

22
December 2020

Gaetano Domenici

Editoriale / *Editorial*

Lockdown e didattica emergenziale: una criticità non risolta 11
(Lockdown and Emergency Didactics: An Unresolved Weakness)

STUDI E CONTRIBUTI DI RICERCA

STUDIES AND RESEARCH CONTRIBUTIONS

Jean Ecalle - Jean-Luc Vidalenc - Annie Magnan

Computer-based Training Programs to Stimulate Learning 23
to Read in French for Newcomer Migrant Children:
A Pilot Study

*(Programmi di formazione realizzati con software computerizzati
per stimolare l'apprendimento della lettura in francese per i bambini
migranti nuovi arrivati: uno studio pilota)*

Agostino Portera - Michael S. Trevisan - Marta Milani

A Status Report on School Intercultural Mediation in Europe 49
(Report sullo status della mediazione scolastica interculturale in Europa)

- Maria Grazia Crispiatico - Patrizia Bestetti - Veronica Velasco
Corrado Celata - Liliana Coppola - Gruppo Estensione LST*
La progettazione scolastica orientata alla promozione
della salute. Un percorso di dialogo intersettoriale
per l'allineamento delle competenze chiave per l'apprendimento
e «life skill» 71
*(School Planning Oriented to Health Promotion. A Process
of Intersectoral Dialogue for the Alignment of Key Competences for Learning
and Life Skills)*
- Marika Calenda - Concetta Ferrantino - Annamaria Petolicchio*
Prove di comprensione del testo: dalla somministrazione
alla revisione 91
(Reading Comprehension Tests: From Administration to Revision)
- Relmu Gedda Muñoz - Natalia Villagrán del Picó*
Academic Self-concept in University Students: Their Association
with Parents' Educational Level and Previous Experience
in Higher Education 109
*(Concetto di sé accademico: associazione con il livello di istruzione
dei genitori e con le esperienze precedenti nell'istruzione superiore)*
- Antonio Marzano - Antonio Calvani*
Evidence Based Education e didattica efficace: come integrare
conoscenze metodologiche e tecnologiche nella formazione
degli insegnanti 125
*(Evidence Based Education and Effective Teaching: How to Integrate
Methodological and Technological Knowledge into Teacher Training)*
- Hendrikus Midun - Oswaldus Bule - Widdy H.F. Rorimpandey*
The Effect of Scaffolding on Assignment Quality
and Procedural Learning Achievement 143
*(L'effetto dell'attività di scaffolding per il raggiungimento del successo
nell'apprendimento procedurale)*
- Alhemaiddi Mohammed Aldhaidan*
Influencing Factors in Psychological Resilience: A Study
on the Role of Emotional Reassurance and Optimism
as Predictive Dimensions 159
*(I fattori influenti nella resilienza psicologica: uno studio sul ruolo
della rassicurazione emotiva e dell'ottimismo quali dimensioni predittive)*

<i>Giulia Vettori - Claudio Vezzani - Lucia Bigozzi - Giuliana Pinto</i> Assessing the Multidimensionality of Students' Learning Orientations: The Use of LO-COMPASS for the Well-being and Scholastic Success	179
<i>(Valutare la multidimensionalità degli orientamenti verso l'apprendimento degli studenti: l'utilizzo di LO-COMPASS per il benessere ed il successo scolastico)</i>	

NOTE DI RICERCA

RESEARCH NOTES

<i>Ceyda Şensin - Guido Benvenuto - Émiliane Rubat du Mérac</i> Teaching Non-Italian Students: Italian Adaptation of the Questionnaire on Teachers' Perspectives	201
<i>(Insegnare agli studenti non italiani: adattamento in italiano del Questionario sulle percezioni degli insegnanti)</i>	

COMMENTI, RIFLESSIONI, PRESENTAZIONI,
RESOCONTI, DIBATTITI, INTERVISTE

COMMENTS, REFLECTIONS, PRESENTATIONS,
REPORTS, DEBATES, INTERVIEWS

<i>Giuseppe Martinez y Cabrera</i> Scuola: criticità organizzative	217
<i>(School: Organizational Criticalities)</i>	

<i>Journal of Educational, Cultural and Psychological Studies</i> Notiziario / News	227
--	-----

Author Guidelines	229
-------------------	-----

Assessing the Multidimensionality of Students' Learning Orientations: The Use of LO-COMPASS for the Well-being and Scholastic Success

Giulia Vettori - Claudio Vezzani - Lucia Bigozzi
Giuliana Pinto

Università degli Studi di Firenze - Department of Education, Languages, Intercultures, Literatures and Psychology (Italy)

DOI: <https://dx.doi.org/10.7358/ecps-2020-022-vett>

giulia.vettori@unifi.it
claudio.vezzani@gmail.com
lucia.bigozzi@unifi.it
giuliana.pinto@unifi.it

VALUTARE LA MULTIDIMENSIONALITÀ
DEGLI ORIENTAMENTI VERSO L'APPRENDIMENTO
DEGLI STUDENTI: L'UTILIZZO DI LO-COMPASS
PER IL BENESSERE ED IL SUCCESSO SCOLASTICO

ABSTRACT

The twofold aim of the present study is to identify specific cluster-profiles of the learning orientations measured by «LO-COMPASS: Learning Orientation-Cognition Metacognition Participation Assessment»; and to create a psychometric rule to cluster the raw scores obtained by the student at the LO-COMPASS factorial dimensions into a specific cluster-profile. 183 middle-school students (91 males and 92 females) validly completed the original version of the LO-COMPASS Questionnaire. Confirmatory factor analysis and cluster analysis were conducted. LO-COMPASS measures four factors of students' learning orientations. Furthermore, the instrument has been furnished with a psychometric rule to cluster the raw scores obtained by the student at the LO-COMPASS factorial dimensions into two profiles. The application of LO-COMPASS will allow educational psychologists and teachers to analyze middle-school students' difficulties and

problems, as well as strengths in their motivation to learn. The instrument will be useful at multiple levels: prevention, intervention, evaluation.

Keywords: Individual profiles; Intervention on well-being; Multidimensional assessment of learning orientations; Prevention of difficulties; School performance.

INTRODUCTION

School career and outcomes significantly influence child development. As such, the principal goals of the education system are to support and encourage students' achievements of adequate school grades and minimize school dropout (e.g., Vaughn *et al.*, 2020). The demand for innovative actions and services to effectively underpin emerging school needs is increasing due to the evolution of challenges faced by school practitioners, children, and their families (e.g., Walburg, 2014; Vargo, 2020). Difficulties in studying and early school leaving risk compromising their well-being, as well as the efficiency and quality of public-school institutions. Even the public schools within the Italian educational context must face these difficulties and must increase attention to the underachiever populations of students. Studies in the literature (e.g., Loscalzo & Giannini, 2019) have shown problematic academic outcomes among Italian university students. Such difficulties are deeply rooted in the scholastic path of a student. In fact, a large proportion of Italian secondary-school students underscore in literacy and numeracy in the OECD Survey (see OECD, 2016). This current educational scenario indicates the necessity to identify protective learning factors sustaining optimal school success, as well as learning areas that are less developed in a dynamic way. An early recognition of difficulties will allow educational psychologists and teachers to reinforce cognitive, metacognitive, and affective resources in learning among high-achieving students, as well to sustain them among underachievers. Prior research emphasized the role of students' learning orientations which act in supporting or inhibiting school success (Pinto *et al.*, 2018) and long-term academic outcomes (Vettori *et al.*, 2020a). The construct of students' learning conceptions refers to the nature of students' mental representations about the learning process which are set at the intersection of the students' concept of Self and the actual learning experience (e.g., Säljö, 1979; 2009). Holding a learning orientations as self-regulated process, active engagement, and internal motivation exerts a key role for school success (e.g., Vermunt & Donche, 2017; Li,

Zheng, & Liang, 2018; Johnson, Clohessy, & Chakravarthy, 2020; Vettori *et al.*, 2020b). Conceptions of learning are also associated with creativity and well-being (Cera, Cristini, & Antonietti, 2018). A scarce inclination to participate and assume responsibility for success or failure in learning is detrimental for school performance, although students potentially might have the capacities to reach excellent school performance (e.g., Elliott *et al.*, 2005). Alongside the empirical results in the research literature, teachers' own voice mirrors a discrepancy between students' capacities and school achievements, «(s)he could do better, but (s)he doesn't apply him/herself to school as much as (s)he actually could» resulting from students' adoption of surface and rote learning orientations. The literature has shown that evaluating students' learning orientations through a multidimensional perspective is promising since it allows one to reflect on the complexity of the learning process (e.g., Laghi *et al.*, 2012; Cera, Mancini, & Antonietti, 2013). Even from the assessment point of view, it is important to measure students' learning orientations in a way that respects the multidimensionality of the construct covering both cognitive (e.g., memorization and attention processes) and metacognitive aspects (e.g., strategic action, meta-motivational, and affective experiences) (e.g., Vettori *et al.*, 2018). A further acquisition from the literature in this research field highlighted the utility of a person-oriented approach to trace students' profiles of learning orientations (e.g., Lin, Tsai, & Liang, 2012). The specific profiles show different combinations of the learning dimensions covered by learning orientations (e.g., Vettori *et al.*, 2020c). To assess middle-school students' learning orientations enhancing or inhibiting school achievement, the choice of the self-report «LO-COMPASS: Learning Orientation-Cognition Metacognition Participation Assessment» (Pinto *et al.*, 2018; Vettori *et al.*, 2018) presents several advantages. The instrument measures multifacets learning orientations covering cognitive, metacognitive, and affective learning dimensions. Furthermore, LO-COMPASS analyses learning orientations significantly associated with school achievement. By adopting a person-oriented approach with LO-COMPASS presents the advantage to trace students' profiles of learning orientations which may conduce to excellent or low school achievement. The person-oriented approach overcomes the studying of relations between variables toward the identification of individuals' groups based on what patterns of variables (such as, learning orientations) they show (e.g., Nurmi & Aunola, 2005). Prior research has shown that LO-COMPASS is able to group middle-school students in two profiles, the *Dragged by the current* profile shows characteristics that link to low school outcomes; the other typology of middle-school students called *At the helm* show an adaptive vision about learning characterized

by internal motivation, co-constructive processes that link to excellent school results (Vettori, Pinto, & Bigozzi, 2019). LO-COMPASS, thus, proved to be a suitable instrument to identify students' protective patterns of learning conceptions, as well as shed light on learning areas that need to be improved through intervention actions and programs. Third, LO-COMPASS is designed to support the evaluation of students' profiles of learning orientations during critical periods like school transitions (e.g., Entwisle & Alexander, 1998; Waters *et al.*, 2012). School transitions are crucial turning-point phases of school calling for new adjustments, redefinitions of roles and responsibilities which might challenge students' beliefs and visions about learning. School transitions, in fact, imply changes in the school context, in terms of environment, routines, and class group, meanwhile important psychological developmental changes are occurring. Teachers change and might increase in number because of the increased range of school subjects, as well as the organization of school time and materials varying. It is important to focus on school transition to advance our knowledge about factors which may challenge students' school adaptation and achievement (e.g., Oriol *et al.*, 2017). Within the Italian context, a crucial transition interests the passage from primary to secondary school, coinciding with the middle-school years.

1. AIMS

The aim of this paper was twofold:

1. to identify specific cluster-profiles of the learning orientations measured by LO-COMPASS;
2. to create a psychometric rule to cluster the raw scores obtained by the student at the LO-COMPASS factorial dimensions into a specific cluster-profile.

2. METHOD

2.1. *Characteristics of the educational system*

In Italy, the first level of formal education is primary school (from six to eleven years old). The following level is lower-secondary school, also called middle-school (from eleven to thirteen years old). Passing from primary

to secondary school, students experience a very challenging school transition. Over middle-school years students need to activate a variegated set of engagement actions and adjustments because of their renewed role identity as more autonomous and responsible students, different from what was familiar in primary school. Middle-school students' changed role identity implies and is accompanied by the assumption of self-regulated behaviors in learning. The construction of a more autonomous and responsible students' role identity actively engaged in learning is sustained by middle-school students' learning orientations. Adjusting to a new class, school environment and teachers is fundamental, given the significant proportion of time spent at school in a child's life.

2.2. *Participants*

We recruited 183 middle-school students, 91 males [1st year: 34 (37.4%); 2nd year: 29 (31.9%); 3rd year: 28 (30.7%)] and 92 females [1st class: 23 (25.0%); 2nd class: 28 (30.4%); 3rd class: 41 (44.6%)]. They were attending two middle-schools in Florence (Tuscany, Italy) and they represented a convenience (McBurney & White, 2009) and not a random or a stratified sample. They were comparable in terms of educational and socio-economic status. The researchers excluded from the sample of this study students with certified learning disabilities and foreign students, who had resided in Italy for less than 5 years. The distribution of participants by gender and class is shown in *Table 1*.

Table 1. – Crosstab of the conjoint distribution of gender and class attended.

GENDER	MIDDLE-SCHOOL YEAR			TOTAL
	1st	2nd	3rd	
Males	34 (37.4%)	29 (31.9%)	28 (30.7%)	91 (100%)
Females	23 (25.0%)	28 (30.4%)	41 (44.6%)	92 (100%)
TOTAL	57 (31.1%)	57 (31.1%)	69 (37.8%)	183 (100%)

Considering at the same time gender and middle-school year of the participants, the percentage distributions in the table showed how the sample was balanced. It was also approved by the Ethics Committee of the University of Florence. The study adheres to the rules of the Code of Ethics of the Italian Association of Psychology. Parents, school authorities and students themselves were asked to provide their consent to the research project.

2.3. Procedure

The collective administration of LO-COMPASS was carried out in classes in October and November with the presence of both teachers and researchers. Prior to the administration phase, students were told that LO-COMPASS was not a test aimed at assessing them, or in any case motivated by the teacher's need to estimate their school skills. As a result, the questionnaire did not include right or wrong answers, but the way students considered specific aspects of learning. During the compilation of the questionnaire, the researchers and teachers were completely available to answer about specific problems regarding items or response format. Overall, the response time to all the proposed items was about 20 minutes.

2.4. Measures

Students' Learning Orientations. The self-report instrument «LO-COMPASS: Learning Orientation-Cognition Metacognition Participation Assessment» (see Pinto *et al.*, 2018; Vettori *et al.*, 2018) was used to measure patterns of cognitive, affective, and regulative learning orientations among middle-school students. The questionnaire is reported in Appendix A. LO-COMPASS consists of 20 items to be answered on a 5-point Likert response scale (1 = strongly disagreeing; 5 = strongly agreeing). LO-COMPASS shows a 4-factor structure. Each factor represents a specific typology of learning pattern of cognitive, affective and regulative orientations of scholastic learning, as follows: (1) «Learning as a self-regulated and strategic experience» (items 2, 3, 7, 11, 17, 19 and 20); (2) «Learning as a process of affective, motivational and co-constructive activation of Self» (items 1, 5, 9, 10 and 16); (3); «Learning as a guided practice» (items 6, 8, 12 and 14); and (4) «Learning as participation in school practices» (items 4, 13, 15 and 18) (see Appendix B). Results of the structural validity of the self-report instrument LO-COMPASS showed adequate psychometric properties. CFA results showed satisfactory goodness of fit indices (CFI = .89; RMSEA = .04; SRMR = .06). Regarding the reliability of the instrument, each pattern showed a good internal coherence («Learning as a self-regulated and strategic experience»: $\omega = .76$; «Learning as a process of affective, motivational and co-constructive activation of Self»: $\omega = .71$; «Learning as a guided practice»: $\omega = .64$; «Learning as participation in school practices»: $\omega = .64$).

2.5. Data analysis

In order to check the normality of the distribution of each dimension detected by the instrument, the descriptive statistics (mean, standard deviation, skewness and kurtosis) were calculated. Specifically, the factorial scores were calculated by computing the sum of the answers provided by the participants to the items belonging to the same factorial construct. Consistently with the first aim of identifying specific profiles of aggregation of the 4 constructs measured by the questionnaire, a cluster analysis was implemented on the factorial dimensions measured by LO-COMPASS. A K-means estimation algorithm was used to identify the clusters. The analysis was implemented by the IBM SPSS statistical package (see 23.0). Furthermore, in order to demonstrate the presence of a significant difference between the two profiles (students *Dragged by the current* vs. students *At the helm*), a series of One-Way Analyses of Variance (ANOVAs) was performed. Coherently with the second aim, the raw scores for each factor were calculated and a rule was created for assigning them to the profiles identified by cluster analysis. For this purpose, the raw factor scores were obtained by adding together the responses provided by the students to the items corresponding to each different factorial dimension (see Appendix B). Furthermore, the averages and corresponding confidence intervals were calculated for the raw factor scores of the participants classified by the cluster analysis in profile P1 or in profile P2. We computed 8 confidence intervals, 4 for profile P1 and 4 for profile P2. So, the confidence intervals of a specific dimension are to be used to assign a particular new subject that compiles the questionnaire to profile P1 or to profile P2. Subjects that have a raw score within the uncertainty zone will not be probabilistically assigned to either profile.

3. RESULTS

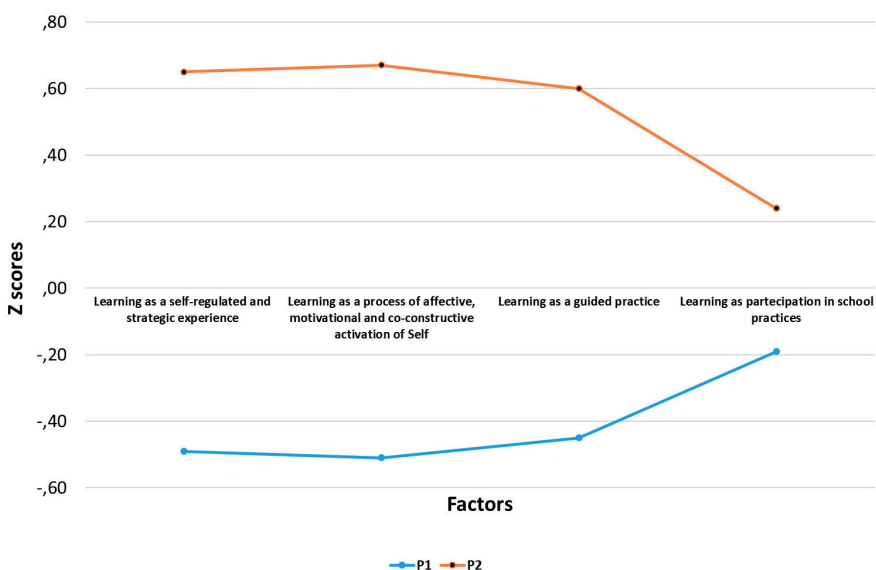
The first table shows the descriptive statistics of all the factor dimensions of LO-COMPASS (see Pinto *et al.*, 2018; Vettori *et al.*, 2018). The coefficients of skewness and kurtosis reported in *Table 2* are ranged between -1 and +1 for all 4 factors, showing the normality of the frequency distributions of each dimension.

Table 2. – Descriptive statistics of the factorial scores:
mean, standard deviation, skewness and kurtosis coefficients.

FACTOR	M	SD	SKEWNESS	KURTOSIS
Learning as a self-regulated and strategic experience	13.64	2.60	.12	-.76
Learning as a process of emotive, motivational activation and co-construction of Self	18.09	3.76	-.65	.61
Learning as a guided practice	15.04	2.80	-.62	.31
Learning as participation in school practices	13.45	1.89	-.36	-.57

3.1. Identify profile membership: K-means cluster analysis and ANOVAs

Concerning the first aim, the results of the cluster analysis allowed us to identify two preferential aggregation patterns between the factorial scores (standardized in Z-scores) of the instrument, thus allowing us to identify two significantly diversified «profiles» (Fig. 1).



Note: P1 = Dragged by the current student; P2 = At the helm student.

Figure 1. – Mean distributions of the factorial scores of LO-COMPASS in the two profiles individuated by cluster analysis.

The results obtained from cluster analysis seem to be very consistent with the profiles obtained by Vettori, Pinto, and Bigozzi (2019). In order to demonstrate the presence of a significant difference between the two profiles, a series of One-Way Analyses of Variance (ANOVAs) was performed, in order to identify in which factorial dimensions, the two profiles (obtained by the cluster analysis) were significantly different. The results obtained showed a significant difference between the two groups for all the dimensions measured by the questionnaire [«Learning as a self-regulated and strategic experience»: $F(1, 181) = 86.56, p < .001$; «Learning as a process of affective, motivational and co-constructive activation of Self»: $F(1, 181) = 95.58, p < .001$; «Learning as a guided practice»: $F(1, 181) = 67.60, p < .001$; «Learning as participation in school practices»: $F(1, 181) = 8.65, p < .01$], similarly with the results obtained by Vettori, Pinto, and Bigozzi (2019). Considering the trend of the factor scores reported in *Figure 1*, the first profile was labelled as a student *Dragged by the current* and the second profile as a student *At the helm*.

3.2. Assignment to membership profile: a classification grid of raw scores

The rule for assigning raw factor scores to a specific profile is summarized in *Table 3*.

Table 3. – Classification of the raw scores of the factors to the respective profile.

FACTOR (RAW SCORE)	ATTRIBUTION RULE		
	<i>Dragged by the current</i> student (P1)	Uncertainty zone	<i>At the helm</i> student (P2)
<i>Learning as a self-regulated and strategic experience</i>	from 7 to Upper C.I. _{P1}	between Upper C.I. _{P1} and Lower C.I. _{P2}	from Lower C.I. _{P2} onwards
<i>Learning as a process of affective, motivational and co-constructive activation of Self</i>	from 5 to Upper C.I. _{P1}	between Upper C.I. _{P1} and Lower C.I. _{P2}	from Lower C.I. _{P2} onwards
<i>Learning as a guided practice</i>	from 4 to Upper C.I. _{P1}	between Upper C.I. _{P1} and Lower C.I. _{P2}	from Lower C.I. _{P2} onwards
<i>Learning as participation in school practices</i>	from 4 to Upper C.I. _{P1}	between Upper C.I. _{P1} and Lower C.I. _{P2}	from Lower C.I. _{P2} onwards

Note: The raw factor scores were obtained by adding together the responses provided by the students to the items corresponding to each different factorial dimension.

For an easier understanding of the assignment rule in *Table 3*, it is recommended to examine it in conjunction with the profiles in *Figure 1*.

Table 4 shows the percentages of study participants who were classified in each of the two profiles (or in the uncertainty range) for each LO-COMPASS dimension.

Table 4. – Percentage distribution of the participants in to the two profiles, regarding each factorial dimension of LO-COMPASS.

FACTOR	MEMBERSHIP PROFILES		
	<i>Dragged by the current student</i>	Uncertainty zone	<i>At the helm student</i>
<i>Learning as a self-regulated and strategic experience</i>	48.6%	15.8%	35.6%
<i>Learning as a process of affective, motivational and co-constructive activation of Self</i>	37.2%	25.1%	37.7%
<i>Learning as a guided practice</i>	37.7%	12.0%	50.3%
<i>Learning as participation in school practices</i>	30.1%	18.0%	51.9%

Table 5 shows, for each of the 4 factors, the ranges of raw scores useful to assign the participants probabilistically to each profile, in line with the classification criterion described above.

Table 5. – Table of association of the raw scores of each factor with the respective profile.

FACTOR (RAW SCORE)	OUTCOME PROFILES		
	<i>Dragged by the current student</i>	Uncertainty zone	<i>At the helm student</i>
<i>Learning as a self-regulated and strategic experience</i>	7-13	14	15 +
<i>Learning as a process of affective, motivational and co-constructive activation of Self</i>	5-17	18-19	20 +
<i>Learning as a guided practice</i>	4-14	15	16 +
<i>Learning as participation in school practices</i>	4-8	9	10 +

Note: The raw factor scores were obtained by adding together the responses provided by the students to the items corresponding to each different factorial dimension.

We recall that the computing of the raw scores can be carried out by adding together the responses (from 1 to 5) provided by the students to the items corresponding to each different factorial dimension (see Appendix B). The sums thus obtained represent the raw score of a specific latent dimension.

The grid of values shown in *Table 5* can therefore be used to standardize the raw scores obtained by any student assigning them probabilistically to a specific profile or to the uncertainty threshold labelled «Band of uncertainty».

4. DISCUSSION

This study provides a valid, reliable, and concise instrument to measure students' profiles of learning orientations, the «LO-COMPASS: Learning Orientation-Cognition Metacognition Participation Assessment». One of the principal advantages is that it allows one to trace the profile of learning orientations of each student and to assess the functionality of the learning orientations profile with respect to school performance. The application of LO-COMPASS supports a reliable evaluation of learning-difficulty prevention and for intervention programs, particularly useful in the delicate school transition from primary to middle-school (e.g., Oriol *et al.*, 2017). Differently from primary school, middle-school students are required to both participate collectively in the class (see Ligorio, 2010) as well as to manage individually the studying work assuming a self-regulated, autonomous, and responsible role (see Cornoldi, 2010). It is important that teachers, school psychologists, and education professionals can identify the strengths and weaknesses of their students' learning orientations, especially in transition. Currently, however, teachers and school professionals must rely on their professional experience and intuitions to understand students' needs for school success.

The statistical analyses carried out in this study produced results at different levels. First of all, the cluster analysis conducted on the factorial dimensions of LO-COMPASS allowed us to confirm the statistical existence of two different profiles, very similar to those already obtained by Authors (Vettori *et al.*, 2019). The results of the cluster analysis showed a consistent grouping of the levels of the 4 latent dimensions within each profile. In fact, in the *At the helm* student profile the levels of the 4 dimensions measured by LO-COMPASS were significantly higher than the distribution of the levels of the 4 dimensions in the *Dragged by the current* student profile. All this, in our opinion, highlights even more how

all the constructs measured by LO-COMPASS are very important to a better understanding of school performance. The findings have shown that *Dragged by the current* students are characterized by low scores at the cognitive, affective and regulatory dimensions of learning orientations informing to scarce active and autonomous role as learners. Instead, *At the helm* students are characterized by high scores at internal motivation, opportunity for personal growth and co-construction dimensions of learning. It is interesting to note that the two profiles associated with educational outcomes in a different way: the first profile was linked to low school achievements, while the second profile to excellent school achievements.

The further step achieved in this study was to develop a statistical procedure that allows teachers to analyze students' difficulties and problem basing on their belonging to the profile of *Dragged by the current* student or the *At the helm* student profile for each of the 4 latent dimensions measured by LO-COMPASS. The application of this procedure would lead to the case of a student with scores on some factorial dimensions overlapping with those of the *Dragged by the current* student profile, while for other factorial dimensions the scores would fit with the trend of the peculiar scores of the *At the helm* student profile. The application of a person-oriented approach allows one to shed light on the «real» student who probably does not fully fit either of the two profiles identified by cluster analysis. Moreover, a «region of uncertainty» has been created for each of the 4 latent dimensions, able to account for scores that can be attributed, with sufficient probability, neither to one nor the other of the two profiles.

Table 3 shows the psychometric procedure used to cluster the raw scores obtained by the student at the LO-COMPASS factorial dimensions into a specific cluster-profile (*Dragged by the current* or *At the helm*) or in the «region of uncertainty». This classification procedure uses the confidence intervals computed for the centroids of the two clusters. The use of this type of statistical procedure is very important because it allows us to assign a particular score in a specific dimension of LO-COMPASS by only a strictly probabilistic criterion.

Table 4 also shows how the standardization sample is equally distributed within each raw score range defined by the procedure described in *Table 3*, corresponding to the *Dragged by the current* student profile, to the *At the helm* student profile or to the «region of uncertainty». This is further evidence of the goodness of the classification procedure shown in *Table 3*, because each raw score range seems to be sufficiently represented in terms of sample size.

Table 5, on the other hand, is the operational transposition of the procedure described in *Table 3*, which can be concretely used to apply this clas-

sification procedure. *Table 5* shows the ranges of raw scores that allow us to cluster each student in the *Dragged by the current* student profile, in the *At the helm* student profile or in the «region of uncertainty», and this for each of the 4 dimensions of the questionnaire. Just to give a practical example, a «real student» with a raw score of 10 in «Learning as a self-regulated and strategic experience», 11 in «Learning as a process of emotive, motivational activation and co-construction of Self», 17 in «Learning as a guided practice» and 7 in «Learning as participation in school practices», coherently with the procedure described in *Table 3* will be classified in the *Dragged by the current* student profile for all the dimensions of LO-COMPASS, except for the «Learning as a guided practice» dimension, for which this student will be classified in the *At the helm* student profile (see *Tab. 5*).

By applying the grid provided with LO-COMPASS, educational practitioners (e.g., teachers, school psychologists, and educators) will be able to identify what the strengths and weaknesses of the student's cognitive and metacognitive disposition towards learning are. Educational practitioners will therefore be able to better understand if a particularly poor school result is linked to an ineffective vision of learning, identifying the specific aspects on which to base an intervention to strengthen the student in the lacking aspects. The professional will be able to conduct the evaluation of the orientations held by her/his students in a diversified way with respect to the different school subjects. In fact, it is possible to expect that the vision and beliefs of students will change considering different school subjects, also according to the relationship established with teachers and/or classmates, which may be of different nature and quality. This is an easy tool for teachers and school clinicians to administer with students experiencing a significant school transition for a preventive or intervention action to promote students' engagement (e.g., Cacciamani *et al.*, 2012) and internal motivation in the learning process (e.g., Corsaro & Molinari, 2005).

This study offers further validity and reliability evidence of the LO-COMPASS self-report and opens the way to innovative prevention and intervention programs to assess the multidimensionality of students' learning orientations with a single and concise instrument. LO-COMPASS extends the availability of tools assessing both cognitive and metacognitive aspects in learning within the Italian education context. LO-COMPASS, thus, provides a valuable aid for different purposes. First, by identifying on which orientations the student is most leveraged from an emotional-affective, metacognitive and strategic point of view. This step may play an important role in promoting primary preventive actions during classroom-based curricula. Middle-school is certainly a particularly critical time because it is a period of transition from primary to secondary school. Many

pupils encounter difficulties of various kinds that often reflect on their scholastic performances, which are much lower than in the previous school. Psychologists, educators, and teachers administering LO-COMPASS may identify profiles of learning orientations, significantly related to school performance, held by students within a delicate moment of development and school transition. Teachers and school practitioners may easily administer a short set of items to identify students at risk of scarce school achievements and understand which learning dimensions need attention and intervention. The brevity of LO-COMPASS eliminates item redundancy, which is associated with participant boredom and frustration resulting, thus, in a suitable measure for preadolescent students. The proposed classification grid, in fact, allows one to categorize each possible raw score into a specific learning profile. Second, school practitioners can build on the strengths or protective factors in students' profiles and select services to address areas that are less developed. The LO-COMPASS area to be developed may be important to design and examine effectiveness of programs seeking to increase student adaptive learning orientations. One in five Italian students encounters a particularly difficult moment in their school career, requiring the help of an expert (Costabile *et al.*, 2013). In Italy there are 1,743,587 (ISTAT, 2020) middle-school students, so the problem affects more than 348,700 pupils. It is common for pupils' teachers and families or pupils themselves to turn to specialists, psychologists or learning mentors to solve such problems.

LO-COMPASS can be used by school psychologists and educational practitioners to gain a sensible understanding of the students' service population, inform services, and promote the assumption of an evidence-based approach to the school needs. Further research should be conducted to evaluate the applicability of LO-COMPASS with other types of school levels, populations, and education communities.

APPENDIX A

ITEM	RESPONSE SET				
1) I feel that I really learn through discussion and confrontation with others	1	2	3	4	5
2) I'm always trying to get a place to sit in class to help me keep up with the explanation	1	2	3	4	5
3) When I'm listening to a lesson, I try to get some paper to write down the important things	1	2	3	4	5
4) After an oral examination, I can figure out how I performed	1	2	3	4	5
5) The learner while studying can create new ideas himself	1	2	3	4	5
6) In order to really learn I need someone to teach me	1	2	3	4	5
7) As the teacher speaks, I make notes to remember and understand better	1	2	3	4	5
8) Learning is above all a matter of concentration and commitment	1	2	3	4	5
9) I feel learning as something based on self-confidence	1	2	3	4	5
10) I feel learning is a time of personal growth and change	1	2	3	4	5
11) I have a habit of checking if I really understood what I studied, asking questions or doing exercises	1	2	3	4	5
12) You really learn when you listen to explanations given by an teacher	1	2	3	4	5
13) When I read a story, I easily orient myself among characters and in the story plot	1	2	3	4	5
14) The last time I successfully passed a school test, I felt that it was also the merit of those who had taught me	1	2	3	4	5
15) I prepare myself in a different way for oral questioning, for a class assignment or for group work	1	2	3	4	5
16) Above all, a good teacher makes his/her students compare and discuss with each other the opinions they have about the things that the school teaches	1	2	3	4	5
17) To decide what to highlight, I keep in mind the title, the type of text and the purpose of the reading	1	2	3	4	5
18) During study I find it easy to tell if I'm prepared or not	1	2	3	4	5
19) I'm very careful when teachers ask questions, to understand what they expect	1	2	3	4	5
20) I study all subjects with the same method	1	2	3	4	5

APPENDIX B

ITEM	FACTOR
1) I feel that I really learn through discussion and confrontation with others	F2
2) I'm always trying to get a place to sit in class to help me keep up with the explanation	F1
3) When I'm listening to a lesson, I try to get some paper to write down the important things	F1
4) After an oral examination, I can figure out how I performed	F4
5) The learner while studying can create new ideas himself	F2
6) In order to really learn I need someone to teach me	F3
7) As the teacher speaks, I make notes to remember and understand better	F1
8) Learning is above all a matter of concentration and commitment	F3
9) I feel learning as something based on self-confidence	F2
10) I feel learning is a time of personal growth and change	F2
11) I have a habit of checking if I really understood what I studied, asking questions or doing exercises	F1
12) You really learn when you listen to explanations given by an teacher	F3
13) When I read a story, I easily orient myself among characters and in the story plot	F4
14) The last time I successfully passed a school test, I felt that it was also the merit of those who had taught me	F3
15) I prepare myself in a different way for oral questioning, for a class assignment or for group work	F4
16) Above all, a good teacher makes his/her students compare and discuss with each other the opinions they have about the things that the school teaches	F2
17) To decide what to highlight, I keep in mind the title, the type of text and the purpose of the reading	F1
18) During study I find it easy to tell if I'm prepared or not	F4
19) I'm very careful when teachers ask questions, to understand what they expect	F1
20) I study all subjects with the same method	F1

Note: F1 = *Learning as a self-regulated and strategic experience*;
F2 = *Learning as a process of affective, motivational and co-constructive activation of Self*;
F3 = *Learning as a guided practice*;
F4 = *Learning as participation in school practices*.

REFERENCES

- Cacciamani, S., Cesareni, D., Martini, F., Ferrini, T., & Fujita, N. (2012). Influence of participation, facilitator styles, and metacognitive reflection on knowledge building in online university courses. *Computers & Education*, 58, 874-884.
<https://doi.org/10.1016/j.compedu.2011.10.019>
- Cera, R., Cristini, C., & Antonietti, A. (2018). Conceptions of learning, well-being, and creativity in older adults. *Journal of Educational, Cultural and Psychological Studies*, 18, 241-273.
<https://doi.org/10.7358/ecps-2013-007-cera>
- Cera, R., Mancini, M., & Antonietti, A. (2013). Relationships between metacognition, self-efficacy and self-regulation in learning. *Journal of Educational, Cultural and Psychological Studies*, 4, 115-141.
- Cornoldi, C. (2010). Metacognition, intelligence and academic performance. In H. S. Waters & W. Scheneider (Eds.), *Metacognition, strategy use, and instruction* (pp. 257-276). New York: The Guilford Press.
- Corsaro, W. A., & Molinari, L. (2005). *I Compagni: Understanding children's transition from preschool to elementary school*. New York: Sociology of Education Series.
- Costabile, A., Cornoldi, C., De Beni, R., Manfredi, P., & Figliuzzi, S. (2013). Metacognitive components of students' difficulties in the first year of University. *International Journal of Higher Education*, 2, 165-171.
<https://doi.org/10.5430/ijhe.v2n4p165>
- Elliott, J., Hufton, N., Willis, W., & Illushin, L. (2005). *Motivation, engagement and educational performance: International perspectives on the contexts for learning*. Britain: Palgrave.
<https://doi.org/10.1057/9780230509795>
- Entwisle, D. R., & Alexander, K. L. (1998). Facilitating the transition to first grade: The nature of transition and research on factors affecting it. *The Elementary School Journal*, 98, 351-364.
<https://doi.org/10.1086/461901>
- ISTAT – National Institute of Statistics (2020). *Scuola secondaria di secondo grado*.
http://dati.istat.it/Index.aspx?DataSetCode=DCIS_SCUOLESECONDO2.
- Johnson, E. S., Clohessy, A. B., & Chakravarthy, P. (2020). A self-regulated learner framework for students with learning disabilities and math anxiety. *Intervention in School and Clinic*, Advance online publication.
<https://doi.org/10.1177/1053451220942203>
- Laghi, F., Picone, L., Lonigro, A., & Fossati, M. (2012). Processi motivazionali, volitivi e autopresentazione efficace in adolescenza. Risultati di uno studio longitudinale. *Journal of Educational, Cultural and Psychological Studies*, 3, 57-74.

- Li, M., Zheng, C., Liang, J. C., Zhang, Y., & Tsai, C. C. (2018). Conceptions, self-regulation, and strategies of learning science among Chinese high school students. *International Journal of Science and Mathematics Education*, *16*, 69-87.
<https://doi.org/10.1007/s10763-016-9766-2>
- Ligorio, M. B. (2010). Dialogical relationship between identity and learning. *Culture & Psychology*, *16*, 93-107.
<https://doi.org/10.1177/1354067X09353206>
- Lin, C., Tsai, C., & Liang, J. (2012). An investigation of two profiles within conceptions of learning science: an examination of confirmatory factor analysis. *European Journal of Psychology of Education*, *27*, 499-521.
<https://doi.org/10.1007/s10212-011-0092-3>
- Loscalzo, Y., & Giannini, M. (2019). Study engagement in Italian university students: A confirmatory factor analysis of the Utrecht Work Engagement Scale – student version. *Social Indicators Research*, *142*, 845-854.
<https://doi.org/10.1007/s11205-018-1943-y>
- McBurney, D. H., & White, T. L. (2009). *Research methods*. Belmont, CA: Wadsworth Cengage Learning.
- Nurmi, J. E., & Aunola, K. (2005). Task-motivation during the first school years: A person-oriented approach to longitudinal data. *Learning and Instruction*, *15*, 103-122.
<https://doi.org/10.1016/j.learninstruc.2005.04.009>
- OECD (2016). *PISA 2015. Results*, Vol. 1: *Excellence and equity in education*. Paris: OECD Publishing.
<https://doi.org/10.1787/9789264266490-en>
- Oriol, X., Torres, J., Miranda, R., Bilbao, M., & Ortúzar, H. (2017). Comparing family, friends and satisfaction with school experience as predictors of SWB in children who have and have not made the transition to middle school in different countries. *Children and Youth Services Review*, *80*, 149-156.
<https://doi.org/10.1016/j.childyouth.2017.06.053>
- Pinto, G., Bigozzi, L., Vettori, G., & Vezzani, C. (2018). The relationship between conceptions of learning and academic outcomes in middle school students according to gender differences. *Learning, Culture and Social Interactions*, *16*, 45-54.
<https://doi.org/10.1016/j.lcsi.2017.11.001>
- Säljö, R. (1979). Learning about learning. *Higher Education*, *8*, 443-451.
<https://doi.org/10.1007/BF01680533>
- Säljö, R. (2009). Learning, theories of learning, and units of analysis in research. *Educational Psychologist*, *44*, 202-208.
<https://doi.org/10.1080/00461520903029030>

- Vargo, K. K. (2020). A teacher's guide to using a multiple schedule of reinforcement in educational settings. *Intervention in School and Clinic, 56*, 1-7.
<https://doi.org/10.1177/1053451220910745>
- Vaughn, M. G., Roberts, G., Fall, A.-M., Kremer, K., & Martinez, L. (2020). Preliminary validation of the dropout risk inventory for middle and high school students. *Children and Youth Services Review, 111*, 104855.
<https://doi.org/10.1016/j.chilyouth.2020.104855>
- Vermunt, J. D., & Donche, V. (2017). A learning patterns perspective on student learning in higher education: State of the art and moving forward. *Educational Psychology Review, 29*, 269-299.
<https://doi.org/10.1007/s10648-017-9414-6>
- Vettori, G., Pinto, G., & Bigozzi, L. (2019). The relation between emotions, conceptions, learning strategies and school success in secondary school students: A person-oriented approach. Paper presented at the XXXII Congresso Nazionale AIP (Associazione Italiana di Psicologia), sezione di Psicologia dello Sviluppo e dell'Educazione, Napoli, 23-25 settembre.
- Vettori, G., Vezzani, C., Bigozzi, L., & Pinto, G. (2018). The mediating role of conceptions of learning in the relationship between metacognition and academic outcomes among middle school students. *Frontiers in Psychology, 9*, 1-13.
<https://doi.org/10.3389/fpsyg.2018.01985>
PMid:30405480 PMCID:PMC6206844
- Vettori, G., Vezzani, C., Bigozzi, L., & Pinto, G. (2020a). The predictive role of prior achievements and conceptions of learning in university success: Evidence from a retrospective longitudinal study. *Higher Education Research & Development*, Advance online publication.
<https://doi.org/10.1080/07294360.2020.1817875>
- Vettori, G., Vezzani, C., Bigozzi, L., & Pinto, G. (2020b). Upper secondary school students' conceptions of learning, learning strategies, and academic achievement. *The Journal of Educational Research*, in press.
<https://doi.org/10.1080/00220671.2020.1861583>
- Vettori, G., Vezzani, C., Bigozzi, L., & Pinto, G. (2020c). Cluster profiles of university students' conceptions of learning according to gender, educational level, and academic disciplines. *Learning and Motivation, 70*, 101628.
<https://doi.org/10.1016/j.lmot.2020.101628>
- Walburg, V. (2014). Burnout among high school students: A literature review. *Children and Youth Services Review, 42*, 28-33.
<https://doi.org/10.1016/j.chilyouth.2014.03.020>
- Waters, S. K., Lester, L., Wenden, E., & Cross, D. (2012). A theoretically grounded exploration of the social and emotional outcomes of transition to secondary school. *Journal of Psychologists and Counsellors in Schools, 22*, 190-205.
<https://doi.org/10.1017/jgc.2012.26>

RIASSUNTO

Il duplice scopo del presente studio è quello di identificare specifici profili di orientamenti verso l'apprendimento misurate tramite «LO-COMPASS: Learning Orientation-Cognition Metacognition Participation Assessment»; e di creare una regola psicometrica per raggruppare i punteggi grezzi ottenuti dallo studente alle dimensioni fattoriali di LO-COMPASS in uno specifico profilo. 183 studenti di scuola media (91 maschi e 92 femmine) hanno validamente completato la versione originale del Questionario LO-COMPASS. Sono state condotte un'analisi fattoriale confermativa e un'analisi dei cluster. LO-COMPASS ha rilevato quattro fattori di orientamenti verso l'apprendimento degli studenti. Inoltre, lo strumento è stato corredato da una regola psicometrica per raggruppare i punteggi grezzi ottenuti dallo studente alle dimensioni fattoriali di LO-COMPASS all'interno di due profili. L'applicazione di LO-COMPASS permetterà agli psicologi scolastici e agli insegnanti di analizzare le difficoltà e i problemi degli studenti alla scuola secondaria di primo grado, nonché i punti di forza nella loro motivazione all'apprendimento. Lo strumento sarà utile a più livelli: prevenzione, intervento, valutazione.

Parole-chiave: Intervento sul benessere; Misura multidimensionale degli orientamenti verso l'apprendimento; Prevenzione delle difficoltà; Profili individuali; Rendimento scolastico.

How to cite this Paper: Vettori, G., Vezzani, C., Bigozzi, L., & Pinto, G. (2020). Assessing the multidimensionality of students' learning orientations: The use of LO-COMPASS for the well-being and scholastic success [Valutare la multidimensionalità degli orientamenti verso l'apprendimento degli studenti: l'utilizzo di LO-COMPASS per il benessere ed il successo scolastico]. *Journal of Educational, Cultural and Psychological Studies*, 22, 179-198. DOI: <https://dx.doi.org/10.7358/ecps-2020-022-vett>