# Are Greek students ocean literate? Analysing ocean science issues in primary education textbooks

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The ascertainment that ocean sciences are among the most underrepresented disciplines in K-12 educational curricula has led to the development of the Ocean Literacy Campaign in the USA. Within this framework, the knowledge required to be considered ocean literate in accordance with the National Science Education Standards was outlined; ocean literacy was defined and seven essential principles and forty four fundamental concepts of ocean sciences were identified (e.g. Cava *et al.*, 2005; Strang *et al.*, 2007; Cudaback, 2008; Schoedinger *et al.*, 2010). The present study attempts to portray whether these essential principles and the corresponding fundamental concepts of ocean literacy are included in textbooks of Greek primary education, and to what extent. One key issue on ocean literacy is school curricula and whether these have an ocean literacy oriented perspective. Considering the latest transitions in education worldwide, the Institute of Educational Policy in Greece started planning the revision of the Greek curricula in 2000. Maintaining the centralized character of the curriculum, the Institute proceeded to many educational innovations, based on new pedagogical and psychological theories (The Institute of Educational Policy, 2003). The textual corpus analysed in our study, consisted of textbooks used for the teaching of science issues in Greek primary education. Four textbooks were taken in consideration ('Studying the Environment', 'Geography', 'Science' and 'Environmental Education Interdisciplinary Activities Guide'). All textbooks were analysed by employing the content analysis method (Krippendorff, 1980; Mayring, 2000). Our analysis applied an a priori coding, as the requisite categories were the seven Ocean Literacy Principles (OLPs); the whole page was determined as the analysis unit, containing either phrases or depictions (photographs, drawings, charts, maps). Each textbook was studied and all the relative pages were isolated and recorded. Analysis showed that ocean science issues cover 162 out of the total 1,125 pages of all textbooks, corresponding to 15.1%; their percentages varied, among textbooks, between 7% (in 'Science)' and 29.7% (in 'Geography'). Not all seven principles, neither all fundamental concepts per principle are cited. OLP 7 is not reported at any textbook or grade. The most frequently observed principles are the first, fifth and sixth; most of them occur in 'Geography' and the 'Activities Guide', whereas the fewest in 'Studying the Environment' and 'Science' textbooks. Furthermore, OLPs 1, 4 and 6 have most of their fundamental concepts covered, followed by the second, third and fifth principle. In conclusion, our study revealed that very few of the fundamental concepts are included in detail, while most of the others are represented by an almost abstract and fragmented pattern, with many inconsistencies within the same textbook or among different grades; therefore primary education students receive little information about oceans and oceanic life, and their importance not only to our own well-being, but to the welfare of the whole planet. Given the fact that Greece is a country with specific characteristics, deriving from its geographical location and maritime heritage, it is interesting to investigate the secondary education textbooks as well, in order to obtain a clearer picture of the formal education contribution to the Greek students' ocean literacy status.

## References

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