A CROSS-CURRICULAR TEACHING PROJECT BASED ON WALT DISNEY’S CARTOON “DONALD IN MATHMAGICLAND”

Miroslawa Sajka  
Pedagogical University of Cracow, Poland

Konstantinos Tatsis  
University of the Aegean, Greece

Edwin Watson  
College for Foreign Language Teachers in Sucha Beskidzka, Poland

The presented project is based on Walt Disney’s cartoon “Donald in Mathmagicland” and was initially used as a multidisciplinary model of knowledge integration for English, Music and Mathematics classes. After viewing the cartoon the participants work in groups to construct activities that may promote students’ actual involvement and encourage them to transfer knowledge and skills from different disciplines. Different approaches concerning each country’s curricula are discussed, together with possible ways of integrating multimedia technologies in the mathematics classroom.

The school system at junior high schools and at high schools requires students to be involved almost at every consecutive lesson in a different topic, resulting from the curriculum of different school subjects. This causes a great difficulty in their acquisition of new concepts and it can also reduce their engagement in the didactical situation introduced by their teachers. Cross curricular projects can soothe this difficulty by using the common topics found in consecutive lessons. This allows the students to apply and practice mathematical skills and concepts before and during their use in other subjects. Such coordination reinforces the ideas of investigation and experimentation emphasized in the National Council of Teachers of Mathematics (NCTM, 2000) standards. Douville, Pugalee and Wallace (2003) provide other benefits of these approaches:

The potential for meeting the individual differences of students is also enhanced within an integrated curriculum. When students are able to use literacy skills to learn about science and mathematics, opportunities are provided for the development of multiple intelligences (Drake, 1998; Wood, 1997). Nuthall (1999) contended that, when concepts are elaborated through the interdisciplinary links reflected in integrated instruction, information is recalled more easily for subsequent problem-solving tasks. He asserted that these interdisciplinary links result in a learning process that is dynamic because it actually “feeds on itself (p. 336)”. Finally, the activation and extension of conceptual understanding within an integrated curriculum fosters the type of learning engagement that stimulates students’ motivation for learning (Guthrie, Anderson, Alao, & Rinehart, 1996). (p. 390)

Lessons in some school subjects can be related to each other in a very natural way, for example humanistic subjects (e.g. foreign language literature of native language, history, art) or science subjects (e.g. mathematics, physics, chemistry, biology). In Polish curriculum there are some types of junior secondary education pointed out which are multidisciplinary by nature, e.g. ecology. In Greece, a recent reform has resulted in a number of pilot programs in primary and secondary education with the intention of promoting a more holistic approach to education that would help pupils make the connections between different subjects, disciplines, and areas of knowledge.

The teaching project presented demonstrates the possibility of combining lessons from different subjects like English as a foreign language, mathematics and art. The literature on the cross-curricular integration, enumerates three models of knowledge integration (Dereń et al., 1999):
1. Monodisciplinary model of knowledge integration;
2. Multidisciplinary model of knowledge integration;
3. Interdisciplinary model of knowledge integration.

The described project is an example of knowledge integration according to the multidisciplinary model at the 2nd grade of junior high school. It can be also suitable to the realisation at the high school level. The following figure shows the functions of this model.

![Diagram of Multidisciplinary Model](image)

**Figure 1. Multidisciplinary model of knowledge integration**

The multidisciplinary model cannot be used without considering the general goals in mathematical education. Krygowska (1988) has introduced the following hierarchy of these goals:

Level I: On this level we formulate the goals of mathematics teaching concerning basic mathematical knowledge, abilities and skills. They are usually described in school curricula. (e.g. the ability to formulate the Pythagoras' theorem, interpret it and use in a standard situation).

Level II: On this level we formulate the goals of mathematics teaching concerning elements of mathematical methodology and behaviours unique to mathematics, i.e. mathematical mental activities like defining, hypothesis formulating and verifying, understanding the role of examples and counter-examples, proving, generalising, specifying, deducing, finding analogies, transfer of a method (Klakla, 2002).

Level III: On this level we formulate the goals concerning the development of approaches and general intellectual behaviours which can be constructed in mathematics and then transferred to everyday life situations. They are needed for everybody, regardless of his/her area of activity. Such behaviours include: problem solving, expression of logical argumentations, development of skills of learning with the use of different sources of information, discipline and critical thinking (Klakla, 2003).

The structure of the workshop is the following:

1. An introduction to cross-curricular teaching is made followed by a short description of other projects; finally the “Donald in Mathmagicland” project is discussed.
2. The participants watch the fragment of Walt Disney cartoon “Donald in Mathmagicland” (original English version).

3. A short description of the English language and music lessons that were based on the project is delivered by the authors.

4. The participants are asked to create a short lesson plan, based on the cartoon. Emphasis is put on creating relevant activities and/or projects that promote the students’ actual participation. These activities should involve some of Bishop’s (1991) mathematical activities: counting, measuring, locating, designing, explaining and playing and Krygowska’s mathematical mental activities. The level of the topic and the topic itself is chosen according to each participant’s interests. Participants are encouraged to work in small groups.

5. The lesson plans are presented and discussed by the participants on the basis of their implementation concerning different approaches (e.g. related to different national curricula) and different assumed aims.

6. A whole group discussion is made, based on the initial aims of the project, which were the following:
   a. Raising pupils’ awareness of the holistic nature of learning.
   b. Encouraging pupils to transfer knowledge and skills from one subject to another.
   c. Understanding and interpreting complex situations and situations containing many pieces of different information.
   d. Building positive attitude towards school subjects, especially mathematics.
   e. Giving motivation for learning.
   f. Using and taking advantage of the information technology (film – during the project, internet and PowerPoint presentations – during preparing homework).

We believe that the study of mathematics in an abstract way is an essential part of its teaching, but it should build upon the concrete experience of the learner, so that s/he can appreciate mathematics for its usefulness and, eventually, for its beauty. A child-centred, interdisciplinary approach to mathematics can help students develop into confident, fulfilled individuals and life long learners (Dodge, 2000).

REFERENCES


Miroslawa Sajka
Pedagogical University of Cracow, Poland
msajka@ap.krakow.pl

Konstantinos Tatsis
University of the Aegean, Greece
tatsis@aegean.gr

Edwin Watson
College for Foreign Language Teachers in Sucha Beskidzka, Poland