



## Science Teachers' Awareness of Education for Sustainable Development

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### Abstract

*In September 2015, the United Nations presented the new Agenda for 2030 with 17 goals and 169 targets. Given the relevance of the citizens' awareness to achieve the targets of Agenda 2030, more attention should be given to its goals within a school context, thus connecting the learning process with a necessary growing comprehensive and familiarity of sustainable development by science teachers.*

*In order to evaluate the Portuguese science teachers' awareness regarding the new 2030 Agenda for Sustainable Development a questionnaire was elaborated and validated by five experts in Education for Sustainable Development. The questionnaire was designed so as to be answered in five minute and comprised two questions, after identifying the age and gender of the respondents: (i) Do you know what 2030 Agenda (of United Nations to Sustainable Development with the aim of changing the world) is?; (ii) Taking into account the aims of Agenda 2030 (which we provided in a sheet of paper), what research questions do you consider to be a priority in Portugal? These questionnaires were administrated after a science teachers' development course that took place in a public Faculty in the North of Portugal.*

*A content analysis was subsequently performed to the 86 questionnaires (68 females and 18 males). To better analyse the answers to the second question, all the members of the research team independently performed content analysis. They subsequently compared and improved their analysis, until a consensus was reached. Afterwards a descriptive statistical analysis was done.*

*The main evidence shows that only a small number of science teachers are aware of the new aims and targets for Sustainable Development (n=25; 29%). When analysing the answers to question number two it was verified that all seventeen goals were mentioned by the respondents. Nevertheless, goal number four (ensure inclusive and quality education) was mentioned by 27% of the respondents, being the most referred. Goal seventeen (global partnership for sustainable development) was the less mentioned (2%). The results show that more attention should be given to the conceptions and knowledge of science teachers regarding the Agenda 2030 goals and aims.*

### 1. Introduction

It is undeniable the impact that humans have had in our planet. Visible changes include the built environment, conversion of forests and grasslands to agriculture, algal blooms, smog, increases in ozone, carbon dioxide (CO<sub>2</sub>), and methane (CH<sub>4</sub>) in the atmosphere [1]. Driven by the impact of these alterations, Crutzen and Stoermer (2000) argued that we live in the "Anthropocene" [2], a time in which humans have replaced nature as the dominant environmental force on Earth.

The planet is struggling to ensure sustainable development, a concept based on three fundamental pillars. To ensure the sustainable development of the planet, we need to make sure that the environmental concerns are accompanied by an increase of the awareness of the social inequalities and an improvement of the social and economic conditions of world's population. Sustainable development aims to guarantee that humankind find equal opportunities for both genders, peace, security, and social, economic and environmental conditions required to have quality of life. The 2030 Agenda is the most recent plan of action for people, planet and their prosperity. It also seeks to strengthen universal peace in larger freedom.

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As educators, teachers are fundamental to reduce the lack of knowledge regarding Sustainable development and increasing its awareness towards the Agenda 2030 goals.

### **1.2 Sustainable development and United Nations Agenda 2030**

The expression “Sustainable Development” was first defined at the United Nations Conference on the Human Environment (UNCHE), in 1972, but it was in 1992 that took place the UNCED in Rio de Janeiro, also known as the Earth Summit, a conference that became part of the world’s history marking the first time so many different countries expressed the common concern regarding sustainability and sustainable development. Twenty years after the first conference on the environment (UNCHE, 1972, Stockholm), another conference addressed mainly the environmental problems and sustainable development, resulting in the production of several documents of great importance: Agenda 21, Rio Declaration on Environment and Development, the Statement of Forest Principles, the United Nations Framework Convention on Climate Change and the United Nations Convention on Biological Diversity [3].

In September 2000, the United Nations joined world leaders together to adopt the United Nations Millennium Declaration, which goals should be achieved by the year of 2015. This document established the values of freedom, equality, solidarity tolerance, respect for nature, and shared responsibility as fundamental to improve the relations amongst XXI century countries [4]. Some years later, in 2012, Rio de Janeiro hosted the “Rio+20 Conference”, with the intention of renewing and reminding the political commitment to a sustainable development. It was attended by 190 countries becoming the largest event ever held by the United Nations [5]. This meeting was decisive and paved the way for the future 2030 Agenda and the Sustainable Development Goals [6]. This new agenda, comprised 17 new sustainable development goals (also called *Global Goals* and 169 targets to be achieved by the year 2030.

Science teachers are fundamental to raise students’ awarness towards Agenda 2030 goals and targets. It is important that Education for Sustainable Development concentrates not only in the environmental problems but also adresses the political changes and social needs of each country [7]. And while, on the one hand, teachers can be a driven force to inspire local and global awareness, the Agenda 2030 also empowers teaching by recognizing that it is necessary to garuantee the quality of Education (goal 4 in the Agenda 2030) in order to achieve sustainable development. Schools are undoubtedly key places for training and the most appropriate infrastructure to function as Educational entries for sustainable development [8].

## **2. Methodology**

In order to evaluate the Portuguese Science Teachers’ literacy regarding the new 2030 Agenda for Sustainable Development a survey was conducted. A questionnaire was elaborated and validated by five experts in Education for Sustainable Development. The questionnaire was designed so as to be answered in five minutes and it comprised two questions, after identifying the age and gender of the respondents:

- (i) *Do you know what Agenda 2030 (of United Nations to Sustainable Development with the aim of changing the world) is?*
- (ii) *Taking into account the aims of Agenda 2030 (which we provided in a sheet of paper), which research questions do you consider to be a priority in Portugal?*

These questionnaires where administrated after a science teachers’ development course that took place in a public faculty in the north of Portugal. The convenient sample had no demand of gender or age. The respondents ages ranged from twenty-one to sixty-five years old (average age=42). The majority of the respondents were women (n=68; 79%) and only eighteen (29%) were men.

A content analysis was subsequently performed to the 86 questionnaires (68 females and 18 females) using SPSS version 25. To better analyse the answers to the second question, all the members of the research team independently performed content analysis. They subsequently compared and improved their analysis, until a consensus was reached. Afterwards a descriptive statistical analysis was done which results are presented in the following section.



### 3. Results

This section will present and discuss the results of this study, following the structure of the questionnaire.

Regarding the first question – Do you know what the 2030 Agenda (of United Nations to Sustainable Development with the aim of changing the world) is? – the majority of respondents (n=59; 69%) did not know what the 2030 Agenda for sustainable development is. Two teachers, both female, did not provide a satisfactory answer (n=2; 2%). When analysing this results by gender, we can verify that there is no meaningful difference between women’s and men’s knowledge regarding Agenda 2030. The results related to the first question are presented in Table 1.

Table 1. Results to the question n.º 1.

		n	Percentage (%)		
<i>Do you know what the 2030 Agenda (of United Nations to Sustainable Development with the aim of changing the world) is?</i>	<b>Yes</b>	Male	5	27	29
		Female	20	29	
	<b>No</b>	Male	13	72	69
		Female	46	68	
	<b>No Response</b>		2	---	2
	<b>TOTAL</b>		86	----	100

Regarding the second question – Taking into account the aims of Agenda 2030, which research questions do you consider to be a priority in Portugal? – most participants (n=23; 27%) refer Education as the main priority of research in Portugal. The necessity of ensuring the equitable access to quality Education seems to be one of the main concerns of the teachers participating in this study. This topic is the most referred by women but is only the third main concern for male participants (n=3; 17%). Figure 1 presents the results concerning the total of respondents, as well as an analysis by gender.

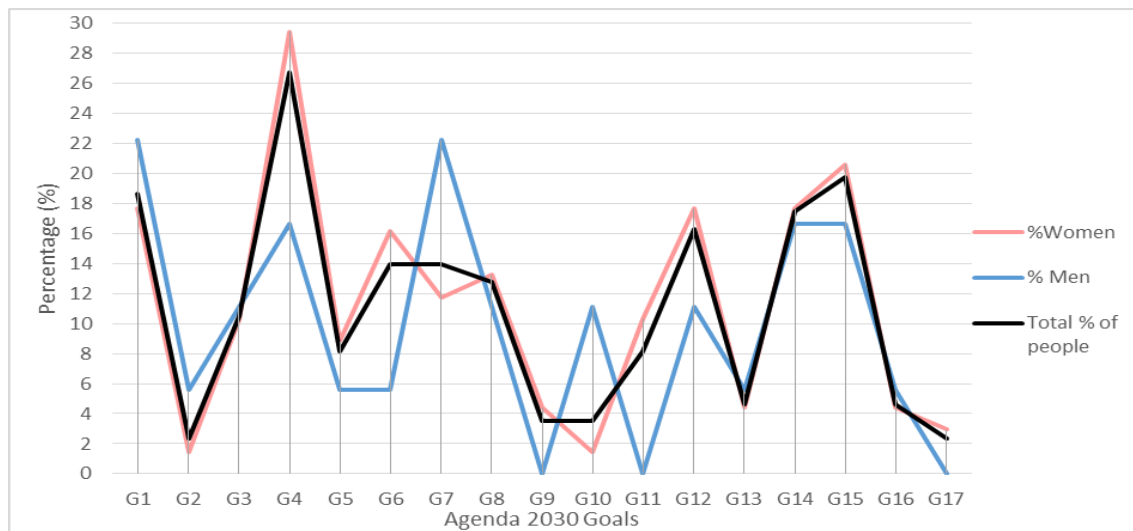


Figure 1. Results to the question n.º 2.

In general, according to the participants, the main research questions should focus on ending poverty, ensuring quality education, promoting responsible consumption and production, and protecting marine and terrestrial biodiversity. When analysing the results to this question by gender, it is perceptible that female and male teachers have different perspectives about where to focus our research questions. To the male participants of the study, the most important research questions should address the



problems of poverty and renewable energies, while female participants focused on the questions regarding education and protection of life on land. However, the performance of an independent qui-square test only gave evidence of a significant difference between female and male answers in the analysis of the reference to goal number 10 ( $\chi^2 (1) = 3,929$ ;  $p=0,047$ ). To the other 16 goals, there is no significant difference between male and female answers.

Probably because this study was conducted among teachers, the needs for research concerning education and the access to quality Education was the goal most referred, especially among women. Nonetheless, only 2% of the teachers mentioned the need to enhance global partnership for sustainable development, a target that lays the foundation for all the others.

#### 4. Conclusions

The results of the study reflect the need to aware science teachers for the importance of sustainable development and its goals. Portuguese science teachers are greatly unaware of the goals and targets defined by the United Nations Agenda for 2030. Since Agenda 2030 is a plan for the people, the planet and its prosperity, it is important that schools work as a venue to better inform and aware young students of the local actions that can promote a sustainable development. It is also essential that teachers and the school community make efforts to prepare informed citizens capable of recognizing the research fields of critical importance for mankind.

#### References

- [1] Ruddiman, W. F., Ellis, E. C., Kaplan, J. O., & Fuller, D. Q. (2015). Defining the epoch we live in. *Science*, 348 (6230), 38-39.
- [2] Crutzen, P. J., & Stoermer, E. F. (2000). The Anthropocene. *Global change newsletter*, 41, 17-18.
- [3] United Nations (1997). UN Conference on Environment and Development (Online). Available in: <http://www.un.org/geninfo/bp/enviro.html>. [Accessed in October 22, 2016]
- [4] United Nations (2015). *The Millennium Development Goals Report*. United Nations: New York.
- [5] United Nations (2012). *Resolution adopted by the General Assembly on 27 July 2012* (Online). Available in: [http://www.un.org/ga/search/view\\_doc.asp?symbol=A/RES/66/288&Lang=E](http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/66/288&Lang=E). [Accessed May. 20, 2016]
- [6] IISD (2016). *Overseeing Agenda 2030 - How to Avoid a Repeat of the Commission on Sustainable Development* (Online). Available in: <http://www.iisd.org/blog/how-avoid-repeat-commission-sustainable-development>. [Accessed May. 20, 2016]
- [7] Vasconcelos, C. (2008). *Aprendizagem Baseada na Resolução de Problemas: Um estudo no âmbito da educação ambiental* (Relatório de Pós-Doutoramento). Braga: Instituto de Educação e Psicologia da Universidade do Minho.
- [8] Schmidt, L, "Ensaio para a aplicação da Década EDS em Portugal" in Seminário Educação para o Desenvolvimento Sustentável, Biblioteca Nacional de Portugal, 57-75.