

## Co-operative learning of Logo in the classroom – development of project “Recycling”

**Tatjana Balvočienė**, *t.balvociene@gmail.com*

The teacher of IT, expert, Silute Vyduņas gymnasium, Lithuania

**Vaida Paukštė**, *vaida.paukste@gmail.com*

The senior teacher of IT, Vilnius Abraomas Kulvietis secondary school, Lithuania

### Abstract

Co-operative learning (also known as learning in small groups) – strategy that helps students to achieve better learning results, to develop social and communicative skills, put a positive effect on students' opinions and values associated with the school and other students, especially with training and learning.

Co-operative learning can be successfully applied in the classroom of Logo when getting acquainted with that system and preparing more complicated projects. The article presents and discusses example of how the Logo can be used in the classroom for co-operative learning. When doing a bigger project students from the beginning of the project distribute the work and responsibilities: gather information and share it, draw or collect the necessary project drawings, describe the events and procedures and, finally, everything combine into a single job. In each stage different student's abilities are revealed (since the work and students are very different).

In this paper the project-game "Recycling" (Figure 1) is described. It can be prepared by the 2-3 students group who are of the age 12-13. With the help of the teacher students plan their work, provide each member with a specific activity and at the end of the project evaluate the process and achieved results.



Figure 1. Project-game "Recycling". The model shows how the waste should be dragged by the mouse into a suitable container.

### Key words

Co-operative learning; project; Logo; *Imagine Logo*.

## The situation in Lithuanian schools

### Co-operative learning

Co-operative learning is also called learning in small groups when students in the class are divided into small groups of two to four members. The main aim of learning in small groups – to achieve that each student when communicating with others, actively performing given tasks, would learn better. Co-operative learning is not one of the teaching methods, but rather an approach to the same training, based on social interaction and fostering cooperation among small groups of learners (Sahlberg, 2004).

A few years ago (2002-2006 years) Lithuania Ministry of Education was carrying out Lithuanian School Improvement Programme for the Millennium<sup>1</sup> of Lithuania, one part of which was a long-term teacher training (learning) based on co-operative learning.

IT learning usually is an individual student's work, when deepening your knowledge into the possibilities of computer programs. Nevertheless, it is perfectly adaptable in the classroom, where Logo system is used for co-operative learning.

### Student's IT skills for working with the Logo system

One of the parts of IT course in class 5-6 is defined as the Curriculum framework for primary and basic (lower secondary) education approved by the Minister of Education (2008)<sup>2</sup> – "Constructing by a computer". This course of study is particularly suitable and recommended for the Logo system. In class 5-8 up to 108 lessons can be devoted to IT course.

Integrated IT program is added to the field of IT learning. This program is implemented through other subjects when using IT for learning purposes. In class 7-8 it is especially recommended to integrate IT learning into other subjects. In such lessons students can successfully apply existing IT and work skills with the Logo system, particularly in the development of more sophisticated projects.

The Logo system can be successfully integrated into other disciplines or being taught during after school activities in upper grades. There are several versions of Logo system translated into the Lithuanian language: *LogoWriter*, *Comenius Logo*, *Imagine Logo*. All the examples described in this article were made with *Imagine Logo*, but these ideas can be perfectly realized with different version of Logo system.

In this paper we describe how work is organized with the students in class 6 at the end of the school year. At that time, students have already acquired many skills, as defined in the Framework Programme – learn how to work with folders and files (to copy, move, rename, etc.) to prepare and form a simple text, work with graphics editor, use the web services (find a text and visual information, add it to the wanted folder) to work with *LogoMotion* graphics and animation editor, *Imagine Logo* system to create new objects (buttons, Turtles), change their options, describe the procedures and simple events items, to create movement with the help of the commands.

---

<sup>1</sup> More on this project can be found at <http://www.mtp.smm.lt/>

<sup>2</sup> The programs define the state-level curriculum. Schools and teachers, in accordance with the Framework programs, develop school and classroom-level (according to their abilities) to achieve the best possible results (Curriculum framework for primary and ..., 2008)

## Project-game “Recycling”

### The idea of the project

Students with better skills on Logo system, using co-operative knowledge may develop advance projects, such as the creation of their favourite animated illustrations of literary works or to develop an interesting game.

An example of the project-game on ecological theme "Recycling". On the "scattered" display it is proposed to sort the waste – take every item which is given with a mouse and drag it into a suitable container. Object is emitted only if the container is chosen properly, otherwise it remains visible on the screen in place, which has been towed. Both containers and waste are represented by the Turtle with masks.

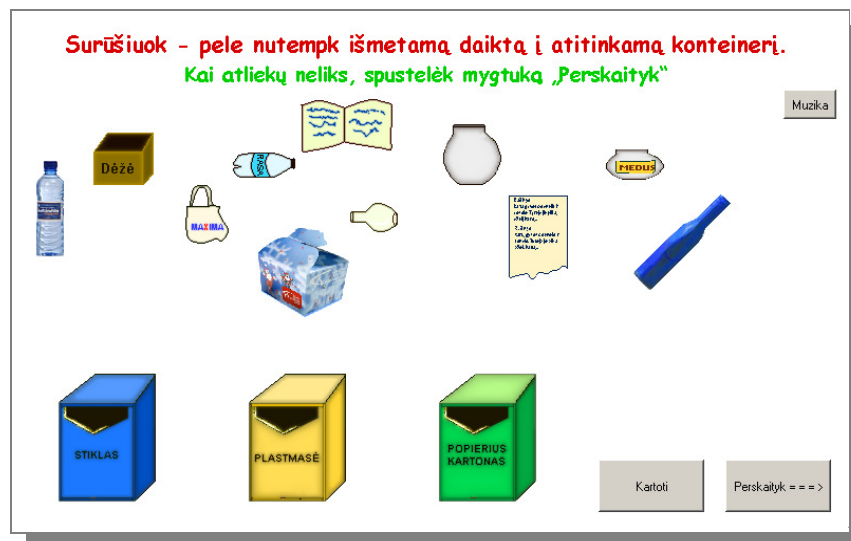


Figure 2. An example of the project-game "Recycling". The model shows how the waste should be dragged by the mouse into a suitable container

Such drafting may be integrated with the natural sciences and / or biology lessons. Before the start of the project preparation, IT teacher should consult the colleagues who teach children science or biology lessons that the importance of recycling would be discussed. Thus, together with teachers, students would learn how various waste is sorted, why is it necessary to do, what damage can be done to nature and the environment, without sorting waste. Students also can read more information about recycling on the specified websites. Lithuanian students used the information from the site "Do not be indifferent – recycle!" (<http://atliekos.am.lt>). The website provides explanations and tips. Analogical Logo project created by other students or teacher could motivate students to inquire about waste recycling and to prepare the project on that theme.

### Expected Results

Expected student achievement:

- Working in teams, students will be able to plan, prepare and present an integrated science project, demonstrating how to sort the emission of paper, plastic, glass items.
- Students will be able to describe the object for Logo items – for a sheet, Turtle or a button.

This project helps to develop not only skills of working with information technology, but also the social skills of pupils are taught (to assume responsibility for the overall result, to help for a class friend, to agree on a collective working).

The project is not complicated, but for one student it would take a longer time to prepare it. If students work in small groups, the final results can be achieved much faster.

### Work steps

This article describes how students' work is organized in pairs, when 3 lessons are devoted for the preparation of the project. The teacher should advice students to split into small groups, according to their wishes and abilities. If the number of students is odd in the classroom, one student with a teacher may consult their classmates on the subject (when giving the task for the student, the teacher should take into account the level of achievement and communication skills of the student) or in one group there will be only three students.

### The first lesson

- Before starting the work on the Logo system, the teacher explains the general principles of the project development and progress:
- necessary masks are prepared (recycling objects, containers);
- Turtles with the masks chosen by students (containers and recycling items) are laid out on the sheet;
- to describe events Turtles are used. Turtles will help to drag the "waste" in to appropriate containers.

**Start** procedure is described and **repeat** button is created.

It is necessary to emphasize the relevance of the Turtle-container names (for example, "cardboard", "glass", "paper") – they are used to describe an event **onLeftUp** hidden under Turtle mask which symbolizes recycling item. Example, if the event describes the commands **if overlap? [cardboard] [hideMe] [ ]** the waste will be thrown out (the Turtle will hide) when it is dragged by a mouse to the suitable container. That is why it is necessary to give a name for the Turtle symbolizing that container.

To make the work faster in the beginning a teacher could initiate all class-joint activities: each student could paint one element of sorting the waste or one of the containers for recycling. For this they can use the painting program or the Internet, then arrange the items (for example remove the background), to save as the Logo masks – several of the masks are shown in Figure 1-2. Students who work faster can prepare and adapt more pictures. Prepared masks are copied into a file which is accessible from any class computer and each group of students from this shared folder chooses images which they will later use in their work.

At the end of the lesson further work steps and the activities of the next lesson are discussed:

- student group (pairs) receives a package of measures – cards with a reminder (explanation) of steps of project;
- a teacher explains that at the beginning of the second lesson students will use these cards (if it is necessary use the teacher's assistance), will perform individual tasks, and then work together in pairs.

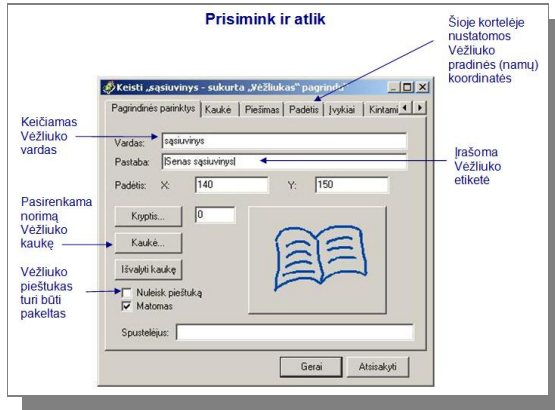


Figure 3. The card explaining student's work – to recall how and where Turtle's name must be changed, Turtle label is added, the initial (home) position is set, etc.

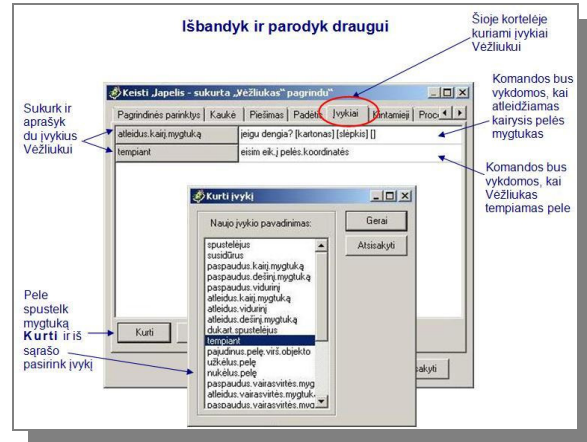


Figure 4. The card explaining students' work – how the Turtle's events are developed and described for the project.

## Second lesson

Individual work, which takes about half of the second lesson, is organized as follows:

- one student plans the Turtles (symbolizing recycling items and containers) layout on the screen (calculates coordinates which show the position of the Turtle mask on the Logo sheet); remembers how to change Turtle options – name, home position, etc.;
- the other student examines the events described in Turtle, enabling to realize dragging of the "waste" (Turtle with a mask) into the right "container" (which also is represented by the Turtle mask); these students get Logo design template, which has at least two Turtle containers with appropriate names, such as glass and plastic;
- if there is a small group, which has three pupils, a third member chooses information about sorting from the Web sites, predicts what links will be created into information sources from *Imagine Logo* sheet, remembers how to do it;
- teacher advises students who need help.

Later on, students working together use the produced information: change the options of every Turtle – give it a name (according to the mask it represents), indicate to raise the pen up, describes the events. To make the work faster the text can be copied from one ID card to the other making necessary changes.

After finishing those works not complicated procedure **start** is added to the project. This is needed to return Turtles into their "home" ("home" coordinates should be indicated in every ID card of Turtle options):

```

to start
  tell all
  penUp
  home showMe
end
    
```

**Repeat** button is created. In the ID card of this button the procedure **start** should be performed. When the button is pressed all the images of thrown away goods are returned to their "home" and can be recycled again.

### Third lesson

Third lesson is dedicated to presentation of the projects and discussions:

- every group of students is given questionnaires to discuss the work process (*Where we succeeded the most? What we failed this time? Why? What should we do differently in the future?*), achieved results (*If we succeeded in developing the project? What can we improve or add in it?*);
- the time is given to reflect and discuss issues (about 10 min.);
- each group should present their work and the results of their discussion;
- at the end of the lesson the teacher suggests to choose the most original, smartest, most realistic, etc. project. Even the smallest input of each student should be noticed because it raises learning motivation. That's why teacher should prepare various nominations in advance for all the groups.

### The opportunities of project development

A similar project development and organization could be performed differently: it depends on the class achievement level, students' abilities to work together, the number of lessons and the experience of the teacher:

- if students work in larger (3-4) groups and / or more lessons can be given for project preparation, the project could be bigger—more sheets could be created, animation, sound effects could be used. Figure 5 shows the eco-design, which contains information about the importance of recycling. There can also be added animated elements such as hedgehogs, caring bottles of mineral water to a waste container;
- more participants, students teachers, parents could be invited in to project presentation.

An example given in the article is described in the textbook of IT for classes 5-6 (Balvočienė, Kriščiūnienė, 2008), but these or similar projects are appropriate in the work with the higher classes. Then more complex Logo items could be adapted in the project and projects may be larger.

### Can we define learning in small groups as co-operative learning?

According to Bennett and others (2000), the key elements that separate the co-operative groups from the normal ones are: **a positive interdependence, individual responsibility, close interaction, communication skills assessment.**

The elements of co-operative learning in this project:

- **small positive interdependence of group members is formed** to achieve the same team goal (the aim is to finish the overall project), to use similar measures (every student gets a part of material for individual preparation), to be of the same importance for the group (when returning to a group work everybody presents their work done);
- every student in each group **is responsible** for the analysis of a piece of material and presentation of it to other group members (to other group members if it is not a pair work);
- discussion and presentation of the work prepared assures one more element of co-operative learning – **evaluation and assessment**. It is very important to highlight not

only a created product but also the process of work, so pupils are educated and students' co-operative skills are developed, learning motivation is being raised.

Of course, there is a possible range of situations how to prepare the project. However, in most cases remains the possibility of co-operative learning elements developing not only academic but also social skills of students.



Rūšiuokite namuose ir meskite į atitinkamus konteinerius prie jūsų namų!  
Jeigu rūšiavimo konteinerių nėra - kreipkitės į savo savivaldybės administraciją.  
Didžioji dalis panaudotos pakuotės atliekų, kuri gali būti naudojama kaip antrinė žaliava, patenka į savartyną. Todėl reikėtų jas rūšiuoti, kad būtų:

- sukaupiamos antrinės žaliavos, iš kurių galima pagaminti naujus produktus;
  - tausojami gamtos išteklių ir energija;
- sumažintas atliekų patekimas į savartynus ir kenksmingumas aplinkai:
  - pristabdytas miškų kirtimas, vandens bei oro tarša;
  - sumažintos buitinių atliekų tvarkymo išlaidos.

Popierinės nesuirusios atliekos savartyne išguli 2 metus. Vienas konteineris popieriaus išgelbės nuo kirtimo vieną medį.

Stiklas gamtoje sudulėja per 900 metų.

Irdamas ir deginamas plastikas išskiria daug nuodingų junginių, teršiančių orą, vandenį ir žemę. Plastiko pakuotės savartyne išsilaiko 200 metų.

PLASTMASĖ

< = Grįžti

Informacijos šaltinis interneto svetainė „Nebūk abejingas - rūšiuok“

Baigti = = >

Figure 5. Project-game "Recycling", the second page – a detailed information about the importance of waste sorting, the influence of not sorted waste on the environment, ecology is presented.

## References

- Balvočienė T., Kriščiūnienė N. (2008) *Projektų mozaika*. Informacinių technologijų vadovėlis V-VI klasei. Kaunas: Šviesa.
- Barrie Bennett, Carol Rolheiser-Bennett, Laurie Stevahn, (1991). *Cooperative learning: Where Heart Meets Mind. Educational Connections*, Toronto, Ontario.
- Curriculum framework for primary and basic (lower secondary) education* (approved by the minister of education and science of the republic of Lithuania, 26 august 2008, resolution no. ISAK–2433)
- Sahlberg P. (2004) *Mokymosi bendradarbiaujant principai*. / Sėkmingo mokymosi link. Serija „Į pagalbą mokytojams“. Vilnius: Leidykla „Sapnų sala“, pp. 53-62.