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IMPROVING SCHOOL SETTINGS AND CLIMATE: WHAT ROLE FOR THE NATIONAL OPERATIVE PROGRAMME? INSIGHTS FROM A LEARNING ANALYTICS PERSPECTIVE

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Although students are increasingly involved in extra learning activities aimed at enriching the attributes and the contents of conventional educational programmes, still little is known on the main implications of these initiatives. Embracing a Learning Analytics (LA) perspective, the article sheds light on the effects triggered by students' involvement in innovative educational activities and learning processes co-financed by the Call no. 10862/2016 issued by the National Operative Programme (PON) 2014/2020. We implemented a three-step study design, which consisted of: 1) a descriptive analysis; 2) a principal component analysis; and 3) a discrete choice regression analysis. Our findings pointed out that educational activities and learning processes were especially effective in improving social relationships at school; moreover, they contributed in increasing the students' willingness to expand their horizons.

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1 Introduction

1.1 The growing relevance of learning analytics

The New Media Consortium (NMC) "Horizon" report issued in 2014 (Johnson *et al.*, 2014) identified schools and, in general, educational settings as fertile grounds to implement Learning Analytics (LA) tools and approaches. In fact, LA has been variously understood as a timely and relevant opportunity to: 1) enhance pedagogical and educational theories and models; 2) assess and improve learning processes; and 3) shed light on the factors that are more likely to affect the students' behaviour and performances (Siemens, 2013; Roll & Winne, 2015). This is especially true as far as disadvantaged students are concerned, including those who show greatest risks of dropout due to either economic or social frailties (Coates, 2017).

LA is intended to enhance the methodologies and the tools used in the educational context (Fulantelli & Taibi, 2014). In fact, it is defined as "... *the measurement, collection, analysis and reporting of data about learners and their contexts, for the purpose of understanding and optimizing learning and the environments in which it occurs*" (Siemens & Baker, 2012, pp. 252-253). It makes an effort to merge data mining (Baker & Inventado, 2014), information retrieval (Berland *et al.*, 2014), and technology-mediated learning (Gašević *et al.*, 2015), in order to turn educational research in a data-driven science (Knight *et al.*, 2014). In other words, LA is aimed at enhancing the ability of educational institutions to make decisions in light of reliable evidence obtained by dependable data analysis; this paves the way for the advancement of students' experiences and, consequently, for a better functioning of the educational system (Lockyer *et al.*, 2013).

In an epoch which has triggered the process of "data explosion" in the educational context (McIntosh, 1979: p. 82) – with the increasing growth of online learning, big data analytics and digital technologies applied to learning processes – educational institutions have to reframe their strategies, organizational models and management approaches, in an attempt to deal with the challenge of complexity. Sticking to these considerations, the Educational Data Mining field is gradually emerging as a research stream concerning the development and implementation of tailored methods directed, on the one hand, at investigating quantitative data about the educational contexts and, on the other hand, at exploiting these data to better understand the students' expectations (Slater *et al.*, 2017) and to enhance the quality of educational services (Romero & Ventura, 2010).

In this research field, LA primarily concerns the appropriate use of smart data – directly produced by schools, teachers, students or by other sources

of information – to shed light on social issues affecting learning processes, performances and dynamics (Baker & Inventado, 2014). Even though LA includes a variety of streams and developments, conceptual and practical challenges are still to be overcome in order to unravel and realize the full potential of LA in improving the functioning of educational institutions (Aldowah & Al-Samarraie, 2019).

1.2 Research context

The study launched by the Italian National Institute of Documentation, Innovation and Educational Research (INDIRE) in 2015 – that is intended to comprehensively assess the performances of the whole national educational system – can be contextualized in the theoretical background depicted above. INDIRE introduced a brand new management system – labelled GPU "Gestione della Programmazione Unitaria" – to support the Italian Ministry of Education, University and Research (MIUR) in its role of management authority for the governance of the National Operative Programme (PON) 2014-2020 "For the School: competencies and environments for development". PON should be understood as a strategic plan, whose institutional aim is to pave the way for a high quality educational system and for excellence in learning.

PON is entirely financed by the European Structural Funds. It is addressed to all the schools operating in Italy and, therefore, to the whole population of students and teaching staff of Italian public educational institutions. Its main purpose is to enhance the quality, the timeliness and the effectiveness of educational activities, in order to facilitate the achievement of the key strategic aims listed in the strategic framework for European cooperation in education and training: 1) curb the rate of early leavers from education and training aged 18-24 below 10%; 2) encourage at least 40% of people aged 30-34 to complete some form of higher education; 3) bring at least 20 million people above the poverty line and/or outside conditions of social exclusion.

Contributing in the achievement of such goals, GPU fosters the involvement of schools, students, and teachers in initiatives that are financed either by the European Social Fund (ESF) – in the case of soft interventions focussing on educational activities – or by the European Regional Development Fund (ERDF) – in the case of hard, infrastructural interventions. From a methodological point of view, GPU is established on the Deming Cycle, *i.e.* an iterative management model including four main steps (PDCA) (Chen, 2012):

- *Plan*: definition and agreement of objectives and processes;
- *Do*: implementation of the plan;
- *Check*: evaluation and assessment of data and/or information collected during the "Do" step;

- *Act*: amendment of problems and inconsistencies and improvement of strengths identified during the "Check" step.

By accessing the GPU platform, schools have the opportunity to submit their proposals to the calls issued by the Management Authority. They formalize their submission and, if their project is approved, they are enabled to manage and assess on-line their project. Employing the PDCA scheme, GPU allows schools to thoroughly manage and oversee the progress of implemented activities and to constantly improve educational processes.

1.3 State of the art and research questions

The results achieved in the period 2007/2013 were encouraging: in fact, the educational institutions operating in the "Convergence" Italian regions (Calabria, Campania, Apulia and Sicily) managed more than 30.000 project financed by ERFD (intended, inter alia, to co-finance the acquisition of innovative technologies, the design of advanced teaching laboratories and the upgrading of existing learning structures) and more than 60.000 ESF projects (aimed at the design and implementation of innovative learning activities and educational processes). About 2.5 million people – including both students and teachers – participated in more than 200.000 interventions that have been financed by PON and managed through GPU.

This article specifically looks at the Call no. 10862/2016 of the PON 2014/2020, labelled "Social Inclusion and fight to deprivation". This call promotes positive actions intended to prevent school dropouts. More than 600.000 students coming from about 4.400 schools established in the Italian Peninsula have been involved in the projects submitted to the call. Data about the activities implemented were collected from the observation cards, which are filled by educational tutors in two circumstances: 1) before the beginning of the project; and 2) at the end of the project. These cards allow illuminating changes in students' behaviours and performances that are strictly related with the project to which they participated. Such data are stored in the GPU platform.

Table 1 and Figure 1 summarize the sources that have been accessed to collect the data examined in this study. Our main purpose was to obtain and discuss some evidence about the effectiveness of interventions financed by the Call no. 10862/2016 to minimize the occurrence of schools' dropouts and to prevent social exclusion. Two research questions triggered our study:

- *R.Q. 1*: What are the main factors influencing students' behaviours and educational performances?
- *R. Q. 2*: What kind of strategic and management initiatives can be implemented to increase the students' willingness to actively participate in innovative learning processes and educational activities?

We exploited LA to provide a tentative answer to these research questions. The article is organized as follows: Section 2 depicts the research design and methods; Section 3 reports the study findings, shedding light on the main implications of initiatives co-financed by the Call no. 10862/2016; Section 4 critically discusses the study results, paving the way for some conceptual and practical insights inspiring further developments.

2 Methods

2.1 Research Strategy

To meet the purposes of this paper, we accessed primary data from GPU. GPU is owned by INDIRE and it is currently part of the Axis IV "Technical Assistance to the Management Authority of the Italian Ministry of Education, University, and Research" of the PON 2014/2020 (CP: 4.1.4A-FSEPON-INDIRE-2015-2; CUP: B55I15000470007). One of the main aim of GPU is to improve the efficiency, the effectiveness and the quality of financed interventions, as well as to contribute in the assessment of the outputs and outcomes of implemented projects.

Table 1
DATA SOURCES

Source	Type of information
Observation cards	They allow to assess changes in the students' behaviours and educational performances
Evaluations	They allow to gauge the effects of interventions on students' school performances
Project indicators	They concern the expected outcomes as formalized in the project submission
Transversal indicators	They include output and outcome indicators yearly provided to the European Commission and to the Italian National Inspectorate for the financial relationships with EU
Self-assessment	Educational managers self-assess the achievement of project indicators and transversal objectives
Satisfaction survey	They measure the students' satisfaction with the contents of the initiatives realized

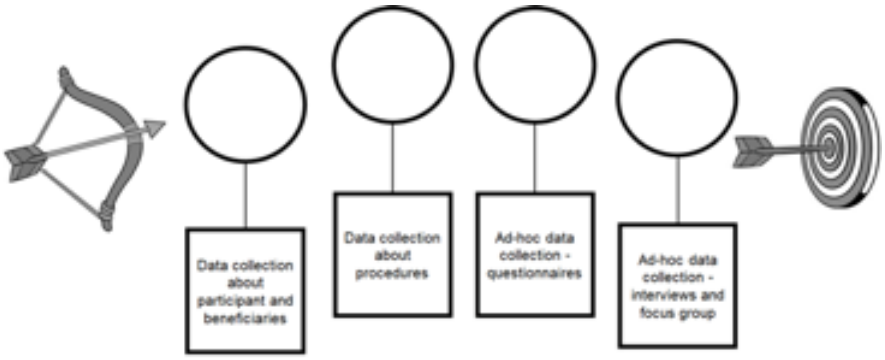

Fig. 1 - The process of data collection.

Most of data used in this study were collected through Lime Survey, an on-line open source survey software that is embedded in the GPU platform. Lime Survey allowed us to administer ad-hoc questionnaires to the educational tutors of each educational activity implemented within the Call no. 10862/2016 of the PON. More specifically, the survey was aimed at eliciting the respondents' considerations and insights into the behaviours and approaches of students who participated in the financed educational activities.

The items included in the survey concerned six main themes:

- *Relationships with peers*: this theme allowed us to understand how students established and nurtured inter-personal relationships with their peers; inter alia, we examined the implications of interpersonal relationships on the development of soft skills and social competencies;
- *Relations with teachers*: this theme sheds light on the educational, social and cultural approach employed by teachers;
- *Ability to reflect on negative school experiences*: this theme permitted us to assess how students critically reflected on failures as an important growth opportunity;
- *Extra-curricular motivation*: this theme was useful to early detect the increasing needs and expectations held by students;
- *Awareness and respect for rules*: this theme – which has been usually underestimated both in theory and in practice – is crucial to gauge the growth of students and their ability to effectively perform in the society;
- *Ability to manage emotional sphere*: this theme is essential to assess the students' self-esteem and awareness of their contribution to the society.

The educational tutors were asked to self-rate – at the best of their knowledge – the items included in each of the six themes reported above; obviously, an

individual score was reported for each of the students who participated in the initiatives financed by the Call no. 10862/2016. A 10-points Likert scale was attached to each item: "1" indicated that the event reported in the item was not relevant or that it did not occur; conversely, "10" indicated that the event reported in the item was highly relevant or that it occurred frequently. The interviewees provided a huge amount of data, which concerned more the 1 million students.

2.2 Study Design

In light of the huge number of observations and the large amount of data available, we decided to use a mixed study design, which was consistent with the distinguishing nature and the specific purposes of this research. More specifically, our study was articulated in three steps. Firstly, we performed a preliminary, descriptive analysis; this preliminary investigation was useful to shed light on the main issues which were obtained from the filled questionnaires. We used both measures of position and variability for this purpose. Secondly, we implemented a multivariate statistical analysis, which was aimed at pinpointing the principal components included in the collected questionnaires, in an attempt to illuminate – embracing an *ex post* perspective – potential areas of improvement. Thirdly, we arranged a binomial logistic analysis, in order to gauge the positive or negative effects of the educational initiatives on the behaviours and performances of students.

2.3 Statistical models

As previously anticipated, the principal component analysis was useful to curb the number of variables in our large and complex data set. The reduction of dimensions was inspired by the purpose of eliciting the most relevant and/or most significant factors contemplated in the analysis, which explained most of the variances of responses for each theme investigated. A brief overview of the approach used to implement PCA follows. Define **C** as a correlation matrix with covariance "*p x p*", where:

$$\mathbf{C} = \mathbf{V}\mathbf{\Lambda}\mathbf{V}' = \sum_{i=1}^{p} \lambda_i \, \mathbf{v}_i \mathbf{v}_i'$$

$$\mathbf{v}_i'\mathbf{v}_j = \boldsymbol{\delta}_{ij} \text{ (orthonormality)}$$

$$\lambda_1 \geq \lambda_2 \geq \cdots \geq \lambda_p \geq 0$$

Eigenvectors vi represent the principal components. The direction (*i.e.* the sign) of principal components cannot be identified. In fact, principal components are estimated to allow that $1'\mathbf{v}_i > 0$ The sum of variances is:

$$\text{trace}\,(\mathbf{C}) = \sum \boldsymbol{\lambda}_j$$

The asymptotic distribution of eigenvalues $\hat{\mathbf{v}}_i$ and $\hat{\lambda}_i$ of the covariance matrix **S** for a sample with a multivariate normal distribution $\boldsymbol{N}(\mu, \boldsymbol{\Sigma})$ has been proposed by Girshick (1939). Readers who are interested in additional details, can make reference to Anderson (1963), Jackson (1991), and Lawley (1956), Besides, Tyler (1981) provides some insights into the elliptic distribution. We preferred to use an elliptic distribution rather than an exact one to avoid complex computations, which are related to the latter (Muirhead, 1982).

As reported in the introductory section, we were especially interested in assessing the likelihood that the participation and the involvement in an educational initiative financed by the Call no. 10862/2016 produced a change (in either positive or negative terms) in the emotional, social, relational, and educational spheres of students. For this purpose, we identified both the nature and the direction of the principal factors, which were more effective in explaining the change in the students' behaviours and performances. A cross-section sample of 1,143,681 students distributed in the Italian context was involved in the analysis.

We designed a probability model to investigate our dummy dependent variable as a function of a set of explicative variables (*i.e.* regressors) and parameters. The regressors concerned the thematic areas reported above, which were assessed both *ex ante* and *ex post*: this permitted us to shed light on the evolution of students' behaviours and performances. The parameters measured the effects that such variables generated either at the beginning of educational activities (*ex ante*) or at the end of the educational activities (*ex post*) for each student involved in the analysis.

Alongside the regressors, which were run in the analysis, we also included in our statistical model a variable concerning the geographical area where the students lived and accomplished their educational activities: this was useful to take into account potential territorial effects on the object of our analysis.

The logistic regression model arranged for the purpose of this research can be described as follows:

$$y_i^* = x_i\beta + \epsilon_i, i = 1, \ldots, N$$

Where:

- y_i^* is a latent variable;
- The observed variable is a binary variable y_i, which is equal to 1 if $y_i^* \geq 0$, and equal to 0 if $y_i^* < 0$.
- The estimated value of y_i implies the likelihood that one of the two available alternatives occurs;
- x_i is a vector with "*1 x K*" regressors;
- β is a vector with "*K x 1*" parameters;
- and ε_i is the error term.

3 Findings

3.1 Descriptive statistics

Table 2 and Table 3 provide an overview of the items, which were included in this study, reporting average values and standard deviations. We found that the average values of the *ex ante* situation were higher than those concerning the *ex post* situation only concerning two items: 1) "she/he is willing to ask peers for help"; and 2) "she/he is willing to help others". It is worth noting that the relationships with peers generally improved as a result of educational activities. Moreover, the respondents reported a drop of several negative shades of students' relationship with others, such as: 1) "she/he prefers to stay alone"; 2) "she/he only interacts with a few students"; 3) "she/he is willing to only interact with older peers"; 4) "she/he is not interested in socializing with others"; 5) "she/he is likely to be humiliated by peers"; 6) "she/he is considered to be aggressive by peers". Interestingly, we did not detect perceivable variations in the item "she/he is considered to be a leader by peers". In sum, we found a sort of improvement of relationships between students as a result of educational activities. In fact, several negative dynamics – such as social exclusion, bullying, and social isolation – were less common in the *ex post* situation than in the *ex ante* one.

Most of items which concerned the relationship between students and teachers improved at the end of the learning process. This was especially true for those items which concerned the delivery of educational activities: at the end of the initiatives, students were more likely to ask for explanation to better understand topics dealt with during the lessons and to pass written exams. Besides, they were more prone to collaborate with peers to meet the teachers' assignments. However, several items were found to be lower in the *ex post* situation, such as: 1) "she/he is willing to take position against the teachers' instructions", and 2) "she/he tends willing to be dependent on teachers".

Students were found to be more willing to ask teachers for help to understand

their wrongdoings and to achieve greater awareness of the errors made during written exams in the *ex post* situation. Whilst, the students did not seem to be attracted by innovative topics (*i.e.* arguments not included in conventional educational programmes), they were collaborative in performing extra learning activities. It is worth noting that, in the *ex post* situation, we detected a slight worsening of the students' relationship with rules. Lastly, students showed a greater ability to manage social and performance stressors during the everyday school activities after the completion of educational activities.

3.2 Principal component analysis

The 31 items investigated in this research were run in a principal component analysis in order to point out the factors, which concomitantly contributed in illuminating the implications of the educational activities co-financed by the Call no. 10862/2016. As summarized in Table 4, we identified three principal components, which explained slightly more of half of the total variance (50.2%). To increase the amount of total variance explained, we included a forth component, which allowed us to cover about 60% of the total variance. Since the differences between eigenvalues of the following components were marginal, we decided to stick to 4 components.

Table 2
RELATIONSHIP OF STUDENTS WITH PEERS AND TEACHERS BEFORE AND AFTER THE DELIVERY OF EDUCATIONAL ACTIVITIES (N = 1,140,705)

Observation cards	*ex ante*		*ex post*	
Relationship with peers	**Mean**	**S.D.**	**Mean**	**S.D.**
She/he prefers to stay alone	4.11	2.91	3.44	2.73
She/he only interacts with a few students	4.55	2.92	3.84	2.79
She/he is willing to only interact with older peers	4.01	3.30	3.42	3.01
She/he is willing to report peers' wrongdoings to peers	5.13	2.97	5.03	3.02
She/he is not interested in socializing with others	3.93	2.90	3.41	2.77
She/he is willing to ask peers for help	5.74	2.54	5.91	2.58
She/he is willing to help others	6.27	2.66	6.53	2.74
She/he is likely to be humiliated by peers	4.31	3.01	4.37	3.04
She/he is seen by peers as a potential victim of bullying	3.43	2.83	2.97	2.67
She/he is considered to be aggressive by peers	2.75	2.54	2.42	2.36
She/he is seen by other students as a peer	6.45	2.97	6.40	3.19
Relationship with teachers	**Mean**	**S.D.**	**Mean**	**S.D.**
She/he is willing to ask for explanations to better understand topics dealt with a lesson	6.58	2.56	6.97	2.60

She/he is willing to ask for explanations to pass written exams	6.49	2.64	6.94	2.64
She/he is willing to ask teachers for help to avoid peers' mistreatment	4.93	2.90	5.16	3.01
She/he is willing to positively deal with the teachers' instructions	6.41	2.77	6.62	2.93
She/he is willing to take position against the teachers' instructions	3.06	2.59	2.73	2.49
She/he tends willing to be dependent on teachers	4.28	2.80	4.02	2.81

Table 3

SOCIAL, MOTIVATIONAL, CIVIC, AND EMOTIONAL BEHAVIORS OF STUDENTS BEFORE AND AFTER THE DELIVERY OF EDUCATIONAL ACTIVITIES (N = 1,140,705)

Observation cards	***ex ante***		***ex post***	
Ability to reflect on negative school experiences	**Mean**	**S.D.**	**Mean**	**S.D.**
She/he is willing to ask teachers for help to understand her/his own wrongdoings	6.49	2.55	6.94	2.60
She/he is aware of the errors made during written exams	6.82	2.50	7.12	2.65
She/he is aware of the meaning of negative evaluations achieved	6.95	2.57	7.16	2.74
Motivation for additional learning activities	**Mean**	**S.D.**	**Mean**	**S.D.**
She/he is interested for topics which are not included in conventional educational curricula	7.03	2.68	7.01	2.97
She/he is interested towards new topics	6.90	2.70	6.95	2.96
She/he is collaborative in performing extra learning activities	7.08	2.77	6.86	3.12
Relationship with rules	**Mean**	**S.D.**	**Mean**	**S.D.**
She/he is aware of school rules	6.79	3.01	6.64	3.30
She/he agrees with the school rules	6.86	2.95	6.72	3.25
She/he complies with the school rules	6.82	2.93	6.69	3.23
She/he is aware of guidelines set in the classroom	6.86	2.98	6.68	3.29
She/he agrees with the guidelines set in the classroom	6.89	2.94	6.74	3.25
She/he complies with the guidelines set in the classroom	6.85	2.92	6.71	3.23
Ability to manage the emotional sphere	**Mean**	**S.D.**	**Mean**	**S.D.**
She/he is able to manage emotions and social stress during oral exams	6.70	2.29	7.41	2.43
She/he is able to manage emotions and performance stress during written exams	6.02	2.30	7.12	2.40

Table 4
MAIN OUTPUT OF THE PRINCIPAL COMPONENT ANALYSIS

	Eigenvalues	Δ	% of variance	Cum % of variance
Comp1	9.21	5.24	27.92%	27.92%
Comp2	3.98	0.59	12.05%	39.97%
Comp3	3.38	1.25	10.25%	50.22%
Comp4	2.14	0.62	6.48%	56.70%
Comp5	1.51	0.25	4.59%	61.28%
Comp6	1.27	0.26	3.83%	65.11%
Comp7	1.01	0.05	3.06%	68.17%
Comp...	...	...	...	...
Comp28	0.20	0.05	0.59%	99.09%
Comp29	0.14	0.05	0.42%	99.51%
Comp30	0.09	0.01	0.26%	99.78%
Comp31	0.07	0.07	0.22%	100%
No. Of observations	1,140,704			
No. Of components	4			
Trace	31			
□	0.57			

Table 5 shows the variance and covariance matrix, which allows us to identify the four components, which resulted from the analysis. We only included in each component those items, which mostly contributed in explaining the variance of the related construct; for this reason, items whose eigenvalues exceeded the third quartile (Q3) were assumed to be part of each construct. The first component is composed by concordant variables and is labelled "self-management": in fact, it mainly concerns the students' ability to acknowledge, agree, and stick to the rules and the guidelines, which regulate individual and collective behaviours at schools. This is an important finding, since the Call no. 19862/2016 is targeted to fragile people, who generally live in suburbs and experience cultural, social, and economic disadvantage.

The second component concern the students' "emotional distress": the items included in this component focussed on the negative interactions established by students with their peers and teachers, including the willingness to challenge the instructions of the teachers and the propensity to social isolation and to aggressiveness towards peers. Since poor interpersonal relations might undermine the effectiveness of educational activities, they should be properly

handled to minimize their drawbacks.

The third component involved the students' "relationality", *i.e.* the willingness of students to ask peers for help, to seek explanation in order to improve their understanding, and the propensity to establish peer-to-peer relationships with other students. Good relationships with other people in the classroom and the establishment of a friendly environment foster learning processes, paving the way for a fair atmosphere, which enhances the students' desire of learning. Conversely, poor relationships at school hinder the learning experience, creating a disempowering environment.

Table 5

FACTOR LOADINGS FOR EACH PRINCIPAL COMPONENT

Item	Components				
	Self-Management	Emotional maturity		Interest in learning	N.E.
She/he is aware of guidelines set in the classroom	0.2443	-0.1463	-0.2406	-0.1568	0.1164
She/he agrees with the school rules	0.2437	-0.1512	-0.2302	-0.1549	0.1316
She/he agrees with the guidelines set in the classroom	0.2434	-0.1525	-0.2358	-0.1621	0.1175
She/he is aware of school rules	0.2430	-0.1414	-0.2310	-0.1436	0.1518
She/he complies with the school rules	0.2389	-0.1543	-0.2261	-0.1611	0.1510
She/he complies with the guidelines set in the classroom	0.2384	-0.1544	-0.2274	-0.1640	0.1494
She/he is interested towards new topics	0.2083	-0.1122	0.0598	0.2036	0.4496
She/he is interested for topics which are not included in conventional educational curricula	0.2073	-0.1060	0.0376	0.1988	0.4702
She/he is aware of the errors made during written exams	0.2039	-0.1083	0.1776	0.2087	0.3705
She/he is collaborative in performing extra learning activities	0.2031	-0.0973	-0.0048	0.1712	0.5197
She/he is aware of the meaning of negative evaluations achieved	0.2006	-0.1008	0.1328	0.1928	0.4499
She/he is willing to positively deal with the teachers' instructions	0.2003	-0.0730	0.0967	0.1142	0.5497
She/he is willing to ask for explanations to better understand topics dealt with at lesson	0.1898	-0.0647	0.2264	0.1546	0.4269
She/he is willing to ask teachers for help to understand her/his own wrongdoings	0.1893	-0.0758	0.2337	0.1613	0.4067
She/he is willing to ask for explanations to pass written exams	0.1861	-0.0573	0.2359	0.1548	0.4283
She/he is willing to help others	0.1653	0.0080	0.2055	-0.0470	0.6005
She/he is willing to ask peers for help	0.1617	0.1904	0.2626	-0.3901	0.0566

She/he is seen by other students as a peer	0.1539	0.0124	-0.0157	0.0447	0.7760
She/he is likely to be humiliated by peers	0.1536	0.1514	0.0953	0.0229	0.6598
She/he is able to manage emotions and social stress during oral exams	0.1426	-0.0889	0.1537	0.1086	0.6761
She/he tends willing to be dependent on teachers	0.1257	0.2275	-0.0645	0.0655	0.6254
She/he is willing to report peers' wrongdoings to teachers	0.1217	0.1950	-0.0668	-0.0389	0.6941
She/he is willing to take position against the teachers' instructions	0.1127	0.2675	-0.1201	0.0979	0.5292
She/he is seen by peers as a potential victim of bullying	0.1094	0.2729	-0.0973	0.0623	0.5534
She/he is considered to be aggressive by peers	0.1093	0.2909	-0.1048	0.0957	0.4968
She/he prefers to stay alone	0.1059	0.2806	-0.1652	0.1236	0.4587
She/he is willing to only interact with older peers	0.0990	0.2577	-0.1222	0.1013	0.5732
She/he is seen by peers as a leader	0.0980	0.1348	0.0905	0.0167	0.8109
She/he is not interested in socializing with others	0.0951	0.2841	-0.1956	0.1467	0.4202
She/he only interacts with a few students	0.0936	0.2847	-0.193	0.1469	0.4248
She/he is able to manage emotions and performance stress during written exams	0.0613	0.0760	0.026	0.0592	0.9327

The fourth and last component – labelled "interest in learning" – involves the students' willingness to expand their horizon dealing with new topics and issues and striving for understanding errors made during written and oral exams. Since the increased interest towards educational activities and the students' engagement are two critical ingredients of the recipe for curbing social dropouts, this component is especially relevant for the purpose of this research. In fact, the interest, curiosity and desire to learn are crucial steps of the individual personal and educational growth.

3.3 Discrete Choice Regression Model

Table 6 summarizes the main findings of the multivariate regression analysis. We found that the item "She/he is willing to ask peers for help" (β=0.016) showed a statistically significant and positive coefficient: this suggested that – as an outcome of the educational initiatives – students were more likely to rely on their peers to successfully deal with the learning activities. In addition, we found that the educational activities implemented within the Call no. 10862/2016 contributed in increasing the students' ability to face social distress during written and oral exams (β=0.029) and in enhancing their willingness to establish peer to peer relationships at school (β=0.001). In sum, it can be

argued that the educational activities were successful in ameliorating the school climate, which is essential in triggering better school performances.

We also found that the educational activities financed by PON had a positive effect on the student-teacher relationship. At the end of the educational activities, students were more willing to ask teachers for: 1) help to avoid peers' mistreatment (β=0.035), 2) help to understand wrongdoings (β=0.035), 3) explanations to pass written exams (β=0.016), and 4) explanations to better understand topics dealt with a lesson (β=0.014). In other words, the initiatives financed by PON were effective in triggering greater trust of students towards teachers, making the former more willing to establish a co-creating partnership with the latter.

Lastly, yet importantly, the logistic regression analysis suggested that the educational activities had a positive and significant effect both on the students' awareness and on respect for rules and on their willingness to expand their horizons, paving the way for a more effective and smoother learning process.

Table 6

THE RESULTS OF THE DISCRETE CHOICE REGRESSION ANALYSIS

Item	Coeff	Sig	S.E.	z	P > |z|
She/he prefers to stay alone	-0,0287	***	0,0012	-24,86	0,000
She/he only interacts with a few students	-0,0370	***	0,0011	-32,92	0,000
She/he is willing to only interact with older peers	-0,0262	***	0,0007	-35,21	0,000
She/he is willing to report peers' wrongdoings to peers	-0,0123	***	0,0008	-16,07	0,000
She/he is not interested in socializing with others	-0,0071	***	0,0009	-7,46	0,000
She/he is willing to ask peers for help	0,0156	***	0,0009	17,58	0,000
She/he is willing to help others	0,0062	***	0,0009	7,07	0,000
She/he is seen by others as a leader	-0,0041	***	0,0007	-5,57	0,000
She/he is likely to be humiliated by peers	-0,0381	***	0,0009	-41,65	0,000
She/he is considered to be aggressive by peers	-0,0102	***	0,0012	-8,68	0,000
She/he is seen by other students as a peer	0,0019	**	0,0007	2,71	0,007
She/he is willing to ask for explanations to better understand topics dealt with a lesson	0,0145	***	0,0012	12,03	0,000
She/he is willing to ask for explanations to pass written exams	0,0159	***	0,0012	13,52	0,000
She/he is willing to ask teachers for help to avoid peers' mistreatment	0,0351	***	0,0008	42,95	0,000
She/he is willing to positively deal with the teachers' instructions	0,0103	***	0,0009	11,8	0,000
She/he is willing to take position against the teachers' instructions	-0,0167	***	0,0011	-15,65	0,000
She/he tends willing to be dependent on teachers	-0,0096	***	0,0008	-11,47	0,000

She/he is willing to ask teachers for help to understand her/his own wrongdoings	0,0349	***	0,0011	31,38	0,000
She/he is aware of the errors made during written exams	0,0053	***	0,0013	4,08	0,000
She/he is aware of the meaning of negative evaluations achieved	-0,0058	***	0,0012	-5,03	0,000
She/he is interested for topics which are not included in conventional educational curricula	-0,0033	**	0,0013	-2,65	0,008
She/he is interested towards new topics	0,0109	***	0,0013	8,7	0,000
She/he is collaborative in performing extra learning activities	-0,0498	***	0,0010	-47,77	0,000
She/he is aware of school rules	0,0091	***	0,0015	5,95	0,000
She/he agrees with the school rules	-0,0034	*	0,0016	-2,11	0,035
She/he complies with the school rules	0,0009	*	0,0016	0,6	0,500
She/he is aware of guidelines set in the classroom	-0,0117	***	0,0017	-6,84	0,000
She/he agrees with the guidelines set in the classroom	-0,0040	*	0,0018	-2,28	0,023
She/he complies with the guidelines set in the classroom	-0,0092	***	0,0017	-5,59	0,000
She/he is able to manage emotions and social stress during oral exams	0,0290	***	0,0010	30,38	0,000
She/he is able to manage emotions and performance stress during written exams	0,0002	***	0,0010	0,19	0,000

Concluding remarks

The study findings should be read in light of the limitations, which affected this research. First, we only focussed on the Call no. 10862/2016; therefore, the breadth of our analysis was limited. In addition, our research exclusively contemplated Italian students; hence, it is not possible to argue for the generalizability of the study results at the international level. Lastly, we adopted a static perspective, which did not allow us to time after time detect the evolution of the students' behaviours and performances throughout the educational activities.

In spite of these limitations, we collected several intriguing evidence, which push forward our understanding of the potential implications of innovative educational activities delivered alongside conventional learning processes. The students involved in this study were consistent in showing an increased interest in interacting with others (both teachers and peers) to grasp with the issues and topics dealt with in the classroom. In addition, they were found to be more aware of the rules guiding individual and collective actions. From this standpoint, it can be argued that the PON performs as an effective tool to improve students' engagement with educational activities and to enhance their ability to establish fair and fruitful interactions in the classroom. This may lead to lower risks of social exclusion in the educational context and, consequently, to reduced rates of school failures and dropouts. Embracing a LA perspective,

the research findings stress that, to support students' positive behaviors and enhance their educational performance, learning contexts need to be reframed following two main trajectories: first, they should contribute in boosting the emotional maturity and the relationality of students, involving them in "social learning" practices; second, they should raise the students' interest in learning, nourishing their self-management skills and their self-awareness of individual skills and capabilities.

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