

USING STUDENTS' VOICE TOWARDS QUALITY IMPROVEMENT OF ANGOLAN SECONDARY PHYSICS CLASSES

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Abstract

Educational research points to similar learning experiences across different countries, in particular that physical science tends to be an unpopular discipline among students from secondary school. The use of students' voice to adapt curriculum and implement innovative teaching practice has been gaining relevance towards the effort of potentiating positive and meaningful learning experiences. The present research discusses the voice of 1139 Angolan students from one public school attending the first cycle of secondary education (7th to 9th grade) considering their physics classes. Students' voice was accessed through the application of a questionnaire which included open and closed questions, some in the format of statements requiring students to indicate their individual opinion. Descriptive statistics to ten specific aspects of their physics classes points to a global scenario of transmissive teaching and a lack of laboratorial and technological resources. Moreover, laboratorial work, suggested in national curriculum to cover topics in Physics, and students' involvement in assessment seems to decrease from 7th to 9th grade. Identified patterns revealed to be statistically significant. Based on these results three specific recommendations for educational stakeholders are presented. The consideration of students' voice in curriculum and school management is particularly innovative, not only but also for Angolan contexts and particularly relevant considering that the Angolan curriculum reform is presently under evaluation. Finally, educational researchers around the world may find relevant insights for their own educational challenges taking into account the milestones associated to the fourth goal of the Sustainable Development Goals, which is focused in assuring a quality education for all.

Keywords: Angola, physics classes, secondary education, students' voice, quality education.

Introduction

In order to improve teaching, learning and assessment processes (TL&A) Angola initiated a curricular reform, in particular at secondary education, in 2001, which leads to the adoption of new curricula, new programs, textbooks and guidelines for TL&A (GRA, 2001). Even though this reform is presently at its last stage focused on evaluating quality of the associated processes and outputs (MEA, 2008), only a few schools are being integrated in this process due to financial and human resources constraints. While it is globally acknowledged that Angola has made important progress towards the increase of students' enrolment in the last decade, there is

actually no guarantee that this fact is leading to students' higher access to an educational quality system. How certain are we that more students in (side) schools means actually that more of them are experiencing positive and meaningful learning experience? In alignment with Arroio's (2015) recommendation, namely in focusing research on quality rather on quantity considering African educational contexts, the present research aims to contribute to the minimization of this uncertainty.

Considering that educational research in Angola is still scarce, the present research is focused in covering the learning experiences of Angolan students, whose voice seems not to be sufficiently taken into account and therefore not yet sufficiently integrated at individual and/or institutional practices and policies.

The relevance of the research is also evident in a broader context considering the fourth goal of the Sustainable Development Goals, which is focused in assuring a quality education for all. Within the Incheon Declaration the importance of greater students' involvement in the management of schools and in the definition of institutional and educational policies is highly emphasized (UNESCO, 2016).

The theoretical background underlying this research comes from literature focused on students' voices about the aims, content and methodologies of their schooling, which has been growing since the 1990s (Cook-Sather, 2006; Jenkins, 2006; Santos Gouw & Vincenzo Bizzo, 2016). This topic of research has been challenging the dominant image of students as silent, passive recipients, and has been encompassed as research on 'student/pupil voice' (Cook-Sather 2006; Fluter, 2007).

Research Focus

This research draws on the central approach of 'listening to' and 'learning from' (Angolan) students considering the quality of teaching, learning and assessment in (physics) classes.

In the last decades research considering students' voices about the way they are taught has been growing (Santos Gouw & Vincenzo Bizzo, 2016). The research has been focused on integrating what students think and feel about (science) classes and their learning into the management of educational problems. At a broader context, the emergence of 'students' voice' within the educational research can be seen as a response to the United Nations Convention on Children's Rights, which defends that every child has a right to express his/her opinion and that this opinion is taken into account in any matter or procedure affecting that child (Osler, 1994). In this sense students' voice has progressively become an important element in understanding teaching and schooling more generally (Mc Callum, Hargreaves & Gipps, 2000). Students' voice has also been gaining relevance as an instrument for curriculum development promoting alignment with students' needs and interests, including in Physics Education, partly due to the relative unpopularity of physical science as a subject of advanced study (Jenkins, 2006; Osborne, Simon & Collins, 2003).

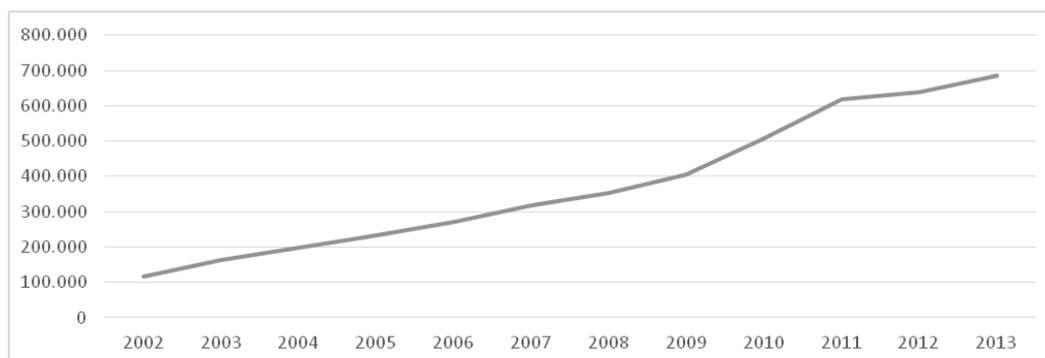
Reviewed literature on students' voice, revealed that the majority of research lacks an evolutionary perspective (Jenkins, 2006) and that the most frequent research methods include questionnaires, personal interviews and focus groups where students are directly asked to express their opinion about specific topics (Oldfather, 1995; Jenkins, 2006). There are several projects focused on investigating students' voices about science, scientists and science classes, mainly through the application of multiple choice questionnaires/inventories. One of the most known initiatives is the Norwegian Project about Relevance of Science Education, in short ROSE Project (<http://roseproject.no/>), which involves the application of a questionnaire to students with an average age of 15 years. Data has already been collected from more than 40 countries including eight African countries (Sjoberg, & Schreiner, 2010; Anderson, 2006), but not Angola.

Indeed, despite the fact that Angola is struggling with similar problems considering the unpopularity of physics among secondary students (Chimbalandongo, 2015), an extensive literature review about research on science/physics education in Angola highlighted its scarceness, and particularly no study was identified on students' voices, despite its international relevance.

Methodology of Research

National Background of Research

Since the instauration of peace in 2002, Angola has been able to expand its educational systems (Liberato, 2014). According to national documentation (MEA, 2008, 2014), and since political stabilization, Angola has increased the number of schools in the country as well as the number of students' enrolment. According to national reports (MEA 2008, 2014), and considering the first cycle of secondary education (7th to 9th grade), the number of classrooms grew 382.5% from 2002 to 2013, and the number of enrolled students grew 220.8% from 2002 to 2008 (Figure 1).



2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
115.475	164.654	197.735	233.698	270.662	316.664	353.210	406.795	507.125	619.841	638.436	685.426

Figure1: Total number of Angolan students enrolled in the first cycle of secondary education (7th to 9th grade) within the period of 2002 and 2008.¹

Currently, all the 18 provinces of the country offer first cycle secondary education. Despite accomplished progresses, continuing efforts and further investment are needed. The two presently major problems are the lack of infra-structures and equipment, such as school laboratories, as well as the lack of qualified teachers (MEA, 2014; Lopes, Costa, & Matias, 2016) compromising the quality of the associated teaching, learning and assessment processes. On what concerns to infra-structures, national reports from the MEA recognize that classes still remain too big considering pedagogical aims adopted within the reform, indicating that, in general, classes have more than 40 students, particularly in urban areas (MEA, 2008, 2014). However, no official reference specifying how many classes have more than 40 students and exactly how many students integrate these classes was found. Calculations based on the statistical information available in report of 2008 (MEA, 2008) indicate that the smallest class may vary between 38-45 students, and that the size of the majority of classes may be above this number. In fact, other independent studies also report the existence of a high number of students per class, referencing classes with 70 to 100 students in some schools (Liberato, 2014; Delfin, 2014).

1 Elaborated based on information available at MEA, 2008, pages 7 and 18; MEA 2014, page 24).

Research Approach and Research Population

This research is integrated in a broader case-study involving physics teachers and students from one public school of Lubango city. This city is located in the province of Huíla, has about 776.249 habitants, and a total of 54 public schools ministering classes from 7th to 9th grade (first cycle of secondary education) involving roughly 113.000 students².

The school was chosen by its historical background. This particular school was founded in order to allow displaced students, due to Angolan war, to complete their studies, even if they had already achieved the maximum age. This school is regionally referenced as being rooted in addressing students' rights and needs. The school is composed by five different associated buildings located in five different neighborhoods with a rough distance of 5-7 km between each one.

While the broader case-study involved multiple data gathering along three years (documental analysis, teacher interviews and students questionnaire) this particular research is focused on discussing the students' voices attending the school. It was aimed to cover all students enrolled in the first cycle of secondary education, namely 3994 students (Table 2), however, due to a high level of students' absenteeism it was only possibly to apply the questionnaire to 1149 students, 28.8% of the population. Moreover, from the total gathered questionnaires ten were excluded since they did not have enough information to be considered valid (more than 50.0% of non-answers). The final sample is therefore composed by 1139 students, 383 attending the 7th grade, 411 attending the 8th grade and 345 students from the 9th grade. The mean age of inquired students is 15.3 years. On what concerns to gender, 52.2% of the students are girls and 47.8% are boys.

Table 2. Distribution of students per school building and grade.

School Building	Number of Students		
Head Building	983	7 th	400
		8 th	280
		9 th	303
Annex Building 1	738	7 th	300
		8 th	238
		9 th	200
Annex Building 2	420	7 th	200
		8 th	130
		9 th	90
Annex Building 3	1220	7 th	560
		8 th	380
		9 th	280
Annex Building 4	583	7 th	230
		8 th	203
		9 th	150
Total	3944	7 th	1690
		8 th	1231
		9 th	1023

2 Information available at: http://www.angop.ao/angola/pt_pt/noticias/educacao/2015/7/32/Huila-Ministro-ensino-superior-destaca-papel-ISCED-formacao-quadros,ce83818c-9a3a-4759-959c-1fd6a9b566e6.html; http://www.angop.ao/angola/pt_pt/noticias/educacao/2017/0/4/Huila-Professores-aguardam-por-reconversao-carreira,1611fe6b-6c84-4e03-ae52-b40920858273.html

Instruments, Procedures & Data Analysis

Students' voice was gathered through their positioning on ten specific statements related to their physics classes by indicating their level of agreement (Total Agree/ "Concordo totalmente", Agree/ "Concordo" and Disagree/ "Discordo"). Notice that these statements emerged from updated international perspectives (Singh, 2014) and national curriculum guidelines (INIDE, 2012, 2013), both for physics education. A pilot-study was conducted previously with some students in order to identify conceptual and structural problems of the questionnaire. The following improvements were made: reduction of the number of open questions and closed questions, the use of a simplified three level agreement scale for the statements that required students' positioning, as referred to above. These adaptations were made because students revealed to have many difficulties in answering to the questionnaire, feeling insecure and not being costumed to give their genuine opinion. Therefore, in the main study, the involved educational researchers invested considerable time in explaining to the students that they were answering to the questionnaire only for investigative purpose, that their answer was anonymous, that they could drop the research whenever they wanted and that it was important to express their genuine opinion and therefore they should not copy the answers of their colleagues.

On what concerns to data analysis procedures, descriptive and inferential statistical analysis was adopted using SPSS® and STATA®.

Results of Research

Table 3 indicates students' positioning considering the ten specific statements related with their physics classes. First, a global view of the results is presented. Secondly, an evolutionary perspective will be elicited by comparing students' percentage with total agreement and disagreement at the beginning of the cycle (7th grade) and at the end of the cycle (9th grade).

Global View

Considering all the grades together, the three statements with higher percentage of total agreement were statement 5 > statement 10 > statement 8, with 61.3 > 57.8 > 51.0 % respectively. The three statements with higher percentage of disagreement were statement 9 > statement 4 > statement 1, with 75.0 > 69.0 > 56.8% of disagreement respectively. The majority of students seem not to do laboratory work (statement 9) or use technological tools during their physics classes (statement 4). Furthermore, 56.8% of the inquired students considered that his/her teacher does not relate the physics contents to other disciplines (statement 2). Students also seem not to ask questions during classes (statement 8) or participate in their assessment (statement 10).

Table 3. Distribution of students' answers of all school levels and per grade.

Statements "In my Physic classes..."	Agreement Positioning	All grades	7 th	8 th	9 th
1. ... my teacher relates the physics subject to those of other disciplines;	✓ Total Agree	20.7	35.9	19.1	13.4
	Agree	22.5	15.7	20.9	24.7
	X Disagree	56.8	48.4	59.9	61.9
2. ... my teacher relates physics to everyday life;	✓ Total Agree	43.4	54.5	41.1	35.2
	Agree	36.2	28.3	37.6	42.5
	X Disagree	20.4	17.3	21.3	22.3
3. ... my teacher transmits contents by dictating what is written in the school book;	✓ Total Agree	50.0	59.3	55.7	42.0
	Agree	30.0	23.3	33.4	39.6
	X Disagree	20.0	17.4	10.9	18.4
4. ... my teacher uses technological tools (e.g. computers);	✓ Total Agree	20.0	22.4	18.1	18.6
	Agree	11.0	6.2	12.7	14.9
	X Disagree	69.0	71.5	69.2	66.5
5. ... my teacher solves the exercises on the board and I copy to my notebook;	✓ Total Agree	61.3	60.5	60.0	59.6
	Agree	26.7	20.9	25.7	33.0
	X Disagree	12.0	18.6	10.3	7.4
6. ... I solve exercises on the blackboard;	✓ Total Agree	48.5	58.4	52.0	38.3
	Agree	29.4	21.3	29.4	37.7
	X Disagree	22.1	23.9	18.6	24.0
7. ... I solve exercises in group with my colleagues;	✓ Total Agree	36.1	37.9	39.1	30.7
	Agree	27.1	18.9	28.6	34.0
	X Disagree	36.8	43.2	32.2	35.2
8. ... I participate in the class, by, for example, raising doubts about what is being taught;	✓ Total Agree	51.0	62.9	50.6	40.1
	Agree	35.0	26.0	35.8	43.7
	X Disagree	14.0	11.1	13.6	16.2
9. ... I realize laboratory work;	✓ Total Agree	13.2	17.7	13.1	8.8
	Agree	11.8	12.7	13.8	7.9
	X Disagree	75.0	69.6	73.1	83.3
10. ... my teacher asks the students to participate in the assessment.	✓ Total Agree	57.8	62.7	59.6	51.2
	Agree	31.0	21.4	31.6	40.1
	X Disagree	11.2	15.9	8.8	8.7

Evolutionary Perspective

Considering the lack of research on students' voice in an evolutionary perspective, the difference of total agreement percentages between 9th and 7th grade as well as the difference of disagreement percentages between 9th and 7th grade was calculated. Statements 8, 9 and 10 were identified as those with higher percentage difference of students' positioning. According to the information of Table 3 it is possible to verify that from 7th to 9th grade statements 1 and 9 have disagreement which increases to 13.7% and 13.5%, respectively. On the contrary, considering students' participation on assessment, which is the focus of statement 10, students' percentage with total agreement reduces 22.8% from 7th grade (62.7%) to 9th grade (51.2%).

In order to support curriculum and classroom practices management of the involved school (institutional decision making), it was decided to confirm if the identified patterns are not just hypothesis, but also tendencies applicable to the population under study. Results of polychoric correlations confirmed the identified patterns for each of the statement, being those statistically significant:

- regarding statement 1 statistical analysis confirmed that the proportion of students who 'total agree' with it reduces significantly from 7th to 9th grade, $\chi^2(2) = 37.253$, $p < .001$ whereas students who 'disagree' increased significantly, $\chi^2(2) = 13.990$, $p < .001$. The polychoric correlation shows that the higher the level of schooling, the greater the disagreement with this statement (Polychoric rho = .218);

- regarding statement 9 statistical analysis revealed that the proportion of students who 'total' agree with it reduces significantly from 7th to 9th grade, $\chi^2(2) = 9.518$, $p < .05$, while students who 'disagree' with this statement increases significantly, $\chi^2(2) = 8.100$, $p < .05$. The polychoric correlation shows that the higher the level of schooling, the greater the disagreement with this statement (Polychoric rho = .191);

- regarding statement 8 statistical analysis confirmed that the proportion of students who 'total agree' reduces significantly from 7th to 9th grade, $\chi^2(2) = 20.447$, $p < .001$, whereas students who 'disagree' increase, being this increase also statistically significant, $\chi^2(2) = 3.507$, $p = .173$. The results of the polychoric correlation showed that the higher the level of schooling, the greater the disagreement with this statement (Polychoric rho = .204).

Discussion

Considering Angolan students' positioning in a *global view*, a scenario of transmissive teaching and lack of resources emerges, pointing to similar demotivating learning experiences already identified in other countries across the world (Lyons, 2006). Many students frequently complain about repeated presentations of topics, the dictating or copying of 'correct knowledge', leaving no room for creativity (Obsorne, Simon, & Collins, 2003; Batista, 2017). The authors Danaia, Fitzgerald and McInnon (2008) also identified a general dislike about decontextualized contents, associated to a global desire of closer links to everyday life, including more practical/hands-on activities. For example, Vázquez and Manassero (2008) reported a students' desire for more opportunities to participate in class discussion. Technical reports from the MEA on the Angolan quality of education reflect similar concerns, assuming that the high number of students per class has been contributing to the general adoption of transmissive teaching methods which are not aligned with the development of competences and skills, like it is globally aimed, leading therefore to school unsuccess (MEA, 2014). This condition may have a particular negative effect on Angolan classes which integrate practical components, such as experimental sciences, namely Physics (Chimbalandongo, 2015). According to outputs from a research project focused on the evaluation of the impact of the curricular reform on Physics education, shortly designated as PIMEFA ("Projeto de Investigação para o melhoramento do Ensino da Física em Angola"), the high number of students per class and the lack of adequate laboratories and equipment in some schools preclude the possibility of experimentation, which makes this discipline more theoretical (INIDE, 2010).

Finally, differences of students' voice among 9th grade and 7th grade was analyzed in response to an extensive literature review conducted by Jenkins (2006) who concluded that research conducted so far on students' voice corresponds mainly to 'snapshots', lacking an evolutionary perspective. According to Angolan students' answers, they do fewer activities related to daily life, less activities in the laboratory and are involved less in their assessment along their school progress. A possible reason for this positioning may be a growing frustration within their progression from 7th to 9th grade, motivating a more critique posture, which reinforces the importance of overcoming the identified problems. Although previous studies already pointed out the major problems of Angolan educational contexts, the key contribution

of the present research is that young Angolan students also acknowledge these problems and report in first-hand how these problems affect their (motivation to) learning. Therefore, their voices constitute a useful instrument for educational management at school level and should be integrated more often in Angolan schools. Besides this national contribution, the fact that our study involved an evolutionary perspective of students' voices covers a research gap in international research in the topic and may guide further studies.

Conclusions

In this research Angolan students' voices from one public school about aspects of their physics classes were explored. Combining descriptive and inferential analysis allowed perceiving that inquired Angolan students (also) do have an opinion, and that this opinion changes over their schooling time. Reasons beneath these seem to be associated to a lack of resources and specific teaching learning and assessment innovative strategies/practices. Considering that students from the 9th grade are in a pre-stage of choosing the knowledge domain of further studies (in science vs. not in science), these outputs, namely a possible growing of students' frustration towards the lack of resources, (more) contextualized learning, and integration in learning and assessment, should be considered at school management, taken into account at political level of education and should be more extensively explored in further research. The results concerning students' voice and its differences among grades, the last novelty of our research for (Angolan) educational contexts, as well as the problematization of what might sustain those differences, is of crucial relevance towards better quality and higher students' motivation in Physics education. Considering that gathering students' voices is still a rare practice in Angolan schools it is worth to mention that much work has to be done in order to familiarize students to answer to questionnaires and to express their true opinion. Researchers that are motivated to do similar investigations are recommended to sustain the application of the questionnaires with complementary strategies that help to assure that students understand what they are asked to do and that they are free to use their *own* opinion.

Finally, based on the obtained results the following recommendations are delineated: (i) continue to invest in gathering data about students' voice in each Angolan school, and use the obtained results for group discussions involving physics teachers from that school, the coordinator of that discipline and the head of the school, in order to help to identify problems and assets and to use the conclusions to prioritize actions; (ii) the discussion of students' voice at each school, and the obtained learning, should be disseminated at a larger scale through the Ministry of Education, namely through the Physics coordinator of each Angolan province; (iii) implement teacher development programs that enhance teachers' capacity in 'listening' to their students' and to use that voice in improving his/her practices at key-points identified by the students.

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