variable).

Results

1. *Descriptive study of the items selected*

Table 1 presents descriptive statistics for selected items from the *ACRA Scale* (Roman and Gallego, 1994). This table displays average values and standard deviations for each item, as well as the degree of relationship between each of these and the total for its dimension, considering this as an indicator of degree of discrimination.

Table 1. Average, standard deviation and item/total score correlation, for each item selected from the ACRA Scales (N=866). The original scale structure is kept for the description.

tems	average	standard deviation	item/total correlation
ad3	2.9758	1.0626	.29
ad5	3.4383	.8523	.41
ad6	2.7494	1.0726	.33
ad7	2.9492	1.1377	.31
ad8	3.4080	.8439	.39
ad11	3.3487	.8280	.33
ad12	3.5024	.7390	.37
ad15	2.9298	.9171	.39
ad20	3.0981	.8690	.34
co3	3.0954	.8378	.44
co9	2.8381	.9498	.45
co19	2.7503	.9004	.36
co25	3.0502	.9256	.31
co30	3.1543	.9418	.46
co31	2.7491	1.0750	.42
co32	3.0075	1.0321	.46
co34	2.9059	1.0454	.46
co36	3.0201	.9820	.34
co42	2.8959	1.0311	.41
re1	2.8146	.9052	.40
re3	2.7715	.9536	.49
re4	3.1794	.8790	.53
re5	2.9809	.8559	.43
re6	2.8206	.8992	.44
re9	2.7751	.9284	.37
re10	3.2344	.8190	.40
re11	3.1938	.8310	.44
re12	3.0502	.8876	.28
re15	3.1914	.8751	.34
re16	3.1053	.8949	.43
re17	3.0251	.8119	.40
re18	2.8337	.8588	.35
ap2	2.8509	.9061	.48
ap3	3.0534	.8658	.48
ap4	3.1429	.8628	.53
ap5	3.1516	.8974	.53
ap6	2.9379	.9968	.45
ap7	2.6944	.9162	.44
ap10	2.9652	1.0468	.34
ap12	2.9292	1.0105	.38
ap17	3.0807	.8934	.49
ap18	2.8174	.9278	.32
ap21	3.0596	.9123	.27
ap22	3.2621	.9289	.29
ap23	2.8360	1.0175	.36
ap25	2.8845	.9465	.40
ap26	3.5217	.7455	.40
ap27	3.2497	.8095	.32
ap29	3.2559	.8021	.39

ap30	3.1106	.9258	.39
ap31	3.0783	.8625	.35
ap32	3.0944	.9416	.47
ap34	2.8708	1.0418	.18

As we can see, some items show a low correlation with the total score. These cases are: ad3, re12, ap21, ap22 and ap34. Items showing a higher correlation with the total score are found in categories classified in the original instrument as codifying, recovery and support.

2. *Discovering the construct dimensions: exploratory factorial analysis of the first order*

In order to identify the factorial structure of the selected items, a first approximation was made using exploratory factorial analysis, having previously confirmed the adequacy of this type of analysis with data obtained. Bartlett's sphericity test, prerequisite to applying a factorial analysis, showed a ji-squared value = 11402.264 (p= .0000), indicating that our correlation matrix is not an identity matrix. This means that high intercorrelations exist, and the data matrix is suitable for factorial analysis. Secondly, the Kaiser-Meyer-Olkin index was calculated: (KMO) = .87122. Both results confirmed that our data were suitable for factorial analysis.

Once the factorial analyses of principal components (PC) and of principal factors (PAC) were completed, we learned that the two account for 55.5 % of the explained variance (considering factors with a weight greater than one unit), using only 14 factors. This represents a considerable reduction from the original instrument, which explained 61.99% with 32 factors. Results of the exploratory factorial analysis by principal components (PAC) contributed information regarding the behavior of items in the abridged instrument.

Table 2. Factorial structure obtained in the exploratory factorial analysis by principal components (PC) and varimax rotation (n=899). Saturations less than .40 were not taken into consideration.

Factor/Strategy	Explained variance	Accumulated variance	Items	Satura-tion	Common-ality	Synthetisized Item description
I. Selection and organization	16.5	16.5	co32	.81	.72	elaborating summaries
			co31	.77	.69	topic summary
			co30	.76	.69	summary of the impor.
			co34	.72	.63	making outlines
			co42	.50	.42	memorizing outlines
			re4	.49	.54	recall during exams

II. Awareness of strategy functionality	6.1	22.6	ap3 ap2 ap4 ap7 ap5	.73 .69 .64 .61 .58	.67 .59 .65 .53 .65	attention strategies memorization strateg. elaboration strategies reflection in exam prep. mnemotechnic strateg.
III. Elaboration	4.5	27.1	re5 re6 re3	.66 .65 .52	.52 .56 .55	secondary searches recalling events and anecdotes recalling processed information
IV. Motivation	4.1	31.3	ap31 ap32 ap30 ap21	.71 .67 .66 .56	.58 .60 .56 .44	intrinsic knowledge expansion feeling proud induction in situation induction of expectations
V. Answer planning and control in evaluation situations	3.0	34.4	re17 re16 re18 re11 re10	.67 .56 .46 .45 .44	.53 .50 .44 .50 .52	data analysis making outlines, script rough answer mental preparation search and adjust
VI. Compre-hension	2.9	37.3	re12 co25 ad15	.70 .69 .45	.70 .69 .45	own expression putting in one's own words mental summary
VII. Underlining	2.7	39.9	ad5 ad8 ad7 ad6	.66 .65 .63 .47	.60 .57 .49 .37	underlining paragraphs underl. for memorizing underlining in color using signs
VIII. Social support	2.5	42.4	ap25 ap27 co9 ap26 ap29	.65 .57 .56 .52 .41	.57 .57 .52 .52 .59	interchange of opinions conflict avoidance and resolution search for help others' social assessmt helping others
IX. Repetition and re-reading	2.4	44.9	ad11	.63	.54	repeating important data Re-reading
X. Scheduling and work plan	2.3	47.2	ap10 ap12	.85 .83	.76 .77	scheduling time work plan
XI. Coping with distractions	2.1	49.4	ap22 ap23	.70 .68	.56 .55	environmental control concentration
XII. Study habits	2.1	51.5	ad3 ad20	.69 .54	.61 .56	general reading study sequence
XIII. Anxiety control	2.0	53.5	ap18	.51	.48	controlling state of anxiety
XIV. Extrinsic motivation	2.0	55.5	ap34	.76	.64	search for social reinforcement

Factor I refers to the use of cognitive strategies of grouping and the recovery of such groups, while factor III refers to the cognitive strategy of searching for signs and codifications. Factor II describes the strategy of self-knowledge. Factor IV reflects the strategy of instrinsic motivation. These four factors account for 31.3% of the explained variance, that is, more than half the total in this variance.

Later on, factors of a different nature appear. Cognitive factors are the most numerous. Factor V reflects the cognitive strategy of search for codification and planning in the written response. Factor VI represents summarizing in one's own words. Factor VII is underlining and Factor IX repetition and reading. Those referring to processing support are also important, such as Factor VIII, social interaction, Factor XI, coping with distractions, XII, controlling one's anxiety, and XIV referring to strategies of extrinsic motivation.

Regarding levels of factorial saturation and regarding commonality, we can arrive at the adequate statistical weight of items included. Regarding correlation results, there exists a certain consistency in relationships between factors of a more cognitive, metacognitive and support nature. These relationships are shown in Table 3.

Table 3. Correlations of first order rotated matrix. Scores lower than .20 are omitted.

Factors	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1														
2	-.72			.38										
3	.21													
4	.20	-.62	-.26			-.57								
5				.38		.51		.57		-.65				
6		-.35	.40				.51		.47					
7			-.42		.39									
8									.47		.32			
9		-.26			.47					-.57				
10					.39			-.34				-.61		
11													-.41	.75
12											-.47			
13			.32					-.34	-.32		.53			
14				-.29					-.35		.31		.54	

3. *Second-order factorial solution*

Given that the correlational analyses have shown a certain grouping relationship among first-order factors, we wanted to confirm this grouping by performing a second-order factorial analysis, using factors from the initial solution. The preliminary statistical analyses, such as Bartlett's test of sphericity = 1874.5561 (p=.0000) and the Kaiser-Meyer-Olkin index = .84520, demonstrate the data's suitability for factorial analysis.

Results reveal a quite consistent factorial grouping, with a second order factorial structure explaining 44% of the variance, simplified in three factors which in turn incorporate different subscales.

Table 4. Factorial structured obtained in the second order exploratory factorial analysis, by principal components (PC) and varimax rotation (n=899). Saturations of less than .40 are not taken into consideration.

Dimension	Explained Variance	Accumulated variance	Factor	Saturation	Commonality description	Synthetized
I. COGNITIVE AND LEARNING AWARENESS STRATEGIES	26.6	26.6	I	.7658	.6043	Selection and organiz.
			VII	.7089	.5040	Underlining
			II	.6750	.5260	Strategy Awareness
			III	.5545	.4238	Elaboration strategies
			V	.4083	.4450	Planning and control
			IX	.3639	.2606	Repetition, rereading
II. LEARNING SUPPORT STRATEGIES	10.0	36.6	IV	.7103	.5645	Intrinsic motivation
			XIII	.6192	.3868	Anxiety control
			XI	.6170	.4512	Coping w/distractions
			VIII	.6147	.6442	Social support
			X	.4333	.4472	Scheduling and work plan
III. STUDY HABITS	7.6	44.4	VI	.6366	.4927	Comprehension
			XII	.4297	.3178	Study habits

Our result, therefore, is the *Abridged ACRA Scale*, with three dimensions, 13 subfactors and 44 items (see Appendix I):

Dimension I. Cognitive and learning-control strategies (25 items):

I (F1). Selection and organization: co32, co31, co30, co34, co42 and re4.

II (F7). Underlining: ad5, ad8, ad7 and ad6.

III (F2). Awareness of strategy functionality: ap3, ap2, ap4, ap5 and ap7.

IV (F3). Elaboration strategies: re5, re6, re3.

V (F5). Answer planning and control in evaluation situations: re17, re16, re18, re11 and re10.

VI (F9). Repetition and re-reading: ad11, ad12.

Dimensión II. Learning support strategies (14 items):

VII (F4). Intrinsic motivation: ap31, ap32, ap30 and ap21.

VIII (F13). Anxiety control: ap18

IX (F11). Coping with distractions: ap22, ap23.

X (F8). Social support: ap25, ap27, co9, ap26, ap29.

XI (F10). Scheduling and work plan: ap10 and ap12.

Dimension III. Study habits (5 items):

XII (F6). Understanding: re12, co25, ad15.

XIII (F12). Study habits: ad3 and ad20.

In this factorial solution item ap34 was eliminated, which adjusted Factor 14 (intrinsic motivation) in the factorial solution of first order. This decision is supported by its having a negative weight in the second order factorial solution, showing us that it measures in the opposite direction of the same dimension than item ap32, already included in Factor IV (intrinsic motivation). The transformed correlations matrix has the following configuration. One can verify the independence of factors, despite their relationship.

Table 5. Correlations between factors of the second order rotated matrix

	FACTOR I	FACTOR II	FACTOR III
FACTOR I	.7070	.6771	.2038
FACTOR II	-.5725	.7173	-.3969
FACTOR III	.4149	-.1639	-.8949

3. *Descriptive, reliability and validity analysis of the Abridged ACRA Scale for university students*

3.1. *Descriptive analysis of the Scale*

Once the adequacy of the factorial structure was confirmed, we carried out a descriptive analysis of the Scale itself and of its subscales. Results are shown in Table 6.

Table 6. Descriptive indices of the Abridged ACRA Scale for university students.

Scale	Average	Standard Deviation	N
Total (43 items)	118.99	230.18	802
Sub-scale I (23 items)	76.27	10.99	853
Sub-scale II (14 items)	42.27	6.53	843
Sub-scale III (5 items)	15.11	2.77	854

3.2. *Reliability study.*

Reliability indices of the Abridged ACRA Scale for university students are acceptable, with a global alpha =.8828, and indices between high and moderate (.85 and .56, respectively). Subscale indices are shown in Table 7.

Table 7. Reliability indices in the Abridged ACRA Scales for university students (N=826).

Scale	Standardized Cronbach Alpha	Spearman-Brown Even/Odd
Total abridged	.8763	.8498
Sub-scale 1	.8562	.8152
Sub-scale 2	.7753	.7219
Sub-scale 3	.5420	.4138

3.3. *External validity study*

Validity of the Abridged ACRA Scale for university students was confirmed by carrying out ANOVAs between academic performance levels and learning strategies, as well as for marks obtained during the university term.

Table 8. Statistical effects for the ANOVA performed. The average (standard deviation) for each score obtained in each performance level is included.

SCORE	UNIVERSITY
TOTAL STRATEGIES:	$F_{2,224} = 5.55$ ** Sheffe: 3 > 1 * Failed= 143.06 (19.16) Passed= 147.15 (17.22) Above Average= 155.10 (17.82)

* p<.05 ** p<.01 *** p<.001 **** p<.0001

Results showed that the level of academic performance differentiates scores obtained in the total Scale for the academic period under analysis, making apparent that students with higher marks also use a greater number of strategies included in the Abridged ACRA Scale.

Discussion

Results confirmed our original idea about simplifying the ACRA Scale (Román and Gallego, 1994) for university students. Both the results from the first-order factorial solution (with 14 factors and 45 items), and well as from the second-order factorial analysis (with 3 dimensions, 12 factors and 44 items) suggest such a simplification, when one recalls the 32 factors appearing in the initial factorial analysis performed with 119 original items in the instrument (Justicia and De la Fuente, 1999). Such results clarify aspects to be taken into account in improving the original instrument. On one hand, if we abide by data obtained in the current study and in the one previously referenced, we consider that there is insufficient evidence to affirm that the original instrument evaluates the actual strategies of information processing sequences. Rather, it evaluates techniques and strategies of a cognitive nature (including metacognitive awareness) and of learning support. We base this claim on two types of reasoning. For one, different dimensions appear in our abridged ACRA Scale from those in the original instrument. A cognitive and metacognitive dimension by itself explains 26.6% of the variance, revealing, in our opinion, how important this dimension's techniques and strategies are for university learning. Another dimension referring to *learning support* informs us of the importance of motivational-affective techniques. And finally, another dimension referring to *study habits* has lower weight in the variance--probably due to the scarcity of items which evaluate this aspect in the original instrument.

On the other hand, from the perspective of the organizational structure in the dimensions and factors pertaining to learning strategies, we find an alternative conceptual structure of learning strategies from that existing in the original instrument, in several senses. Dimension I of the abridged ACRA Scale refers to *cognitive and metacognitive learning strategies*, which integrates both nuclear aspects of the learning process. Additionally, the components of learning awareness, of planning and of learning control appear among the most essential of metacognitive strategies. This is a clear difference from the original instrument, where the metacognitive dimension of learning is included in the Support Scale. Dimension II, *learning support strategies*, also appears with clear structural differences from

the original instrument, since factors making up this dimension allude exclusively to variables of a motivational-affective sort (De la Fuente, 1998; Gonzalez,1997; Lujan, Hernandez and Garcia, 1998). Thus, the factorial structure which appears is closer to the conception of metacognitive-cognitive-support levels used in learning strategies (Justicia and Cano, 1996), than to the conception of phases of information processing on which the original instrument is based (Roman and Gallego, 1994). In this sense our results also differ from those recently put forward from a reduction of the original scale (Marugan and Roman, 1997). Our results are more in the line of those found by other authors using different instruments and models, such as the MSLQ (Pintrich and DeGroot, 1990), or the Notice Model (Hernandez and Garcia, 1997). In these, the structure of the instruments reveals a triple level of learning strategies: cognitive (metacognitive) and learning support. Study habits, though secondary to cognitive, metacognitive and support strategies, also have great importance. Some illustrative results are reported in another recent study (De la Fuente, Zaldívar, De la Fuente and Claros, 2000).

As for external validity of results, the instrument's levels of discrimination for such an important variable as academic performance lead us to think that despite abridging, the instrument continues to discriminate among students with different levels of academic success.

Another aspect highlighted by our results is a certain simplicity--if not homogeneity--in learning behaviors used by university students, since with a few items it is possible to evaluate the existing variability in learning behaviors. This fact may be to a large extent a consequence of both teaching practices and evaluation practices, since these favor very few changes in the way learning strategies are used during study (Garcia, De la Fuente, Justicia and colls., 2002).

Regarding the limitations of this study, we are aware of the information loss suffered when we do not evaluate the use of other techniques and strategies which previous evidence showed as important for information processing. But perhaps it is premature to evaluate with instruments that capture such richness and depth in learning, within a system which is not sensitive to nor does it encourage the same.

Future research should delimit and replicate the validity of results presented in this study, as a means of consolidating them and opening new channels of evaluation and intervention for improving learning strategies in university students (De la Fuente, 1999; Roces, Gonzalez-Pienda, Nuñez, Gonzalez-Pumariega, Garcia and Alvarez, 1999).

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Appendix 1

Items in the Abridged ACRA Scale for University Students

	DIMENSION I. *Cognitive and Learning Control Strategies*
1	I produce summaries with the help of words or phrases previously underlined (co32).
2	I make summaries of what I studied when finishing each topic (co31).
3	I summarize what is most important from each section of a topic, lession, or notes. (co30).
4	I make outlines with the help of words and phrases underlined or from the summaries I made (co34).
5	I spend some study time memorizing especially the summaries, outlines, charts, conceptual maps, Cartesian or V diagrams, etc., in other words, what is essential from each topic or lesson (co42).
6	Before answering on an exam, I recall the concept groupings (summaries, outlines, sequences, diagrams, conceptual maps, matrices ...) made during study time (re4).
7	In the books, notes or other learning material, I underline in each paragraph the words, data, or sentences which seem most important to me (ad5).
8	I use the underlined parts to help in memorization (ad8).
9	I make use of different colored pens or pencils to enhance learning (ad7).
10	I use signs (exclamation marks, asterisks, drawings...), some of which are only intelligible to me, in order to highlight information from the texts which I consider especially important (ad6).
11	I am aware of the importance of elaboration strategies, which require me to establish different kinds of relationships between the content of the study material (drawings or charts, mental images, metaphors, self-questions, paraphrasing ...) (ap3)
12	I have become aware of the role of learning strategies that help me memorize what I care about, by means of repetition and mnemotechnics (ap2).
13	I have thought about how important it is to organize information by making outlines, sequences, diagrams, conceptual maps, matrices (ap4).
14	I have realized that it is helpful (when I need to remember information for a test, assignment, etc.) to search my memory for the mnemotechnics, drawings, conceptual maps, etc. that I produced when studying (ap5).
15	I have stopped to reflect on how I prepare information that I am to give in an oral or written exam (free association, ordering into a script, completing a script, composition, presentation ...) (ap7).
16	With important issues that are difficult to remember, I look for secondary data, coincidental or from the context, in order to be able to recall what was important (re5).
17	It helps me to remember what I've learned when I recall events, episodes or anecdotes (that is, "cues") which happened in class or at other moments in learning (re6).
18	When I have to explain something orally or in writing, I remember drawings, images, metaphors, etc., which I used to process the information during learning (re3).

19	When faced with a problem or difficulty, I first consider data that I know before venturing an intuitive solution (re17).
20	Before producing a written assignment, I make an outline, script or program of the points to be discussed (re16).
21	When I have to answer a topic for which I do not have data, I make an "estimated" answer, by inferring from knowledge I do possess or by transferring related ideas from other topics (re18).
22	Before beginning to speak or write, I think and prepare mentally what I am going to say or write (re11).
23	In order to recall certain information, first I search my memory for it and afterward decide whether it matches what I have been asked or what I wish to answer (re10).
24	During study I write down or repeat several times the important data or what is most difficult to remember (ad11).
25	When the topic content is dense or difficult I re-read it slowly (ad12).
	DIMENSION II. *Learning Support Strategies*
26	I study in order to broaden my knowledge, to know more, in order to be more expert (ap31).
27	I do my best in studies in order to feel proud of myself (ap32).
28	I use encouraging self-talk in order to stimulate myself and keep myself going on study tasks (ap30).
29	I tell myself that I can beat my current level of performance (expectations) in the different subjects (ap21).
30	I am resourceful in controlling my state of anxiety when it keeps me from concentrating on my study (ap18).
31	I try to keep my study area free of distractions, such as people, noise, disorder, lack of light, ventilation, etc. (ap22).
32	When I have family conflicts I try to resolve them first, if I can, in order to concentrate better on my study.
33	When working, it stimulates me to exchange opinions with my classmates, friends or family members about topics which I am studying (ap25).
34	I avoid, or resolve by using dialogue, conflicts which come up in personal relationships with my classmates, teachers or family members (ap27).
35	I turn to friends, teachers or family members when I have doubts or weak areas in my study topics, or in order to exchange information (co9).
36	I find it rewarding that my classmates, teachers or family members value my work positively (ap26).
37	I encourage and help my classmates to be as successful as possible in their school tasks (ap29).
38	Before beginning to study, I distribute my available time among the topics that I have to learn (ap10).
39	When exams are approaching, I establish a work plan which assigns how much time I will spend on each topic.

	DIMENSION III. *Study Habits*
40	I try to express what I have learned in my own words, instead of repeating literally what the teacher or the book says (re12).
41	I try to learn the topics in my own words instead of memorizing them literally (co25).
42	When studying I try to mentally summarize what is most important (ad15)
43	When beginning to study a lesson, I first skim over the whole thing (ad3).
44	When studying a lesson, in order to improve comprehension, I take a break and afterward review it in order to learn it better (ad20).