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Proposal to the PISA of a new scale of Students' engagement in school

Feliciano H. Veiga^{a*}^a Ph. D, Institute of Education, University of Lisbon, Lisbon

Abstract

Problem Statement: The question of students' engagement in schools has emerged as a powerful issue in educational context. The lack of assessment instruments, with studied psychometric characteristics, has constituted a problem. **Purpose of Study:** This study presents the elaboration of a new student engagement in school scale, including items of the "Engagement Scale" used in PISA 2000 and items in the "SES" adapted for Portugal (Veiga, Pavlovic, Garcia & Ochoa, 2010). **Research Methods:** The psychometric qualities — internal consistency and the external validity — were analyzed. The analysis allowed us to find a new scale that, surpassing the one-dimensionality of the scale of engagement used in PISA, has acceptable levels of reliability. In the study of external validity, the results in the "Student Engagement in School Scale, Version 2 (SES-V2)", appeared partially related to the academic achievement across disciplines. **Findings:** The results permitted us to find that the SES-V2, besides going beyond the lack of scale items used in PISA 2000, presents psychometric qualities that can be used in research and psycho-educational practice, to assess the multidimensional students' engagement in school. **Conclusions:** The future use of the SES-V2 in the PISA studies is considered and proposed. This scale may be a useful opportunity for teachers, psychologists and other education professionals. **Recommendations:** to deepen the study of multidimensionality of students' engagement in schools, including new items, as well as extending the external validity of the affective dimension of engagement, can constitute important fields of research.

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1. Introduction

The concept of engagement has been raising a lot of interest within the international investigation sphere, highlighting the "Exploring Student Engagement in Schools Internationally" project (Lam & Jimerson, 2008; Veiga, 2009 a). Educators and investigators see this concept as a solution for some problems like indiscipline, violence, delinquency, low academic success and high dropout rates that happen in many schools (Fredrick, Blumenfeld, & Paris, 2004; Veiga, 2007; Halstead & Jiamei).

* Feliciano H. Veiga. Tel.: (351) 21 794 3710
E-mail address: fhveiga@ie.ul.pt

In the search of the background for the study of student engagement in schools, we can locate ourselves in the literature about motivation (Wolters, 2004; Hussein, 2010), belonging to school (Finn & Voelkl, 1993) and in the self-regulated learning (Zimmerman & Schunk, 2007). From the literature review, there are two types of factors that emerge – contextual and personal. The positive consequences of the school engagement can be felt on psychological development and on the general well-being of the student (Fredricks, Blumenfeld, & Paris 2004; Veiga, 2007; 2009 b). The literature about the intrinsic motivation indicates the pleasure and the interest in learning activities as predictive on the high academic performance (Ryan & Deci, 2000). In the literature about self-regulated learning, cognitive engagement relates positively with the profound comprehension and synthesis (Zimmerman, 2007), as well as with a lot of academic performance indicators (Boekart, Pintrich, & Zeidner, 2000; Zimmerman, 2007).

The concept of students engagement enables an integrated perspective, as for investigations as for intervention (Fredrick, Blumenfeld, & Paris 2004). It is a multidimensional construct which includes affective, behavioral and cognitive dimensions (Jimerson, Campos, & Greif, 2003). The affective engagement refers to the feelings that students have towards learning (Skinner & Belmont, 1993) and the school they're in (Finn & Voelkl, 1993). The behavioral engagement concerns to persistence and learning effort, as well as to the engagement in extracurricular activities at school (Finn & Voelkl 1993). The cognitive engagement refers to the quality of the cognitive process that students use on the school assignments (Walker, Greene, & Mansell, 2006).

The items used in the engagement research were classified in different contexts (Jimerson, Campos, & Greif, 2003): academic performance (Manlove, 1998; Johnson, *et al.*, 2001); behavior in the classroom (Greenwood, Horton, & Utley, 2002; Johnson *et al.* 2001; Çoklar, Bağcı, 2010); extracurricular participation (Scales, Benson, Leffert & Blyth, 2000); interpersonal relationships at school (Hawkins *et al.*, 2001); and the feeling of belonging on the school community (Battin-Pearson *et al.* 2000; Hawkins *et al.*, 2001).

The engagement evaluation (Jimerson, Campos, & Greif, 2003) shows that variations exist, either in the utilized subjects (students, teachers) or in the evaluation format (questionnaires, interviews or documents analysis). One of the most prominent problems in the scientific research of engagement is the lack of instruments, with psychometric and semantic qualities for its evaluation. A contribute was made by Lam and Jimerson (2008), in their work of construction of the "*Student Engagement in School Scale*" (SES), recently adapted to Portugal (Veiga, Pavlovic, García & Ochoa, 2010), but, due to the lack of items, it needs improvements in the construct and external validities. In PISA 2000 (OECD, 2002), it was used a conjunct of six items for the students engagement in school evaluation, where it was assessed the sense of belonging and peer acceptance. Such items constitute a small scale that, limited to few items (6), presents a weak internal consistence (0.38 on the average of the developed countries) and also with precariousness in the external validity when correlated with school performance indicators (Math, Portuguese and Sciences). Therefore, continues to feel the lack of tools for engagement in school assessment purpose, either in international research as among us. Especially, it lacks multidimensional evaluation instruments, with high levels of fidelity and validity. The present investigation aims to bridge that particular gap. It undertook an analysis of a student engagement in school scale, including the items of the school engagement scale used in PISA 2000 and the items from the "Student Engagement in School Scale."

2. Methodology

2.1. Sample

The study involved a total of 217 students, from 7th (47%) and 9th grade (53%), attending Lisbon schools, and included both female (53, 2%) and male subjects (46,8%). The subject's number of retentions is illustrated in figure 1.

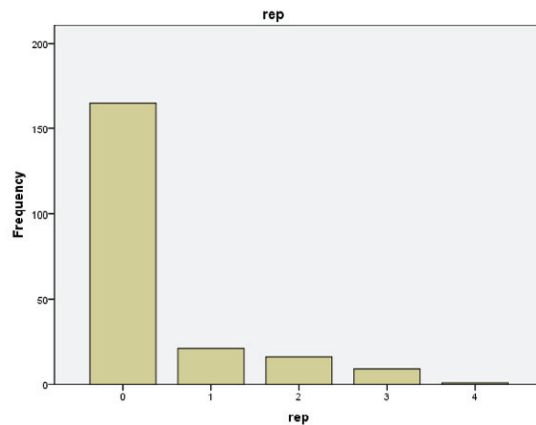


Figure 1. Subjects of the sample by number of retentions

2.2. Instrument

The student engagement scale, object of the present investigation, includes the items from the “Engagement scale” used on PISA 2000 and the items from the “*Student Engagement in School Scale*”, SES, adapted for Portugal (Veiga, Pavlovic, García & Ochoa, 2010). The SES, created and developed by Lam and Jimerson (2008) within the international project (Ozcan, 2011; Lam *et al.*, 2009), is a multidimensional scale with three factors (cognitive, affective and behavioral), with self-report responses according to a Likert scale, with four answering options, from *totally disagree* to *totally agree*. In the present study, the answer possibilities considered were from 1 to 4. The internal consistence (*alpha*) in the total scale is very high (0.92).

The engagement scale used in PISA 2000 (OECD, 2002) consists on a set of six items for the evaluation of the students engagement in school, and aimed to evaluate the belonging feeling and acceptance between peers, based on answers and declarations such as “School is a place where: 1. I feel like a stranger or outsider; 2. I make friends easily; 3. I fell integrated; 4. I fell displaced and uncomfortable; 5. The other students like me; and 6. I fell lonely”. The answers were given according to a Likert scale; the value of the items 1, 4 and 6 was inverted in such way that as higher the score, the greater the belonging and acceptance are. The internal consistence (*alpha*) is very low (0.40), and an approximation of the values found on the international study (OECD, 2002) where the average value in the set of countries was 0.38.

2.3. Procedure

Once it was requested the school authorization, it was administrative the questionnaires with anonymous answers and with the supervision of a teacher of classes involved in the study. This task occurred during the regular class hours, having collaborated voluntary students with the necessary time to answer the questionnaires provided.

3. Results

We present below the informative elements about the fidelity of the results, specifically of the construct and external validity.

3.1. Construct Validity

The study used the factor analysis of the principal components with *varimax* rotation – which showed 4 specific factors with distribution of items as shown in Table 1. The percentage of explained variance, in the entire the factors, was about 59.84%.

Table 1. Results of the factor analysis in the rotated matrix - Factors and their respective items

Items	Cognitive	Affective	Organizational	Behavioral
11	,75			
1	,72			
3	,71			
12	,70			
2	,69			
5	,66			
6	,65			
4	,54			
10	,53			
7		,92		
8		,90		
9		,89		
15			,83	
19			,77	
17			,72	
18			,68	
16			,62	
20			,60	
13				,86
14				,85

The notorious semantic proximity between item content of the emotional and organizational factors, as well as the lack of items in the behavioral factor – corroborating this lack found in the anterior study (Veiga et al., 2010) – led to the option of a new factorial analysis of the items with specification of two factors in the rotated matrix. The results are presented in Table 2.

Table 2. Results of factor analysis in the rotated matrix - Factors and their respective items

Items	Cognitive	Affective
11	,73	
1	,72	
3	,71	
12	,70	
2	,69	
5	,68	
6	,66	
4	,54	
10	,52	
7		,78
8		,77
9		,76
17		,60
15		,57
18		,54
19		,52
16		,45
20		,42

The internal consistence (Cronbach's alpha) in the total scale was 0.76 and, by factors, 0.83 in the cognitive engagement and 0.45 in the affective engagement. The percentage of explained variance in the totality of the factors was 40.56%. The cognitive engagement refers to the quality of the cognitive processing used by the students in learning tasks (Walker, Greene, & Mansell, 2006). The affective engagement concerns to the belonging feelings and the interpersonal relations in school (Finn & Voelkl, 1993; Skinner & Belmont, 1993).

3.2. External Validity

In what concerns to the external validity, it was considered the relation between the results in this new scale – named “Students engagement at school scale, version 2 (SES-V2)”– and specific variables (performance in Math, Sciences, Portuguese, History and number of retentions), having emerged significant correlations in the expected direction, as can be seen in Table 3.

Table 3. Correlation coefficients between the results in the factors of EAE-V2 and school variables
(Mathematics, Portuguese, History, Science, Retentions)

Factors / scholars variables	Mat	Port	Hist.	Scien.	Retentions
Cognitive	,20*	,27**	,31**	,26**	-,18*
Affective	,09	,10	,10	,09	-,09

Regarding the affective dimensions, the correlation coefficients are very low and with no significance, with higher values on the Portuguese and History classes, and lower on Math and Sciences.

The school retentions shows low correlation coefficients with the cognitive engagement ($p < 0.05$), and not significant with the affective dimension. These results are consistent with those observed in the PISA study 2000, where the correlation between the feeling of belonging to school and the academic performance measures were very low and not statistically significant in most countries.

4. Conclusions

The scale now proposed (see appendix) expands the number of items – which are focused on only two dimensions of the engagement – and naturally deserves further insights into the adequacy. We must underline the lack of external validity of the affective dimension, considering the low indices of correlation, not significant, with grades in Mathematics, Portuguese, History and Sciences, as well as with the number of school retentions.

Although the literature refers to engagement at school as a multifaceted construct, with cognitive, affective and behavioral elements, the analysis in the present study highlights the first two dimensions, but not the behavioral one. The items of the behavioral dimension, about the participation on extracurricular activities may conduct to elements with lack of exemption, to the detriment of the students to who these extracurricular opportunities are not offered. Therefore, there is the need for a more shared definition of engagement and also for the items of the instruments to be representative of the multidimensionality of the construct.

In subsequent studies, with the analysis of the results determined by specific variables, whether personal, scholar or familiar, we expect to amplify the external validity of the scale, as to amplify the knowledge about the distribution of the students through student engagement in schools. The differences between the students of several cycles of basic teaching and high school can also be explored. Future researches can keep on exploring the multidimensionality of the engagement, as well as the contexts the items relate too.

In summary, the scale now elaborated –overcoming Pisa 2000 engagement scale fidelity and external validity limitations– may be used in future PISA studies. The cognitive dimension now added shows good psychometric

qualities, concerning internal consistency and external validity, which makes it useful to the investigation and psycho-educational practice, to evaluate the student engagement in schools, their development and their differentiation.

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Appendix

Student engagement in school scale, EAE-V2 (investigation version)

This questionnaire seeks to know the perceptions of the students in relation to their learning experiences. Please answer to the questions according to your experience, thoughts and feelings. There are no right or wrong answers. Your answers are going to be used only for investigations purpose and your personal information is going to be kept confidential. Please make a circle around the number that best represents your opinion according to the following criteria:

Completely disagree	1
Quite disagree	2
Quite agree	3
Completely agree	4

-
- ①②③④ — 01. I try to relate the things I know with the things I'm trying to learn at school
- ①②③④ — 02. I try to understand how the things I learn are related to each other.
- ①②③④ — 03. When I'm learning things at school I try to relate them to other things I learnt on other classes.
- ①②③④ — 04. I try to think on the themes and decide what it is expected for me to learn from them.
- ①②③④ — 05. When I study I try to best understand the class material relating it to the thinks I already know.
- ①②③④ — 06. When I study I try to combine the class materials in different and new ways.
- ①②③④ — 07. I'm proud to belong to the school I am.

- ①②③④ — 08. I'm happy to be in the school I am.
①②③④ — 09. I like my school.
①②③④ — 10. I like what I'm learning in school.
①②③④ — 11. I like to learn new things in class.
①②③④ — 12. I'm really interested in learning things.
①②③④ — 13. I was voluntary on school activities. (*)
①②③④ — 14. I have an active paper on the extracurricular activities of my school. (*)
①②③④ — 15. My school is a place where I fell marginalized or excluded. (-)
①②③④ — 16. My school is a place where I make friends easily.
①②③④ — 17. My school is a place where I fell integrated.
①②③④ — 18. My school is a place where I fell displaced and uncomfortable. (-)
①②③④ — 19. My school is a place where it feels like other students like me.
①②③④ — 20. My school is a place where I fell lonely. (-)
-

(*)Items not to use the future - did not appear in the factorial analysis (cf. Table 2).

(-) Inverse items