

Windows for Science-religion Dialogue in Portuguese School Education

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Introduction

Science and religion are part of the life of ordinary contemporary people. Eventually, during their lifetime, individuals come to think about, or are affected by, questions related to the meaning of life, the consequences of scientific achievements and the uses of technology. Schools should be places of excellence to give citizens the chance to acquire skills to cope with the challenges of a society highly dependent on science and technology and where religion plays an important social role in the formation of the self and of social groups.

It is thus desirable to find opportunities to reflect on science and religion in school curricula. Here, we report on an analysis of the dialogue between these different realms of

the human endeavour in Portuguese schools. Since in Portugal, according to the last census, 81% of the population is Catholic we will focus specifically on the Catholic religion.

Portuguese education

Figure 1 shows the programs and curricular goals or guidelines that establish the educational matrix to be followed by teachers in the Portuguese school system from year 5 to year 12, along with relevant literature.

Figure 1. Structure and documents for Physical and Natural Sciences in Portugal

Life and Earth Sciences Ministério da Educação (1991a) Ministério da Educação (1991b) Bonito (2013)	Natural Sciences Galvão (2001) Bonito (2013) Bonito (2014)		Biology and Geology Amador (2001) Mendes and Amador (2003)		Biology Mendes (2004)		
					Geology Amador (2004)		
	Physics and Chemistry Galvão (2001) Fiolhais (2013)		Physics and Chemistry Martins and Caldeira (2001) Martins and Caldeira (2003) Fiolhais, Festas and Damião (2014a)		Physics* Fiolhais (2004) Fiolhais, Festas and Damião (2014b)		
					Chemistry* Martins (2004) Fiolhais, Festas and Damião (2014c)		
Moral and Religious Catholic Education Pereira (2007)							
Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
Key-stage 2		Key-stage 3			SECONDARY SCHOOL** (Science program)		
BASIC SCHOOL							

* To be enforced in 2017/2018

** In year 10 and year 11, science students have to choose two courses among Biology and Geology, Physics and Chemistry and Descriptive Geometry (not included in this study). In Year 12, students must choose three among more courses, including the ones presented in this figure. To learn more on the Portuguese Secondary Education curricula, see Direção Geral da Educação (sd).

Basic education (Key-stage 2 and key-stage 3)

In the Physical and Natural Sciences there are three key opportunities where a window for a dialogue with other worldviews and areas of knowledge is apparently open:

- To consider other disciplinary areas explanations. The ‘other disciplinary areas’ are any courses other than Physics and Natural Sciences. But as they have to be able to provide scientific explanations for the phenomena, the dialogue excludes non-scientific areas, such as religion.
- Nature of Science. The authors’ perspective seems to be that that science education contributes with scientific literacy and critical reasoning to the participation of students in the social-scientific debates. Nonetheless, there is no consideration of axiological thinking, and one might interpret this as an assumption that scientific thinking alone can lead us to ethical-moral positions.
- Epistemological Knowledge. Analysis and debate of ‘scientific discoveries’: stories in which different models of scientist work are presented or in which the influence of society on science is notorious are purposed for the development of this competence. Although this is actually the only genuine moment of dialogue, the courses’ curricula don’t suggest any space for these activities.

After a careful analysis, we found that the Moral and Religious Catholic Education (MRCE) interdisciplinary suggestions cover almost all the possible dialogue platforms between the science courses and the religious course we had identified. These themes can be categorized as follows:

- Sexuality and human growth;
- Ecology;
- Origin of the universe.

Only two curricular topics – one from MRCE and another from Life and Earth Sciences – were not in the program’s interdisciplinary suggestions and in our view could give rise to an interesting dialogue when related:

- Puberty;
- Adolescence.

Secondary education

Secondary school science programs in Portugal reflect the importance that technological and scientific developments have acquired in ethical and political contemporary debates. The teaching of science is conceptualized as an education for citizenship. The programs seldom

include perspectives from non-scientific areas – such as religion or the social sciences – or engage in an interdisciplinary dialogue, as if it was not necessary to explicitly articulate scientific literacy with an axiological reflection about it.

As for MRCE, in the secondary curricula, most interdisciplinary suggestions involve courses from the humanities group of studies such as philosophy, sociology, anthropology, history or Portuguese literature: *Politics, Ethics and Religion* or *Ethics and Economy*. Such subjects don't find any echo in the science courses' curricular content. *Technology and science* is probable the most obvious and the best unit in all the basic and secondary school curricula to entail science-religion dialogue since it explores topics such as: the relation between science and religion; order and rationality of the universe vs chaos as an explanatory hypothesis; and science, technology and development.

In secondary education curricular topics there isn't any reference to sexuality and human growth; there is, however, a new category that emerges: human origins. So the thematic categories are again three:

- Origin of humankind;
- Ecology;
- The origin of the universe.

The analysis reveals an imbalance between the attention given by the religious education curricula to the possibilities of interdisciplinary dialogue with the science curricula and the almost non-existent mention of religion in the science curricula.

Conclusion

From our analysis it has become clear that both the scientific and the religious programs can encourage an interdisciplinary dialogue. Nevertheless, despite observations on the social nature of the scientific endeavour, the science curricula do not include any suggestions for interdisciplinary dialogue. Thus, when the scientific school programs talk about preparing the student for social-scientific debates it is as if they only mean preparing the student with the necessary pragmatic skills and conceptual knowledge for such debates.

There is a deficit in the teaching of axiological critical reflection skills. The religious course could compensate the said deficit; however, given that it is an optional course it doesn't reach all students. Moreover, the fact that the religious courses in Portugal are all

related to a specific religion will shape the dialogue, and we came to think that perhaps a transversal approach that focuses on religion as a human cultural phenomenon could help to enable the dialogue between science and religion.

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