Third Misconceptions Seminar Proceedings (1993)

Paper Title: INTRODUCTION OF CONSTRUCTIVIST APPROACH INTO SCIENCE EDUCATION IN PRIMARY SCHOOLS IN SLOVENIA
Author: Oblak, Seta

Abstract: In September 1991 on the Pedagogical Faculty in Ljubljana, Slovenia, a Tempus project with the title Primary Science Development has begun in which pre-service and in-service education of primary teachers is being developed with the help of three institutions: Centre for Educational Studies, King's College, London, England; National Institute for Curriculum Development SLO, Enschede, Netherland; and Department for Didactics of Physics, Karlsruhe University, Germany. For in-service training, a 20-day course is being prepared by science teachers of the Pedagogical Faculty and advisers of the Board of Education which constitute the Tempus working group in Ljubljana.

Keywords:
General School Subject:
Specific School Subject:
Students:

Macintosh File Name: Oblak - Science Education
Release Date: 12-16-1993 C, 11-6-1994 I

Publisher: Misconceptions Trust
Publisher Location: Ithaca, NY
Volume Name: The Proceedings of the Third International Seminar on Misconceptions and Educational Strategies in Science and Mathematics
Publication Year: 1993
Conference Date: August 1-4, 1993
Contact Information (correct as of 12-23-2010):
Web: www.mlrg.org
Email: info@mlrg.org

A Correct Reference Format: Author, Paper Title in The Proceedings of the Third International Seminar on Misconceptions and Educational Strategies in Science and Mathematics, Misconceptions Trust: Ithaca, NY (1993).

----- -----

INTRODUCTION OF CONSTRUCTIVIST APPROACH INTO SCIENCE EDUCATION IN PRIMARY SCHOOLS IN SLOVENIA

Seta Oblak, Board of Education of Slovenia, Poljanska 28, 61000 Ljubljana, Slovenia

Data about the Tempus project

In September 1991 on the Pedagogical Faculty in Ljubljana, Slovenia, a Tempus project with the title Primary Science Development has begun in which pre-service and in-service education of primary teachers is being developed with the help of three institutions: Centre for Educational Studies, King's College, London, England; National Institute for Curriculum Development SLO, Enschede, Netherland; and Department for Didactics of Physics, Karlsruhe University, Germany. For in-service training, a 20-day course is being prepared by science teachers of the Pedagogical Faculty and advisers of the Board of Education which constitute the Tempus working group in Ljubljana.

In the first year, knowledge and experience in primary science research and teaching have been transferred from the countries of the European community to Slovenia, partly by courses given by experts from the cooperating institutions to the Slovenian Tempus group, partly by short visits of the Tempus group in England and partly by literature collected from abroad. In the second year, on the basis of this acquired knowledge and of the experiences and knowledge from the home country, the Tempus group has prepared several separate units of the course and tried them out with volunteering teachers from primary schools; at the same time, longer visits of foreign guests in Slovenia and of Slovene group members in the cooperating countries were carried out.

In-service course for primary teachers

In the 20-day science course, the Tempus group, with the help of foreign experts, tried to introduce to the teachers the constructivist approach and interactive method of teaching. The group was faced with several problems. Since it has about 20 members, their understanding of this task is not the same, and besides, they do not have enough experience to apply the new methods. The result is that the units vary very much from one to another, allthough this can have good and bad effects since teachers will get acquainted with the new methods of teaching in different ways.

A second problem in preparing this course was the amount of science education necessary for primary teachers. Until now, science courses for primary teachers usually included only science knowledge, science didactics, and activities for pupils. If new methods should be introduced, there is not much time left for traditional science teaching. The Tempus group tried to balance between these two components, and since different units were prepared by different members, scientists and non-scientists, in the total this goal was achieved at least partially.

The third problem is that science experts who are members of the Tempus group mostly do not have experience with children; they are used to work with pupils of a later age (from 13 on) or with students. This problem can partly be overcome by working together with primary school teachers and advisers.

The fourth problem is integration of biology, chemistry and physics, which in Slovenia have a long tradition as separate subjects. In lower secondary school already, these subjects are taught separately, and this means that at the university, the departments for these subjects are strictly separated and the cooperation depends only upon willingness and openness of people. In the Tempus group, experts for different subjects work together, yet the integration of the different subjects leaves much to be desired.

The fifth problem is the lack of materials for children in Slovenia. In a small country it is not easy to produce materials quickly, and it is also not financialy interesting. Besides, not long ago, only one textbook was prescribed for each class, and publishers are still used to publish the guaranteed number of prescribed textbooks. So, in preparing the course, the authors had to write not only material for teachers, but material for children as well.

After each unit was tried out once, a report was written and the authors are now preparing the material which will be given to the deliverers of the course. For each unit, there will be one repetitory trial with the help of a teacher who will prepare a lesson in the class; the deliverers have to be present at these repetitions. There will be several groups of deliverers for several regions of Slovenia; in each group, there will be about three to four members. Mostly, they are members of the Tempus group and they have worked on the course from the beginning. This work has not yet begun and we will see how the initial plans will have to be adapted.

The situation in primary schools in Slovenia

In Slovene primary schools, the traditional teaching approach prevailes in which teachers transfer the knowledge to the children who are mostly passive listeneres. In the last five years, university courses for primary teachers have been prolonged from two to four years and science was introduced as part of the programme. Together with it, also in-service science courses for primary teachers have been prepared, especially since a few years before more science was introduced into primary curricula. It must be mentioned that primary science usually deals only with the living nature, with nearly no chemistry and physics components. Even if these components are present in curricula and textbooks, they are left out because teachers do not feel confident to handle them. The greatest achievment of this process are planned science activities which are carried out by enthusiastic primary teachers; for these activities, pupils usually get very detailed instructions. Yet teachers are not really motivated to do this, because it means much extra work.

The traditional approach to teaching means that curricula are not goal-oriented, but centered on the content that must be taught in each lesson. For each year of school, one textbook is prescribed. Mostly, it is presumed that the textbook presents the prescribed content in the best possible way, and that teachers do not need to seek for different ways by which pupils could achieve certain knowledge. The result of such education is little interest of children; school for them is boring and not at all connected to the everyday life.

Most teachers are aware of this and are dissatisfied with their work, and so the climate for innovation in Slovene schools is very good. Many experiments are going on and are getting much official support. Yet such experiments mostly are not clearly defined; since the parol of the day is a "school friendly to the child", that usually means that the education is put into the second plan.

Concrete experiences from trying out the units of the course

Separated units of the course were first tried out in spring 1992; they were delivered by foreign experts and by members from the Tempus group. At first, primary teachers were invited who expressed special interest in taking part in them. After a short time, the word got round that these courses are very useful and interesting, and teachers and headmasters from different primary schools all over Slovenia asked to be included.

These teachers were then invited to the courses, yet not all to all of them because there were to many candidates.

These teachers got acquainted with children's preconceptions; they were informed how they should deal with children to learn their ideas. They were given instructions for collecting children's answers or drawings about some concepts, and then other children's preconceptions of the same concepts were presented to them. I have worked on the theme energy, and while inviting teachers to the course, I sent them some pictures with questions for children's interviews. Before questioning the children, they were asked to write their own opinions about the pictures. Some teachers were not willing to do it or they just did not understand the instructions, but mostly they cooperated. When answers were collected it was clear that teachers' ideas were similar to children's, with the additional trouble that earlier science education had left them some misconceptions of which they were not at all aware.

The problem arouse when it was necessary to analise the preconceptions of children. Mostly, teachers were quite satisfied with the idea about energy being the source of all activity, even mind activity, and they did not feel that any additional knowledge about this should be needed. Also, they wanted straight answers about what is right and what is wrong. They wanted to be instructed how to use all these informations they have collected, and were not satisfied only with arousing questions and uneasiness about their own teaching.

The next problem was that teachers are not used to target-oriented teaching which is the basis for all new educational methods. Mostly, they are not used to search for different ways to achieve the prescribed goal, but are satisfied with what the textbook offers them, since it is officially declared as good. This means much less effort, and only teachers who reflect about their teaching and are dissatisfied with the results of the traditional method are willing to try something new.

Teachers who have taken part in these Tempus courses were very satisfied. They at once reported about them to the headmasters, so that these courses very soon got very known in Slovenia. Second, the majority of these teachers prepared short repetitions for their colleagues at school. And third, they tried to use in class, first at science days and second at regular lessons, all the materials that were prepared for children, and to carry out the activities that were suited for children. These results are quite satisfying for the Tempus working group, allthough they do not mean that constructivist approach has

been already introduced into education.

Future planning

The course prepared by the Tempus group should ultimately change the teaching in primary schools.It is clear that for this purpose, the course alone is not enough. To encourage the teachers to try their newly acquired knowledge and skills in the class, the present situation must be changed in certain ways. The Tempus group has already discussed some of them, allthough this work will be mainly done in the future. First, some of the content must be left out from the curricula and attainment targets must be prepared. Second, in the classrooms all sorts of materials should be collected and kept in storage for use. Third, a new position of the science coordinator for the school should be introduced; this should be a primary teacher with special interest for science, whom the school will send to the new science course. Fourth, teacher centers should be developed where teachers will always get help in literature, materials and advices from advisory teachers.

Literature:

Materials recommended by foreign experts working in the Tempus project (projects SPACE, CLIS, APU etc., materials from SLO and Karlsruhe University)
Materials prepared by the Tempus working group in Slovenia