PILOTING MULTIDISCIPLINARY FIELDWORK PROJECT "FOREST"

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Abstract

In Latvia, a new curriculum is introduced to provide the opportunity to acquire skills in multidisciplinary context. To achieve that, schools need to implement projects. In this paper, one example of a multidisciplinary project where fieldwork is involved is described. The aim of the research was to create support materials for teachers and students based on practice to experience multidisciplinary fieldwork to develop competencies. In the end, thirteen different support materials for teachers and students were piloted.
Keywords: *multidisciplinary fieldwork, fieldwork project, school practice*.

Introduction

Starting in 2016, the project "Competency based Curriculum Development and Implementation in Education" started its activities, aiming at ensuring the piloting of the new curriculum of competency-based learning in accordance with the compulsory description of general education and introduction of the curriculum in pre-school, primary and secondary education. The reform of the curriculum that has been initiated is a continuation of the further development of the guidelines formulated in the curriculum for development of competences including fieldwork (LR MK, 2016).

New curriculum materials are being developed and piloted to provide the opportunity to acquire skills in a multidisciplinary context. In this paper, one of the examples of multidisciplinary project where fieldwork is involved is described. The aim of the research was to create support materials for teachers and students based on practice to experience multidisciplinary fieldwork to develop competencies.

Fieldwork, which can be defined as any curriculum component that involves leaving the classroom and engaging in teaching and learning activities through first-hand experience of phenomena (Boyle, Maguire, Martin, Milsom, Nash, Rawlinson, Turner, Wurthmann, & Conchie, 2007), has not a long range of examples in Latvian geography or biology subjects across the 14-19 age range. Also, before curriculum reform that was not mandatory for schools to implement (LR MK, 2006). This is despite the fact that it has long been known that well-conducted fieldwork can make a tremendous difference to the learning and motivation of studying, raise motivation, reduce anxiety about learning and encourage deeper rather than more surface approaches to learning (Amos & Reiss, 2012; Lambert & Reiss, 2016; Fisher, 2001).

Through fieldwork with authentic situation, student develops problem solving skills, critical thinking, attitudes, values, scientific literacy. This is one of the best ways to achieve competencies in sciences because it combines many skills and ends with

student competencies. There is abundant evidence to show that fieldwork is highly rated by students (Lambert & Reiss, 2016). A similar situation is happening in other countries (Fisher, 2001; Lambert & Reiss, 2016). Especially for these reasons, there is a need for good fieldwork examples for teachers to implement with their classes.

Research question: What are the benefits and risks for students and teachers in terms of content development according to the plan?

Research Methodology

To design the curriculum and materials, the research group worked for curriculum reform and noticed that biology and geography subjects needed an authentic problem situation where students could experience multidisciplinary fieldwork, a project where science fields merged together. To adapt the project for better implementation, the research group consulted and met professional forest rangers (Joint Stock Company "Latvia's State Forests" (LVM)) to formulate the problem situation, validate fieldwork methods, discuss needed forest polygons. Based on consultations with experts, our research team made the first base of support materials (detailed problem situation, instructions, visuals, for teachers and students). In 2018, from 6th May till 9th August the support materials for teachers and students were made.

Next phase was to use materials in practice. On 8th August 2018, a feedback from 73 teachers was collected through three questions: 1) What is good in materials? 2) What kind of questions appeared? 3) What needs improvement? Teachers admitted that this fieldwork example was a needed concept, it involved many subjects, was easily adaptable to classes, could reach needed main goals in subjects and showed fieldwork scientific methods. Teachers in process asked for detailed instructions step by step, a short video about methods, worksheets for students, evaluation examples and visuals of strategies used. Research team adapted materials for that and made needed support materials.

From 8th September till 15th November 2018, materials were adapted and piloted in two forest polygons - two schools, 48 students, 3 material authors were involved. After that in total 6 workshops, 5 presentations, one webinar was held for project popularization and to receive a feedback from more than 236 teachers about made support materials. From March to May 2019, five schools, twelve teachers, 156 students approbated support materials in three different forest polygons. Material authors advised them and collected feedback about what they gained and what needs to be improved.

Research Results

For the chosen fieldwork students needed to find explanation for a problem situation where two forests were landed in the same year, but human economic activity was different. In the end support materials were based on research question - how human economic activity affects forest stands wood stock, diversity of organisms and abiotic factors? All together different subjects were combined where specific knowledge and skills were developed, including the use of Geographical Information System (GIS) (see Figure 1).

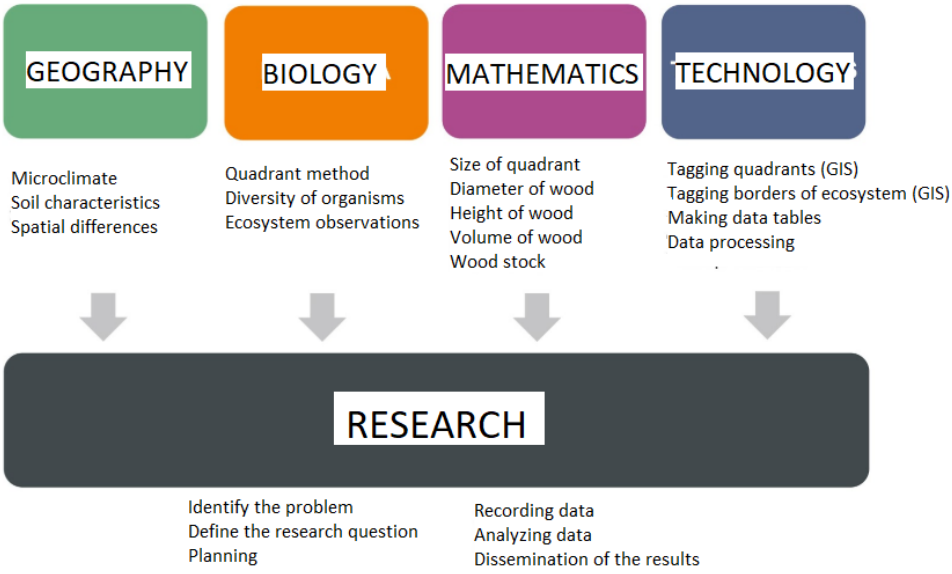

Figure 1. Fieldwork organization model and students' learning goals.

After every school practice feedback was collected from teachers and students, support materials were improved to be shorter and more visual. All together teachers needed a big support and step by step instructions about planning, implementing and analyzing phases. Based on that research group decided to make also an instructional video about used methods. The result is a collection of support materials for teachers and students to achieve complex goals through implementing multidisciplinary project in schools (see Table 1). These materials are based on practice and approbation, so they are safe to use.

Teachers acknowledged that this kind of fieldwork example is really needed especially for 14-19 age range. Also, teachers recognized risks why not to do it: money for transport, time to implement fieldwork, school support, professional knowledge about fieldworks. Similar situation and risks about project implementation are described in other countries (Lambert & Reiss, 2016). 96% of student answers correspond with research group proposed learning goals (see Figure 1).

Table 1. A list of made and adapted support materials for teachers and students.

For teachers	For students
The link between the research and the curriculum; Research steps; Example of a common theme planning; Conditions of research work; Output materials (GIS, forest stand history); Fieldwork description; Resource List; Instructional video.	Topic outline - to guide your learning; Reminders and strategies (soil profile drawing, research steps, quadrant method); Planning worksheets; Output materials (GIS, forest stand history); Evaluation rubrics for self-assessment (geography, biology, research, presentation skills, planning, data analyzing).

Student reflections showed that they found out more about different professions and scientific methods. They concluded that they saw connection between different science fields and how transversal skills were needed in different areas, that project raised their motivation to find out more about work in natural sciences. Other researchers have similar student responses (Lambert & Reiss, 2016).

Conclusions and Implications

This project provides an authentic, complex problem situation, which is a needed example for teachers to implement in schools in order to achieve newly designed curriculum learning goals.

Teachers need structured and detailed support about fieldwork methods – how to precisely measure woods stock and to do quadrant method, which are widely used in geography and biology. Our developed materials are detailed enough to achieve that.

Students concluded that this experience raised their motivation to learn, showed them connection between different science fields and how transversal skills are needed in different areas.

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