From educational ideals to local realities: qualitative unpacking of stereotypes and segregation in PISA 2006

Pedro Moreno da Fonseca[1]

Abstract:

Education is seen as being caught between the material-symbolic networks of school-related agents and of students. The fundamental hypothesis of the research is that the scientific school-agents network is socioeconomically and ethnically biased, creating ontological insularization that is reflected both by structural variables in PISA surveys and by qualitative evidence from classroom interaction. On the other hand, it is explored the parallel hypothesis that social economic and cultural groups establish resilient identities whenever their expression and understandings are not enabled in a way that is translatable into the scientific network. Idealisations, steretypification processes, class, ethnicity and gender are explored as factors concurring to explain 9th graders performance. PISA 2006 data on cognitive science testing is firstly explored (Portuguese sub-sample, n=5100) through a multilevel model and then tentatively unpacked through case-study results from a research developed in a school. In conclusions, introduction of ontological adaptation and cultural variety to curricula and teaching methods are seen as fundamental to bridge the tendency to resistance in learning and separation between symbolic networks.

Keywords: PISA 2006; Ethnicity; Gender; Culture; Education; Portugal; African Students; Social Class; Identity; Self-Efficacy; Social Segregation.

Introduction

Part of the present research was dedicated to analysing the Portuguese sub-sample (n≈5100) data from the third survey of PISA (Programme for International Student Assessment) in 2006. Another part of the research was dedicated to explore some of the clues unveiled by structural indications through a case study developed in a school in Portugal's capital city, Lisboa.

PISA is an OECD initiative, aimed at inquiring and understanding many diverse aspects that can contribute to explain the performance of 15-year olds in key areas

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[1] Sociology Institute, University of Porto. E-mail: morenofonseca@mail.telepac.pt.

of knowledge (mathematics, science and literature). In 2006 the survey was applied in over 50 countries, with a special emphasis on enquiring scientific literacy. The "nested" nature of the data allows for the control of factors on student and school level, through the estimation of hierarchical (multilevel) models.

In spite of the wide variety of factors surveyed, the assessment of cultural and ethnical-related variables could be furthered. Their collection is entirely up to the responsible units that apply the survey nationally, which results, in most cases, in sub-representation of significative ethnic groups in sampling.

Nevertheless, PISA allows for considerable discussion about social-economic factors and scientific identity building among students. Portugal has inquired the ethnicity of students, allowing for a study on the influence of culture, once social-economic variables are controlled. Limited coding of ethnicity has somewhat hampered a more fine analysis of the results and, as seen below, discussion necessarily cannot ascertain very relevant differences inside of, for example, "Portuguese Speaking African Countries", that can include many inter and intranational diverse cultures.

1. Evidence from PISA data

1.1 Crosstabs: Class and Ethnicity

A simple crosstabs between cognitive results in science and social-economic levels, as depicted by the International Standard Classification of Occupations (ISCO) shows a clear positive relation between scores and father's professional status (see T.1), as identified already decades ago by numerous authors (Bourdieu & Passeron, 1970; Bernstein, 1976; Willis, 1977; Hargreaves, 1986).

[Table1]

The evidence of lower results between the children of the less materially and educationally endowed households doesn't seem to be accompanied by a corresponding depression of expectations on behalf of the children, which, in spite of a marginal class-variability, point in the direction of high targets for future occupations. As seen ahead, this level of expectations and concern seems to be shared by parents that reveal a cross-status clear preoccupation with providing children with appropriate study environments at home (see "Study Space" index in T.2).

[Table 2]

If lower income groups are more prone to lower academic performances that does not seem to be related to any type of self-limiting attitude, at least a *conscious* one (see T.3). Nevertheless, self-efficacy and self-concept indicators, by inquiring attitudes and objetive problems with science issues, reveal the establishment of a more fragile academic identity among the members of lower income groups (see T.4).

[Table 3] [Table 4]

Gender analysis further reveals that girls are, in general, less confident with science-related tasks and concepts, and that this gap is not particularly bridged by a raise in professional status or schooling years of parents. In fact, the difference seems to be more acute among the children of scientific/intellectual professionals, whereas in other professional groups the relation is sometimes even reversed (apparently in the ones related to industrial activities, consistently with the now classic Paul Willis' observations about gender differences in academic identity among labour class children).

[Table 5]

Crosstabs between ethnic groups and results (T.5) reveal a clear difference between the results of African (Portuguese speaking) students and the native Portuguese community. The general average result of Africans is strikingly inferior and it is not softened by an analysis per status groups. In some groups, such as industrial operators or skilled agricultural workers the difference is not as high, apparently due to what Machado has identified as class transition in migration (Machado, 1998).

[Table 6]

Many of the African immigrants seem to alter their professional status when finding an occupation in Portugal, getting jobs in industry or agriculture-related activities. This might accrue for relatively better performance of the children of these professional-status groups. The absence of finer data impedes, regretfully, the analysis of the influence of these factors.

The difference in science cognitive scores is nevertheless high for all groups and points out to cultural factors influencing the results, besides access to financial resources or cultural goods. The fact remains that even when trying to control the results for the "cleaner" indicator *parents' highest level of education* (people don't change ISCED level *that* easily with immigration), the results are still consistently much lower for African students (T.7).

[Table 7]

Same as happens with Portuguese origin students, African origin students reveal a gender difference in results, with boys performing in average slightly better than girls in science. This same gender difference is depicted by self-efficacy and self-concept indicators which are, in turn, considerably lower for African students, suggesting a higher difficulty in establishing a scientific identity. Particularly, the lower value of self-efficacy relative to self-concept, reveals a desire to achieve in science (also confirmed by the distribution of students per ethnicity/desired career), which is not accompanied by a high degree of confidence in performing scientific-related tasks.

[Table 8]
Difference Tests and Correlations

[Table 9]
Differences in average student performance were tested for certain critical vari-ables, to ascertain their significance. Having no better identification for rural com-munities, than their size, we created three categories, relating to average locality sizes in Portugal: 15 000 or less inhabitants (small towns); 15 000 to 99 000 inhabit-ants (villages and cities); 100 000 or more inhabitants (big and very big cities).

Testing revealed that the difference in results between the smallest localities and the two other categories are statistically relevant, indicating a clear need to understand further how rurality might be connected to lower results. A better categorisation of localities in the survey is clearly essential on this level.

Average results between students of private and public system were tested with private system students showing higher results, with statistical relevance. When assessing the level of resources of public and private schools it becomes clear that the later have clearly a higher level of material resources. Also, the social-economic level of private system students is in average higher, as depicted by HISEI (highest social economic index).

Analysis of correlations (T.10) confirmed a considerable direct relation between social-economic status and science performance as depicted by the 0.38 correlation between HISEI and cognitive results. The intensity of this correlation increases to 0.41 when we take instead of HISEI the indicator ESCS (economic, social and cultural status), which besides economic aspects includes some cultural aspects (e.g. reading of books). Similarly to what was revealed by the occupational crosstabs, access to cultural goods clearly appears as complementary to economic access as a fator of differentiation in academic success.

[Table 10]
Relevantly there is, same as identified in the crosstabs, evidence of a light tendency to reproducibility in social status, when we look at the correlations that compare students' occupational expectations with parent's professional status. Nevertheless, the intensity of this relation (0.28/0.29) is insufficient to, as noted, speak about perfect reproducibility *of expectations*.

It should be noted, also, the positive correlation (0.22) between the school dimension (number of students) and the average school results. This aspect makes us pose two distinct hypothesis: on one hand, bigger schools are located in bigger cities, pointing out in the direction of a relevant differential in rural access to the scientific symbolic network; on the other hand, large schools are normally more diverse and less segregated environments, offering more chances for cross-class and cross-cultural exchange, with a lesser tendency for concentrating low achieving students in networks with low connectivity with science and very limited cultural syncretism.

1.2 Multilevel Model

A hierarchical (two level) model was estimated for the individual cognitive test results, considering nesting of individual student's data in schools, and thus analyse separately generic and school level effects (the model was estimated using Hierarchical Linear Modelling - HLM 6.0).

First an "empty model" was estimated i.e. with no factors, so to calculate the total weight of each component of variance. Estimation gives an interschool variance of 2566,75, which corresponds to roughly 32% of the total variance of results. In short, we can estimate that 32% of the variation in results is thus due to a "school" effect, which is evidently high. Given the existence of marked income differences and ethnic effects that makes us immediately suspect about interschool segregation.

[Table 11]

A saturated model was calculated, testing for a number of school and student level factors: social-economic status of parents; African origin (Portuguese speaking); foreign non-African origin; gender; school size; resource level of school, locality size (under 15000); school ownership (private or public). Level 1 variables were allowed to be random and assumed to be able to have a differentiated effect from school to school.

Equation 1

$$Y_{ij} = \alpha_j + \beta_{1j} HISEI_{ij} + \beta_{2j} Afro_{ij} + \beta_{3j} ForeignNotAf_{ij} + \beta_{4j} Girl_{ij} + \varepsilon_{ij}$$

$$\alpha_j = \gamma_{00} + \gamma_{01} TotalStudt_j + \gamma_{02} ResourceLevel_j + \gamma_{03} Urb3_j + \gamma_{04} Private_j + U_{0j}$$

$$\beta_{1j} = \gamma_{10} + U_{1j} \qquad \beta_{2j} = \gamma_{10} + U_{2j} \qquad \beta_{3j} = \gamma_{10} + U_{3j} \qquad \beta_{4j} = \gamma_{10} + U_{4j}$$

[Table 12]

T-ratios exclude from the model at a 5% significance level the effect of foreign non-African origin. The level of resources of the school is also excluded from the model, as well as the ownership of the school's capital, which by itself doesn't appear to have a strong enough effect.

Apparently the enquire is unable to create the information which can effectively shed light over management factors that are school adjustable, since most of the questions are about aspects which are, for the large majority of schools (public and cofinanced) extensively defined by Portuguese law (e.g. budgeting, hiring…). A better survey of methods, information and knowledge management, as well as external interactions management is probably necessary.

The fact that once considered the structure of the sample, the difference between private and public schools seems to be unimportant makes us believe that the difference in results is driven by a small number of elite private schools - the ones normally on top of the national rankings.

In spite of a statistically non-significant difference between the average results of girls and boys, once considered interschool variation, gender becomes significant in explaining the results of students. This fact alerts us to the possibility of two

phenomena: one, there is a possibility of relevant effects of gender composition in schools (e.g. a relevant number of schools with male or female composition with knowledge area-biased curricula); two, there is a possibility of stereotyped academic identity construction due to the effects of segregation.

Reestimating the model without the excluded variables and testing for random effects through the chi-square statistics, we conclude that gender maintains significance and is a non-random variable. Although gender has an effect over results in science, this effect appears not to vary significantly from school to school, which goes against the hypothesis of it being an indirect effect of segregation.

[Table 13]

Segregation in itself has quite some proof supporting its existence, given the fact that both social-economic index and African origin are random variables. This suggests a double source of interschool segregation, where we will undoubtedly find a relevant number of schools with a concentration of economically fragile groups possibly coincident with a lot of the ethnic concentration, as depicted by the high value (0,79) of the Var-Cov matrix coefficient for the pair [HISEI, Afro].

The variables included in the final model (T.14) explain around 39 % of interschool variance and only 8,8% of intrasschool variance. Given the variables left, and its standartised effects, this seems to further suggest existence of segregation.

[Table 14]

The fact that the size of the school has a relevant influence can also, as mentioned, be seen as the direct effect of the wider possibilities of interclass and intercultural symbolic interactions activated by the local networks.

2. Stereotyping, segregation and ontological difference: brief evidence from a case study

We have also developed a case-study in a public school with roughly 700 students and with very evident signs of social and ethnic segregation in a semiperiferal area of Lisboa, so to directly explore some of the clues made evident by the data in PISA 2006. We will briefly review some data from this case study so to illustrate some the elements deemed relevant by PISA evidence.

As seen in T.15 below, the school has over 88% of students coming from households where at least one parent works in a low skilled occupation. We will mainly find fathers employed in construction sites and factories and mothers in cleaning services. Further, more than 60% of parents have schooling levels under 9th grade.

[Table 15]

In what relates to ethnicity table 16 shows that the school has a relevant population

of African origin students (5, 1%), well above 1,9% population average depicted by PISA. To these 5% we must add up the "invisible" share of the school population with African origins that, according to the latest evaluations by the Portuguese Ministry of Education, ascends to at least 7,7%[2] and becomes considerably higher in segregated environments.

Interviews to teachers and the direction of the school were combined with direct observation of science classes, a review of structural data about the school and a consultation of legal and administrative documents about the schooling system and the school's own specificities.

Work was developed with a 9th grade class, with ages around 15 years old, following it through theoretical classes, experimental situations, exam preparation and self-evaluation moments. The group included students of African ethnicity and of African origin and was majorly constituted by individuals from low-income households, consistently with the school's general class distribution.

An assessment of local convention, inspired by Dodier's methodology (Dodier, 1993), allowed for the identification of multiple embeddedness in which hierarchical levels colonise the more formal rules of the superior level sequentially, until we arrive to the practise itself inside of the classroom. The local educational convention, essentially defined by an informal council of elders, prescribes an adjusted version of the official speech of the ministry of education. The convention is, in its turn, adjusted by the teacher to his/her own perspetives .

The local consensus is easily summarised by four central ideas:

- The ministry portraits streaming as a measure of liberty, for the ones who'd rather *choose* to have practical over theoretical learning;

> "Professional schools [also referring to VET] are directed to the youth whose *immediate objetives* are the entry into the labour market"
> Official Description of the Educational System *in* Eurydice site
>
>   (our emphasis)

- locally, and given the fragile social structure of the school community, early streaming is seen as a good thing, since it is understood as allowing children to *choose* the type of education they want to have early on;

[2] Roldão, Cristina [*et al.*] (2009), "School performance: from Basic level to secondary level entry", *in Preceedings from the Encounter Educational Contexts in Contemporary Society*, 2009, ISCTE, Lisboa. It's a very high value that reflects the inclusion of de-colonisation effects in the 70's, thus covering white and mixed families with full or partial Portuguese origin. Nevertheless the percentage of African ethnic origins is surely high and not reflected by the monitored variable "naturality" i.e. place of birth, which is in many cases Portugal.

> "To bet in other curricula, to bet in CEF [vocational training track], that prepare them for ative life (…) Something *they feel is going to be useful* for them in an immediate future"
>
> Headmaster (our emphasis)

• total occupation of free time is seen as positive action towards perfect socialisation of "wild" students;
• an educational chime based on one-on-one teaching is established as a way to justify the pragmatism of the adopted solution: streaming

> "(…) personalised teaching. (…) going from table to table, saying ten times the same thing to ten different kids."
>
> Headmaster

The fact that the official documents and the testimony of teachers and directors goes in the sense of emphasising freedom of choice as a defence of early streaming is key to the understanding of classroom events.

There is a shared assumption that a population of feeble economic resources is inadequate, *uninterested* and simply won't adhere to the methods and concepts presented. The adopted solution is, instead of adapting methods and contents, creating a lower tier of studies, protecting streaming under the ample umbrella of freedom of choice.

In practise, teachers do not entirely follow this prescription, but rather colonise it, tending to use it as support when not being able to solve a tension, or when too frustrated whit low retention of knowledge on behalf of the students.

Clearly, social class variables come into relevance, being that the students with easiest retention of concepts were the children of higher income households, with parents with higher educational resources. Quite simply, working class children have a notorious difficulty in establishing an academic identity, both due to a communitarian network that although supportive (most parents were very favourable to their children pursuing higher education) was incapable of supplying the right linguistic tools and study methods, and also due to a type of teaching adverse to their way of expressing.

For example, all delegated learning rituals i.e. "homework" are painstaking to working class children, which in turn find little support from their family at home. As a result, the traditional opening moments of classes with homework correction are filled with tension. When participation occurs, tends to be unstructured and supported by common sense language, instead of prescribed scientific terms, even if the logic of the answer is correct.

In general this type of participation was not particularly well received by the teacher, who tended to do a very controlled admission of this type of contributions, keeping mostly silent or using scolding along very typical lines, an utilitarian mantra:

Is that it? Do you think that's it?
I don't know what you want to do with your life
Frankly, you simply do not study

This type of resilient admission of common sense language makes working class children contributions harder and harder due to the effects it has on their self-love. Further it seems to help cristalize a self-stereotyped identity of academic inadequacy, mostly nurtured by a consecutive inability of expressing one's own grasp of knowledge.

Idealisations and stereotypes affect also foreign students, especially black students, whose contributions are easily discarded as lacking in understanding or being too slow. All through the classes it was possible to understand how the teacher would at times discard higher level reasoning by black students, because it was marked by a different ontology.

For example, African students, in several situations tended not to have a particular comfort in manipulating percentages, preferring to state them as fractions of a unit (a phenomenon somewhat parallel to the ones identified by Helen Verran). This was entirely ignored by the teacher who would not integrate the contribution and only stop her questioning to the class until she would get an answer in percentage form:

> [while interpreting Mendelian table – teacher expects an answer
> in percentage form]
> Teacher: What are the odds of a child being a boy or a girl?
> [silence in class]
> Student [voluntary answer]: There are only two chances.
> Teacher [ignoring]: What are the odds of a child being a boy or
> a girl?
> Student: They are one over two.
> [teacher ignores, student lowers head looking ashamed]
> Teacher: They are fifty percent.

As seen, a translation is not enabled in a situation in which it was easy to promote connectivity between symbolic networks (even of different disciplines: maths and sciences). Most effective exchange dynamics occur as accidents and generally there are no programmed activities to foster local adaptation of contents and rituals. Besides occasional poetic integration of students contributions, typically symbolic exchange occurs in experimental activities.

Although strictly predetermined , experimental activities allow for a relative lowering of cognitive defences by both teachers and students: speech becomes more informal and action is physically driven. Students allow themselves to be more child-like and the teachers become predisposed to integrate spontaneous comments about the experiment and what it evokes. Heuristic accident happens, via interaction with the physical *hexis*, allowing for an easier integration of knowledge.

This aspect became very clear in a classic DNA extraction experiment, using a kiwi fruit. Scalpels, gobels, crushers, scales, salt, washing soap and working on a large board. Lots of physical action with a very resilient but lighter off-voice framing by the teacher that allowed for freer associations, humorous comments and unconscious discrete inscription in students' habitus, which would soon be cheerfully stated by a gipsy boy – *it seems like when I'm in the kitchen with my mother*.

For teachers, student stereotypes exert the fundamental function of justifying the methods and means prescribed, facilitating their ethical adhesion to the model and thus their identity as teachers. Believing that a low achieving student is uninterested is an easy way to adhere to the prescribed methods, since it puts aside the need to modify them and it makes the frustration of teaching failure acceptable. For students stereotypes seem to also allow for an establishment of their own identity, given the threats to which it is exposed.

The idealisations of students derive from the prime ideals they carry from their households. The confrontation with the school knowledge is a potential identity threat for labour class and foreign children. Fallback to prime ideals will many times occur as part of self-stereotyping process.

In the case of working class children, the fact that many of them have intense difficulties with scientific language makes them, in the absence of translation and narcissic support (scolding and irony are the rule) makes them anxious and growingly frustrated before educational rituals. Self-stereotypification occurs as these children tend to crystalize their identity as academic adverse, constantly falling back to prime ideals and interpretations about events and the world.

Very low achieving children actually try to participate at times, but their expressions are immediately perceived as an attempt to disturb class. When discarded as such these participations slowly modify through class into effective attempts to sabotage all the moments in which the child's own expression cannot be enabled. As minutes pass, expressing an identity supported by traditional working class qualities (strength, immediate physical use, swaggering) *in opposition* to the scientific framework becomes mores frequent, overcoming the child's initial attempt to connect them.

Normally these children will also stereotype their colleagues, especially if being outperformed by them in school activities. The student that succeeds poses an extra threat, which is particularly strong when this student is *not supposed* to succeed. Girls and black students face stereotypical pressure from proletarian boys, becoming immediate targets for demeaning comments whenever they have a good contribution in class or a good grade in an exam.

In the case of white girls, the effect of the housewife stereotype seems to be mild whereas the effect of the "half witted black" stereotype seems to be more destructive. Even in the case of a successful performance and identification with scientific knowledge, black children easily suffer from what Claude Steele (1997) calls stereotypical threat. As an effect of frequent peer pressure, many of the black students slowly corrode their academic identity even arriving to the case of abdicating

from it, so to get acceptance by their white, lower performance colleagues. This effect is particularly acute between boys, the most common target of racist comments.

The existence of interschool segregation reinforces these phenomena, by fostering narrow networks, thus reducing the possibilities for dilution of stereotypes and desidelization processes that could occur via cultural syncretism.

Conclusions: the need for adaptation and variety

In spite of its limitations, the PISA survey suggests evidence of important segregational phenomena in the Portuguese schooling system and provides a basis to enhance research on the effects of not only social-economic but also ontogenic factors over the performance of students. The current paper shows how PISA data can be used to highlight critical factors in construction and retention of knowledge among 9th graders. It also points out the value this information has as clue-generator for field research, by posing structural questions that can be unpacked through ethnological observation.

Our research depicts that a lot of the PISA clues are consistent with the dynamics identified in the case study developed. In spite of being in a heavily segregated milieu, we did not find any evidence of a conscious reduction in academic or professional expectations. We *did* find, as PISA also suggested, fragile academic identities, apparently driven by a cumulative process of crystrallization of identities adverse to science, driven by progressive self-stereotyping and fallback into primal ideals, and traditional preconceptions , on behalf of the labour class children.

The differential of results for African children seems to be driven by a number of diverse factors that require close attention. Same as for proletarian children, Africans seem to have some trouble in having a full grasp of the scientific language. Close attention reveals, differently, though, that a great deal of this unease is grounded on ontological difference, as seen through the problems of good African students. Another part of it, still, seems to be caused by stereotypical anxiety that erodes good performances of African students.

In the segregated school the girls seemed to be as good students in science as boys in spite of stereotypical pressure. In fact, our observation suggests an establishment of more favourable identities to science learning among girls, suggesting a fit into the class specificities that PISA seems to also depict.

The local unpacking of the segregational evidence of PISA reveals a slim symbolic network for working class children, whose iterative possibilities are radicalised by a tendency on behalf of the system not to enable translation mechanisms. The management of the school has little concern to the adaptation of language, following the prescription delegated by the ministry, which bypasses the problem, turning it into an issue of liberty of choice/merit, with its typical solution of streaming into lower quality tracks.

The fact that teachers have to protect their identity, somewhere caught between

the ethical adhesion to the prescribed notion of correctness and an effective concern with students' learning, makes translation an accident and seldomly a preprogrammed activity.

The lack of intelligence of the network is sustained by a total inertia of the system/school in generating connections between diverse understandings of the world and diverse types of expression, isolating students from knowledge, students from students (different classes and cultures) and teachers from students (lack of iterability possibilities, in Derrida's sense).

This inertia, added to very unfavourable environmental factors such as the physical isolation of the neighbourhood from the middle class areas and a certain tendency of council house occupation by ethnicity, creates a very *flat* learning environment, with limited diversity of stimulus, openly inviting children and parents to resist in their concrete towers against external interpretations, resuming to the stereotyping processes inherent to their cultural groups.

Notwithstanding the somewhat embryonic and relatively random attempts to include community mediators in the school network, a closer look at one of the schools that PISA seems to shout about when data is conveniently modelled, immediately makes us identify some central issues to the reduction of inequality in educational level transition that directly relate to the relationship of the school itself with its local network.

Fattening the local network, enabling translation seems to be the priority, by generating critical ties between the symbolic network of the school and the ones of the students and between the different ethnic based cultural networks in the school population. Schools need to be helped in the mission of assessing and recognising their own population, in an exercise that will probably affect simultaneously management and operational (preparation and provision of classes) levels.

It seems paramount that schools develop a set of tools to account for the existence of cultural variety in both aspects of the same culture and ontologically different cultures and that learning rituals are adjusted accordingly. Some practical possibilities are creating more comprehensive tools that can gather local information about the symbolic mappings of students and parents as well as reinforcing training to teachers in the sense of stimulating symbolic attention and registration techniques (keeping logs). School management practises can also be improved in the sense of enhancing knowledge of population (sociographical techniques) and local systems assessment.

Interventions must be introduced that can help individuals understand difference (in gender, ethnicity or any other) such as integration of contents in disciplines, fostering of art clubs, debate clubs, presentation of other cultures.

These possibilities can be furthered and deeply explored elsewhere, together with the issues of mutual embeddedness of hierarchical levels and the stability of ties inside of the local networks. In a wider systemic approach deep reflection should be held about coordinating the location of schools with council housing policy, so to avoid establishing narrow networks.

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RESUMO/RÉSUMÉ

Resumo

A educação é encarada como se encontrando contida pelas redes simbólico-materiais dos agentes diretamente associados às escolas dos estudantes. A hipótese fundamental da investigação é a de que a rede simbólica de natureza científica dos agentes da escola se encontra económica e etnicamente enviesada, criando insularização ontológica que é refletida por variáveis estruturais nos inquéritos PISA e por evidências qualitativas reveladas pela interação em sala de aula. É explorada a hipótese paralela de que os grupos económicos e culturais estabeleçam identidades resilientes sempre que a sua expressão e disposições expressivas não são veiculados de modo a que sejam passíveis de tradução para a rede científica. Idealizações, processos de estereotipificação, classe social, etnia e o género são explorados como fatores que concorrem para explicar o desempenho dos alunos do 9º ano de escolaridade. Dados resultantes dos testes cognitivos na área de ciências do PISA 2006 são explorados (subamostra portuguesa, n=5100) utilizando um modelo multinível e, tentativamente explicando e seu significado assistidos dos resultados de um estudo de caso desenvolvido numa escola TEIP. Em conclusões, é observado que a introdução de adaptação ontológica e de variedade cultural nos programas de estudos e métodos de ensino constituem os pilares de uma ponte sobre a tendência para a resistência à aprendizagem e a separação entre as redes simbólicas.

Palavras-chave: PISA 2006; Etnia; Género; Cultura; Educação; Portugal; Estudantes Africanos; Classe social; Identidade; Auto-Eficácia; Segregação Social.

Résumé

L'éducation est vue comme étant attrapé entre les réseaux matériel-symboliques des agents relations aux écoles et des étudiants. L'hypothèse fondamentale de la recherche c'est que le réseau scientifique des aagents de l'école est socioéconomiquement et éthniquement biaisé, créant insularization ontologique qui est reflété par des variables structurales dans des enquêtes de PISA et par des évidences qualitatives revelées par l'interéraction dans la salle de leçon. C'est exploré l'hypothèse parallèle que les groupes économiques et culturels établissent des identités résilientes toutes fois que leur expression et arrangements ne sont pas permis d'une manière dont est traduisible dans le réseau scientifique. Des idéalisations, les processus de steretypification, la classe, l'appartenance ethnique et le genre sont explorés comme facteurs concourant pour expliquer la performance des eleves de 9ème. Des données cognitives de PISA 2006 sur la performance en science sont explorées (sous-échantillon portugais, n=5100) en utilisant un modèle à multiniveaux et, en suivant, à titre d'essai alors déballée par des résultats d'étude de cas d'une recherche développée dans une école. Dans les conclusions, l'introduction de l'adaptation ontologique et la variété culturelle aux programmes d'études et aux méthodes d'enseignement sont vues en tant que principe fondamental pour jeter un pont sur la tendance à la résistance pour apprendre et séparation entre les réseaux symboliques.

Mots-clés: PISA 2006; Appartenance ethnique; Genre; Culture; Éducation; Le Portugal; Étudiants africains; Classe sociale; Identité; Individu-Efficacité; Segregation Sociale.

Tables

Table 1 – Results of science cognitive tests by father's occupational status & parents' highest schooling years

Occupation	% of Students by Father's Occupation (ISCO)	Parents' Highest Schooling Years (average)	Average Score in Science Test
Legislators, senior officials and managers	3,5	12,5	524,2
Professionals	**8,9**	**16,2**	**540,9**
Technicians and associate professionals	8,2	12,8	516,5
Clerks	6,4	11,9	508,1
Service and sales workers	14,0	9,8	477,9
Skilled agricultural and fishery workers	2,7	7,8	480,6
Craft and related workers	29,9	7,6	451,9
Plant and machine operators	11,1	8,0	464,7
Elementary occupations	15,3	8,2	447,0
Total	100,0	9,6	474,3

Table 2 – Some student background indicators

Father's Occupation	ESCS	HEDRES	HOMEPOS	CULTPOSS	Study Space
Legislators, senior officials and managers	0,57	0,50	0,85	0,28	96,3
Professionals	1,53	0,64	1,15	0,69	94,0
Technicians and associate professionals	0,43	0,61	0,70	0,37	93,5
Clerks	0,02	0,59	0,45	0,17	92,4
Service and sales workers	-0,51	0,36	0,23	-0,05	92,9
Skilled agricultural and fishery workers	-1,40	0,04	-0,43	-0,34	90,6
Craft and related workers	-1,23	0,10	-0,32	-0,41	90,3
Plant and machine operators	-1,10	0,20	-0,21	-0,31	90,3
Elementary occupations	-1,21	-0,03	-0,33	-0,30	89,5

The indicators above consist of indexes with the following meaning:

HEDRES – Home Educational Resources (desk; quiet place; calculator; support books; dictionary)

HOMEPOS – Home Possessions (Educational resources + literature; quantity of books; dishwasher; art; internet; educational software; computer)

CULTPOS – Cultural Possessions (literature and art)

ESCS – Economic, Social and Cultural Status (derived from HOMEPOS, HISEI [an arithmetic conversion of occupational status] and the highest level of parental education)

"Study Space" is a 0-100 index calculated from the same information as HEDRES, but considering only aspects directly related with the amenity of the space (reserved space, desk, silence).

Table 3 – Child's desired occupation at 30 per father's occupation (% of enquired students)

Father's Occupation (ISCO)	Child's Desired Occupation at 30 (ISCO)									Total
	Legislators, senior officials and managers	Professionals	Technicians and associate professionals	Clerks	Service and sales workers	Skilled agricultural and fishery workers	Craft and related workers	Plant and machine operators	Elementary occupations	
Legislators, senior officials and managers	4,4	55,8	16,3	1,9	0,8	0,0	0,0	0,0	20,9	100,0
Professionals	3,7	65,2	9,5	0,1	0,5	0,0	0,3	0,0	20,8	100,0
Technicians and associate professionals	0,6	59,0	20,3	0,0	2,3	0,2	1,0	0,0	16,5	100,0
Clerks	0,6	58,0	18,9	1,4	3,6	0,0	2,0	0,0	15,5	100,0
Service and sales workers	1,2	51,2	21,5	1,1	5,5	0,0	1,5	0,4	17,5	100,0
Skilled agricultural and fishery workers	0,0	44,6	16,3	4,0	9,0	1,5	5,8	1,0	17,8	100,0
Craft and related workers	1,0	42,8	20,4	2,2	8,9	0,2	6,2	0,8	17,3	100,0
Plant and machine operators	0,4	45,5	22,7	1,8	7,8	0,1	4,7	1,6	15,4	100,0
Elementary occupations	2,0	39,2	21,5	1,0	8,4	0,2	6,7	1,3	19,8	100,0

Table 4 – Self-efficacy and self-concept by father's occupation and gender

Father's Occupation (ISCO)	Gender	Self-Efficacy	Self-Concept
Legislators, senior officials and managers	Boy	0,18	0,36
	Girl	0,40	0,20
Professionals	Boy	0,64	0,54
	Girl	0,51	0,47
Technicians and associate professionals	Boy	0,44	0,38
	Girl	0,47	0,33
Clerks	Boy	0,39	0,52
	Girl	0,16	0,33
Service and sales workers	Boy	0,16	0,32
	Girl	0,19	0,16
Skilled agricultural and fishery workers	Boy	0,17	0,41
	Girl	0,06	0,23
Craft and related workers	Boy	0,11	0,27
	Girl	0,09	0,25
Plant and machine operators	Boy	0,15	0,33
	Girl	0,21	0,24
Elementary occupations	Boy	0,15	0,39
	Girl	0,05	0,21

**Table 5 – Science results, average social economic status
and parental level of education by ethnicity**

Ethnicity	% of student population	HISEI	Highest level of parental education	Average Results in Science Test
Brasil	0,9	37,3	12,2	441,9
China	0,2	66,9	16,2	476,6
Portugal	92,1	41,8	9,5	477,8
Portuguese-Speaking Africa	1,9	40,3	9,7	377,8
Others EU	1,7	39,6	10,6	483,7
Non-EU Eastern Europe	0,5	34,5	14,3	479,1
Others	2,9	40,3	10,8	459,4
Total	100,0	41,7	9,6	474,3

HISEI – Highest Social Economic Index (occupation of parents)

Table 6 – Science results by ethnicity and father's occupation
(Portugal vs P.S. African Counstries)

Ethnicity	Legislators, senior officials and managers	Professionals	Technicians and associate professionals	Clerks	Service and sales workers	Skilled agricultural and fishery workers	Craft and related workers	Plant and machine operators	Elementary occupations	Total
Portugal	529,3	544,7	519,4	509,6	481,8	481,0	455,3	465,9	446,5	477,8
P.S. Africa	340,3	426,6	376,1	391,1	390,5	470,7	377,8	421,3	400,5	377,8

Table 7 – Science results by ethnicity and highest level of parental education
(Portugal vs P.S. African Counstries)

Ethnicity	None	ISCED 1	ISCED 2	ISCED 3A, 4	ISCED 3B, C	ISCED 5A, 6	ISCED 5B
Portugal	440,9	462,3	470,5	492,8	509,8	524,9	481,2
P.S. Africa	367,7	359,1	372,7	391,2	448,7	418,4	362,1

Table 8 – Science results, self-efficacy and self-concept by ethnicity and gender
(Portugal vs P.S. African Counstries)

Ethnicity	Gender	Test Result	Self-Efficacy	Self-Concept
Portugal	Boy	479,6	0,24	0,36
	Girl	476,0	0,20	0,26
	Global PT	477,8	0,22	0,31
P.S. Africa	Boy	380,0	-0,31	0,11
	Girl	376,4	-0,24	0,16
	Global PSAf	377,8	-0,27	0,14

Table 9 – Synthesis of Difference Tests

Variable		Average Result	Difference	Test Statistic
Gender	Boy	478,3	-6,1	-1,93
	Girl	472,2		
Ownership	Public	471,1	-32,0	-4,66
	Private	503,1		

	Dimension of Locality	Average Result
1	15 000 or less inhab.	460,2
2	15 000 to 100 000 inhab.	478,3
3	100 000 inhab	492,8
	Difference	Test Statistic
(2) – (1)	17,9	2,05
(3) – (2)	17,1	1,23
(3) – (1)	34,9	3,06

Table 10 – Synthesis of correlations

Variable	Corr	s.e.
ESCS	0,41	0,02
HISEI	0,38	0,02
HOMEPOS	0,37	0,02
HEDRES	0,28	0,02
CULTPOSS	0,31	0,02
School Size (Nr. of Students)	0,22	0,03

Table 11 – "Empty model"

		Coeficient	s.e	t-ratio	d.f.	p-value
Fixed Effect	Intercept	472.4881	5.16944	91.268	133	0.000

		s.d.	Variance Component	d.f.	Chi-Square	p-value
Random Effect	Intercept	50.66306	2566.746	133	1951.067	0.000
	R	73.6353	5422.157			

Table 12 – Synthesis of saturated model (fixed effects)

Level	Variable	Coefficient	t-ratio
level 2 (School)	Intercept	396.0326	24.025
	Total Students	0.033195	4.252
	Resource Level	0.075418	0.362
	Size of Locality (Urb)	-12.0765	-1.473
	Ownership (Private)	7.259874	0.742
level 1 (Student)	HISEI	1.271839	12.46
	Afro	-77.0227	-5.418
	Foreign (non African)	-2.64069	-0.414
	Gender (Girl)	-8.2484	-2.745

Table 13 – Synthesis of HL model 2

Effects	Level	Variable	Coefficient	t-ratio
Fixed Effects	level 2 (School)	Intercept	391.288381	44.555
		Total Students	0.038374	5.313
	level 1 (Student)	HISEI	1.284240	13.029
		Afro	-74.690650	-5.717
		Gender (Girl)	-8.050711	-2.685
		Variable	**Chi-Square**	
Random Effects	level 1	Intercept	51.41882	
		HISEI	34.32241	
		Afro	43.34685	
		Gender (Girl)	32.11829	

Table 14 – Stdt. coefficients

Total Students	5,313
HISEI	13,029
Afro	-5,717
Girl	-2,685

Table 15 – Students' parents professional status (ISCO)

ISCO	Pai		Mãe	
	Nº	%	Nº	%
Legislators, senior officials and managers	5	0,8	3	0,4
Professionals	3	0,5	2	0,3
Technicians and associate professionals	8	1,2	14	2,0
Clerks	2	0,3	15	2,2
Service and sales workers	61	9,4	151	21,9
Skilled agricultural and fishery workers	1	0,2	2	0,3
Craft and related workers	153	23,6	0	0,0
Plant and machine operators	136	21,0	10	1,5
Elementary occupations	276	42,7	491	71,4
Military	2	0,3	0	0,0
Total	647	100,0	688	100,0