Printed and Digital Press Science: Ways of transforming Press Science into School Science[i]

D. Mantzouridis, Kr. Halkia, K. Skordoulis
Department of Education (P.E.), University of Athens

Introduction

Recently, many researchers have investigated the influence of press science on formal science education (Pellenchia 1997; Hutton 1996; Wellington 1991). It is generally accepted, that the content of press science material is not always aligned with the needs of the school curriculum, nor does press science share the same aims as school science (Halkia 2003; Hutton 1996). Furthermore, press science uses different communication codes from school science. Scientific language, which is usually used in school science, is abstract most of the time (Lemke 1990, p.155; Parkinson and Adendorff 2004) and formal. On the other hand, the press uses narrative. As Lemke (1990 p.108-109) stresses, the most important stimulus for learning is student's familiarity with the conventions of narrative or story telling.

Press science could be used for science teaching only as a complement of the educational material used in science classrooms (Dimopoulos and Koulaidis 2003). This migth be of value, if only press science is used carefully and critically (Halkia 2003; Wellington 1991), according to specific evaluation criteria.

In Greece, as well as in other countries, research addressed to secondary school students, reveals that students characterize physics as one of the most difficult and less attractive subjects of secondary school programs of study (Halkia and Karanicas 1999). But at the same time the press both publishes articles and offers digital material (SVCD) dedicated to science and technology. These science articles and digital material seem to elicit a positive response from their audience (Halkia 2003), part of which is the student population (Hutton 1996). According to Halkia et al. (2001), students believe that science articles in comparison with their science textbooks are more interesting, attractive and comprehensible.

The question is whether press science (printed or digital) could be used as educational material in formal learning and bring about changes in students' attitudes towards science.

The present research aims to investigate the ways teachers would use press science in teaching science.

The research question is whether popularised press science could be used as complementary educational material in secondary science classrooms as it is defined by the curriculum. The specific questions are:

1. Which are the evaluation criteria teachers have to use, in order to choose the relevant press science material for their science teaching?
2. In which ways can press science be transformed into educational material?

Methods

The steps followed in the present research were:

1. Evaluation criteria were set for evaluating the press science articles and digital material from the point of view of science education.
2. Taxonomy of the press science articles and digital materials, according to their subjects and the specific didactic aims they might serve, was also developed.
3. A "*guide for using press science in the science classroom*" was developed for teachers. It contains instructions to science teachers about the ways press science can be utilised when designing their educational material.

4. Some articles were selected according to the above evaluation criteria and worksheets were designed using passages of these articles, according to the "*guide for using press science in the science classroom*".
5. A pilot experimental implementation was carried out. The research sample was eight students (two groups), 17 years old who had chosen science as their prime course in the upper secondary education. The implementation lasted two hours. In the first hour (45 minutes) the students were taught the phenomenon of lightning with the specially designed worksheets (based on press science). In the second hour, students filled in a questionnaire. The questionnaire consisted of closed and open –ended questions and aimed at evaluating the lesson and the specific articles used as educational materials.

Results

Two factors were taken into consideration for the construction of the evaluation criteria. The first one was the validity and reliability of the press science material. The second one was the potential educational value of this material. The press science articles were classified into five categories according to whether: a) they deal with scientific theories; b) they explain physical phenomena; c) they explain applications of complex science concepts (and technological applications) that affect everyday life; d) they describe experiments in a way that connects them to the needs and interests of people, and e) they report on scientific methods and procedures.

The content of the digital press science material (SVCD) are usually more compatible to the school curriculum than the printed press science and some of them have educational orientation. The SVCD offered by the press were classified into the following categories according to whether: a) they deal with a general subject (e.g. "Earths story", BBC), b) they refer to controversial science and technology issues (e.g. "Clones", National Geographic Society) and their implications for society, and c) they refer to issues on the history of science and technology. Moreover, their form could be of the type: a) a digital book or b) a documentary.

The teachers' guide consists of two parts: The first part explains, on the one hand, why the specific material would be useful in teaching science, and on the other hand, how teachers could use this in the science classroom. The second part is a worksheet in which the specific press material is transformed into educational material.

For the construction of the worksheet, passages of two science articles[ii] that explain the phenomenon of lightning were chosen. These passages were chosen because they either raise students' interest (story-telling), or explain the phenomenon (e.g. picture which mentally organizes the science concepts relevant to the phenomenon), or they include useful information (safe shelters in case of lightning). News relative to the subject (newspaper reports on accidents in which people were struck by lightning) is also used, because it is considered that this kind of news reveals the connection between science and everyday life.

The content analysis of the questionnaire revealed the following points:

The students believe that a lesson which is based on science articles is more interesting, attractive and comprehensible than the corresponding one based on their science textbooks. They also commented that the specific lesson offered them meaningful knowledge. They pointed out that the lesson combines news from real life (accidents caused by lightnings) with useful knowledge (guide-lines for protection from lightning). They also argued that the most useful elements of the worksheets are: a) the picture which mentally organizes the relevant knowledge (with its caption), and b) the news items.

The students were most impressed with the picture mentioned above and the narrative elements of the articles. They also believe that the language of the specific articles is more

familiar to them in comparison with the "difficult" (more formalistic and abstract) language of their science textbooks.

According to students, the main reasons for using passages of press science articles in their textbooks (by replacing the relevant text there) are: the language used in press science articles is more comprehensible than the formal language used in their science textbooks; the pictures are more effective in helping them to understand the relevant phenomenon; the science articles provide useful information for everyday life and for their safety, and offer good explanations for the physical phenomenon they refer to.

Conclusion

Analysis of the results of the pilot research reveals that the use of press science material in teaching science might be helpful in science education. It is of great importance that press science material has to be chosen according to specific evaluation criteria in order to be compatible with the school curriculum and with the mental age of students. The transformation of these materials into educational material could help to modify science into a more attractive, interesting and comprehensible subject of the school program of study. Hopefully the use of press science in science classrooms would help to change students' attitudes toward science into a more positive one.

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[ii] The science articles that were selected for the specific worksheet are:

1. "In traces of Benjamin Franklin", Greek Edition, ("Ben Franklin Slept Here", USA Edition), February 2004.
2. "Lightning, the Summer Murderer", "To Vima", 31 July 2004.