

Evaluation of Awareness and Implementation of Environmental Education in Teachers of Secondary Vocational Schools

Radmila Dytrtova¹ PhDr., CSc.; Karel Nemejc² Ing., Ph.D.

Czech University of Life Sciences Prague, Institute of Education and Communication
Czech Republic

dytrtovar@ivp.czu.cz¹; nemejc@ivp.czu.cz²

Abstract: Environmental education has its own specific significance at secondary vocational schools if it is directed to the future professional orientation of graduates. For the graduates of vocational schools with a focus on agriculture, forestry and related fields, the rate of professional responsibility towards the environment is high. General framework of environmental issues of vocational education is declared in so called Framework Educational Programme by the contents of the cross-curricular theme “The Human Being and the Environment”. The aim of the paper is to evaluate teachers’ awareness and the implementation of the environmental education programme at their schools and to specify competencies for areas of implementation of environmental education at vocational schools with a focus on agriculture, forestry and related fields of study. The target group consisted of teachers who were completing their qualification as a part of complementary pedagogical studies to become teachers at secondary vocational schools. To explore the outlined issues a questionnaire survey was conducted in the academic years 2015–2016 and 2016–2017. The results of the survey have been used to innovate the contents of the subject Environmental Education which is included in the curriculum of the study programme Specialization in Pedagogy for the fields of study focused on “Teaching of Vocational Subjects at Secondary Vocational Schools and Training Institutions” and “Teaching of Practical Vocational Training”, namely to clarify particular pedagogical categories in relation to environmental propaedeutics and in relation to the significance and objectives of environmental education.

Keywords: environmental education, vocational schools, evaluation, teachers, questionnaire survey.

Introduction

Nowadays, environmental problems are experienced worldwide. Solving them is only possible with people, who are knowledgeable about environmental issues, aware of such problems and motivated to solve them, respecting the rights of all living things and acting in accordance with the economic use of resources (Kandir, Yurt, Cevher-Kalburan, 2012; Ozsoy, 2012). To ensure environmental literacy in future generations requires educators who are equipped with knowledge, skills and commitment (Pe’er, Goldman, Yavetz, 2007; Karatekin, Imat, 2014). In the Czech Republic, environmental education at secondary vocational schools is provided on the basis of the Methodological Instruction of the Ministry of Education, Youth and Sports defining the fundamental concepts and, among other things, characterizing the role of school Coordinators of Environmental Education and their activities, as well as the conditions and means for implementation of environmental education. At secondary schools, environmental education should be based not only on the above mentioned Methodological Instruction and on the regional concepts of environmental education, but especially it should be a part of school education programmes which are created by schools on the basis of legally binding Framework Educational Programmes for individual fields of study. According to the State Programme of Environmental Enlightenment, Education and Public Awareness and Environmental Consultancy for the years 2016–2025 (Ministry of the Environment..., 2014) its general objectives are to develop the competencies necessary for environmentally responsible behaviour which is understood in personal, civic and professional spheres as a responsible environmental treatment based on a free choice of the individual. Environmental education itself should prepare and motivate the individual to do this.

Concerning *the implementation of environmental education at secondary vocational schools*, the general objective of environmental education has been divided into several areas or categories of aims as described by a working group of the Ministry of the Environment of the Czech Republic. The document of the Ministry of the Environment publishes five target areas of general content-defined (Broukalova, Novak, 2011): *the relationship to nature, the relationship to the place, ecological processes and rules, environmental problems and conflicts, and readiness to act in favour of the environment*. Within these categories, it is necessary to define the competencies to which environmental education and raising of

public awareness should focus. In our case specifically it is necessary to create them for the sphere of vocational education with a focus on agriculture, forestry and related fields of study.

The above listed categories should be reflected in the educational aims of school programmes of environmental education. According to the Ministry of Education, Youth and Sports, to ensure Environmental Enlightenment, Education and Public Awareness, the headmaster of the school assigns the position of a Coordinator of Environmental Education by a teacher who has completed a qualifying course (Ministry of Education..., 2015). The responsibilities of the Coordinator of Environmental Education include, above all, to ensure that the headmaster and other teachers are informed about the significance of environmental education, to create a school education programme for environmental education, to organize and direct its implementation, or to establish cooperation with centres of environmental education. The implementation of environmental education at schools as such should be based on a developed programme which is to be a part of the school concept. The school should enable the coordinator further education in this issue. Further education is also appropriate for other teachers since if teachers are effectively trained they can effectively change future generations' environmental attitudes (Ozsoy, 2012). All these measures are related to equipping schools with the necessary means to implement the environmental education programme and gradual ecologisation of school operations.

The extent to which the aforementioned plans are being implemented at schools is evidenced by a number of meetings of coordinators of school programmes of environmental education. The plans can only be realized on the willingness of the teachers to make conscious targeted cooperation with the coordinator, and as well it depends very much on the position of the coordinator in the team of teachers.

As regards *the content of environmental education at secondary vocational schools*, environmental education should approach the environment in a comprehensive way - both natural and man-made, it should be interdisciplinary, and it should pay attention to global, regional and local aspects and present and future situations. Such an education should deal with environmental development and growth from the environmental point of view, it should lead to active participation in the prevention and solution of environmental problems, and it should emphasize the following: *interest, feelings, knowledge, skills, attitudes and participation*.

Educational aims within the Framework Educational Programme for environmental education are implemented at secondary vocational schools using the cross-curricular theme "*The Human Being and the Environment*" (Svecova, 2012). The result of the implementation is to be a student's understanding of the links between the various influences in the environment and human activities, impacts on health and life, understanding of the interrelationships among local, regional and global environmental problems, a student's understanding of the context among environmental, economic and social problems and understanding of the importance of respecting the principles of sustainable development for the future. The cross-curricular theme "*The Human Being and the Environment*" also contributes to the formation and development of key and professional competencies.

Key competencies are formed by the students being encouraged to express themselves, to argue, to present their opinions and attitudes to environmental issues. At the same time, to respect the opinions of others, to be able to evaluate, to use information technology resources and to be able to process information. They are led to involvement in the creation and protection of the environment. *Professional competencies* are acquired by vocational school students by learning to consider the use of technologies and working practices due to their possible impacts on the quality of the environment and by forming their awareness of their own professional responsibility towards the environment. Respecting the principles of sustainability in their field means to act economically and responsibly towards the environment and human health (Dytrtova, Bucharova, Husova, 2006).

The implementation of environmental education requires, in addition to securing the educational content, a new teacher's approach to teaching. It is necessary to use interdisciplinary contexts and the way of teaching based on the stimulation of students' interest by appropriate motivation and students' involvement in the educational process by the integration of activation methods (Esa, 2010). According to R. Dytrtova, V. Bucharova and Z. Husova (2006) it is possible, in general, to characterize the implementation of environmental education as a process giving preference to the systemic thinking of students. Besides cognitive learning it also integrates experiential learning with an emphasis on emotional and aesthetic perception of the environment and environmental issues. It is a process focused

also on students' activity in the field under local conditions and responsive to the state of the environment in specific situations.

As seen from the above mentioned, it is necessary to integrate the environmental propaedeutics into the preparation of teachers for their future profession. In our case these are complementary pedagogical studies to become teachers at secondary vocational schools. Especially, the methods and forms of teaching that teachers could apply in their practice in order to activate students in the way of the fulfilment of the mentioned educational aims are essential. In practice, this means involving teachers in the planning of school projects, the creation of educational trails, practicing interactive methods and forms of teaching (problem teaching, debating and staging methods, experiments, field exercises, and so on), and to show teachers how to use the internet in the context of environmental education and how to establish cooperation with centres of environmental education (Dytrtova, Bucharova, Husova, 2006; Kandir, Yurt, Cevher-Kalburan, 2012; Sadik, Sadik, 2014).

The aim of the paper is to evaluate teachers' awareness and the implementation of the environmental education programme at their schools and to specify competencies for areas of implementation of environmental education at vocational schools with a focus on agriculture, forestry and related fields of study. The target group consisted of teachers who were completing their qualification as a part of complementary pedagogical studies to become teachers at secondary vocational schools. To explore the outlined issues the questionnaire survey was conducted.

Methodology

In the context of the assessment of environmental literacy of students and teachers of secondary schools it is possible to draw inspiration from the outcomes of the research already realized both in the Czech Republic and abroad (Pe'er, Goldman, Yavetz, 2007; Harraway et al., 2012; Svecova, 2012; Jowett et al., 2014; Karatekin, Imat, 2014; Stevenson et al., 2014; Cincera, Johnson, Kovacikova, 2015; Cincera et al., 2017). There have been developed methodologies at the Ministry of the Environment of the Czech Republic according to which the environmental literacy of different categories of respondents can be followed in a research survey.

We were interested in the above outlined issues at secondary vocational schools. *The target group* comprised teachers completing their qualification as a part of complementary pedagogical studies to become teachers at secondary vocational schools. Actually, this meant that they were students of the Institute of Education and Communication of the Czech University of Life Sciences Prague of a part-time form of study of bachelor study programme "Specialization in Pedagogy", in the field of study focused on "Teaching of Vocational Subjects at Secondary Vocational Schools and Training Institutions". Of the total number of 156 students (vocational subjects teacher candidates) interviewed, 37.18 % (N = 58) declared that they worked in the role of the teacher, with the length of teaching practice from 1 to 34 years (mean 8.38 years). The remaining 98 students stated that they had not yet taught and therefore they had no teaching experience. Thus, *the sample of the exploratory survey consisted of 58 teacher-respondents*.

An anonymous questionnaire was used as a method of data collection. An online questionnaire survey using Google Forms was conducted at the beginning of winter terms of the academic years 2015–2016 and 2016–2017 to find out teachers' awareness of the implementation of the environmental education programme at the schools they work. The questionnaires were filled in by the respondents in the presence of the researchers at the very beginning of the Environmental Education course in order to ensure 100 % response rate of the responses and to avoid distortion of the data due to influencing the knowledge and attitudes of the respondents while teaching the course during the semester. Educational technologies of the institution were used for this purpose.

The questionnaire concerned both the application of environmental awareness of the teachers in their teaching and their views on environmental matters. Given the focus of this paper, the following three questions were selected of the ten open-ended questionnaire items:

- *characterize environmental education with your own words;*
- *describe how you implement environmental education in teaching your subject, if you do so;*
- *indicate if the school you are working at has a Coordinator of Environmental Education, and what his/her tasks are.*

The data were analysed and processed regardless of the gender, age and length of teaching practice of the respondents. Summarization of the data enabled an insight into the investigated issue and subsequently to interpret the findings detected. Representative opinions and recommendations of the teachers that emerged from answers to given questions and suggestions are presented in the following Results and Discussion section.

Results and Discussion

Specification of competencies of target areas focusing on agricultural, forestry and related fields

The five target areas of implementation of environmental education of the general content were provided by the document of the Ministry of the Environment (Broukalova, Novak, 2011). As for vocational education, in our opinion based on the statements of respondents and on our long-standing experience, the realization of environmental education at secondary vocational schools focused on agricultural, forestry and related fields of study could lead to the following specific profiling of the graduates:

The relationship to nature is essential for graduates of vocational schools with a focus on agriculture, forestry and related fields for the performance of their profession. Due to the permanent contact with nature, the acquired sensitivity to changes in the natural environment and the clarity of one's own attitude in relation to natural values is assumed.

The relationship to the place and the sense of responsibility is assumed in the graduates of vocational schools due to the knowledge of the professional and often also the private sphere of activities of the graduates. This relationship should be professionally based on the knowledge of the regional landscape, which is connected with the consciousness of belonging to the place and with the sense of responsibility for the quality of being in the given locality.

Ecological processes and rules are a part of the content of education of scientifically professional orientation of vocational schools. It is therefore possible to assume the professional awareness of the graduates of the mentioned study specializations.

For *Environmental problems and conflicts*, students can be prepared by means of staging methods, problem and project teaching, and the like. The result maybe one's own required engaged solution to the problem and its defence, and preparation for professional cooperation.

The readiness to act in favour of the environment is very closely related to the profile of the graduate of vocational schools. In particular, graduates should be able to assess the future impact of their professional acting and they should be aware of their own influence on the prevention and solution of environmental problems.

Evaluation of secondary vocational school teachers' awareness of environmental education

The other section of the questionnaire contained one of the questions dealing with *teachers' awareness of environmental education*. The question was formulated as follows: *Characterize environmental education with your own words*. Looking at the results, it is satisfying that approximately 86 % (N = 50) of the teacher respondents were able to answer the question in a meaningful way and furthermore that they outlined the essence of environmental education. Most of the expressions within the respondents' statements concerned the following examples relating to environmental education: *environment, education, nature, relationship, protection, behaviour, man, co-responsibility, waste, treatment, responsibility, state, ecology, friendly, access, care, thoughtful, prevention, quality, savings and health*.

Examples of representative subjective statements of the respondents are as follows:

"Environmental education deals with the relationship of pupils to the environment, to nature, to their surroundings and to the whole of the Earth. Its purpose is to make pupils aware of the environment, nature and a positive attitude towards them." [Respondent 5]

"Ecological education." [Respondents 12, 21, 43]

"It is upbringing towards the harmony of man with the environment. It should serve to understand the contexts and complexities of human and environmental relationships." [Respondent 18]

"I understand environmental education as an educational effort that aims to increase people's co-responsibility for the state of the environment." [Respondent 25]

“Environmental education is a subject dealing with a relationship of man to nature and the environment. It is a great inspiration for me to protect the environment and to care for the cleanliness of the environment.” [Respondent 32]

“It is an education that aims to lead pupils to a responsible environment. I can think of topics such as energy saving, renewable and non-renewable resources, the ozone hole, climate change, or environmental pollution.” [Respondent 34]

“It is learning about nature, about the relationship among nature and humans and other organisms, knowledge of minerals, sources of livelihood for man.” [Respondent 56]

From the statements it can be concluded that the majority of teachers have a satisfactory awareness of what environmental education is and it can be assumed that teachers have met with environmental education at their secondary vocational schools or they are convinced of its importance.

Evaluation of implementation of environmental education programme in teachers of secondary vocational schools

Unlike the previous section of the questionnaire, which found out the theoretical awareness of secondary vocational school teachers, the following section focused on so-called *activity component (actions) in environmental education*. Here, the question was as follows: *Describe how you implement environmental education in teaching your subject, if you do so*. It was found that 75.86 % of respondents (N = 44) implemented environmental education in teaching their subjects. On the other hand, up to one quarter of the respondents do not engage environmental education in their subjects, as in the case of e.g. respondents 12 and 57, which is quite an alarming finding. Others, for example, mentioned the use of ecological approaches in their fields, the use of documentary films, the sorting of waste, visits of ecological centres, excursions, the economical use of foodstuffs, the ways of oil disposal, the welfare of farm animals, discussions with specialists in teaching, and the like. Below there is a selection of representative teachers' expressions with relation to their specialization.

“I point out ways of organic growing without pesticides.” [Respondent 3, Horticulture]

“I teach pupils how to treat nature, in order to continue to provide us with the best, whether crops in the fields, as well as animal production.” [Respondent 10, Farmer]

“I do not realize it, I do not think I could integrate it into teaching my subject.” [Respondent 12, Zoology]

“I teach about organic food and natural medicines.” [Respondent 16, Human nutrition]

“Every Friday we take out sorted waste, and we discuss something about the protection of the environment with the students.” [Respondent 20, Joinery and carpentry]

*“We use environmentally friendly materials and paints. We recycle, we use waste material to produce decorations, we sort waste. In the school education programme there is a cross-curricular theme *The Human Being and the Environment*.”* [Respondent 25, Services - arranger]

“Yes, I do environmental education, since my pupils are working with metals, and it is necessary to throw metal scrap into the designated containers (separating common metals from the coloured ones), and the common waste must also be sorted (paper, plastics).” [Respondent 28, Blacksmith and locksmith work]

“In greenery, we draw attention to the possibilities of using environmentally friendly approaches to cultivation and thereby reducing the volume of pesticides used.” [Respondent 33, Horticulture]

“I encourage my students to save water, electricity.” [Respondent 35, Repair of agricultural machinery]

“We sort waste, we do not waste materials used during practical training.” [Respondent 42, Arrangement of plants]

“I do not use it directly in my subjects.” [Respondent 57, Forestry]

“We use wood material, we compost organic waste.” [Respondent 58, Horticulture]

Very brief answers of the respondents to the question related to their own realization of environmental education indicate their significant reserves. In such teachers it will be necessary to guide them to a willingness to analyse and think about the content of the subject they guarantee, to look for contexts related to environmental issues, or to use interdisciplinary contexts.

Coordinator of Environmental Education and his/her tasks

In the last section of the questionnaire the teachers were asked to *indicate if the school they were working at had a Coordinator of Environmental Education, and what his/her tasks were*. When looking at teachers' statements it can be found that practices at secondary vocational schools vary, probably according to the concept of their School Education Programme. Respondents' answers showed that 27.59 % of schools have an Environmental Education Coordinator, 37.93 % of schools do not have them and 34.48 % of the respondents stated they did not know. From the latter figure it is evident that about a third of the respondents do not have an overview or are not interested in school matters at all, which is not a positive finding. Similarly, the views of teachers on the functions and tasks of coordinators vary, too. In summary, the respondents perceive the coordinator as a teacher who, in addition to teaching activities, together with the school management draws up an environmental education plan, monitors its implementation, contacts other schools and different organizations, encourages environmentally friendly operation of the school, and organizes school waste sorting. However, such a coordinator ensures educational actions aimed at raising a responsible relationship to the environment. Particular statements of the respondents are presented below.

"We do not have a coordinator. They should provide educational events; encourage environmentally friendly operation of the school, collecting paper, PET bottles, collecting herbs, and others." [Respondent 11]

"Our school does not have an environmental education coordinator. They should organize collections of paper and waste sorting at school or organize environmental events." [Respondent 13]

"We do not have an EE coordinator. The coordinator should create an EE school programme and he should update it regularly. He should coordinate and implement EE events at school (ecological projects on important days, lectures) and link environmental education to all possible subjects so that the children learn about it as much as possible." [Respondent 14]

"Our school does not have a Coordinator for Environmental Education. My idea is that he or she should spread awareness amongst pupils about behaviour in nature and also about recycling." [Respondent 16]

"Yes. We have a coordinator. He provides training for teachers and pupils in occupational health and safety, prevention from smoking and drugs. He takes care of school facilities and surroundings." [Respondent 20]

"A Coordinator of Environmental Education? I hear for the first time about this position, and I cannot imagine what they should do. Maybe they should organize various events such as excursions, Earth Day, workshops. Of course, they should also teach." [Respondent 23]

"Yes. We have the coordinator. His job is to coordinate environmental education, as the title suggests. He should integrate cross-curricular themes into educational programmes, develop pupil competencies, and promote active engagement of pupils in environmental care." [Respondent 26]

"Unfortunately - our school does not have an EE coordinator. His or her task would be to disseminate environmental education - e.g. in the form of billboards, leaflets, lectures, and mainly by introducing practical things that will help to respect the principles of ecological behaviour and awaken the pupils' efforts to get involved." [Respondent 35]

"We do not officially have the position of a coordinator at school, but a natural science teacher is actually doing this job. Even, this school year it is me. I plan various talks, lectures, visits to the topic of education to environmental protection. I organize waste sorting." [Respondent 44]

"We have an Environmental Education Coordinator, coordinating environmental activities. She supervises resource efficiency. She also participates in the formation of strategy and organization"

with an emphasis on the ecological side of teaching. She cooperates with the control authorities for the environment.” [Respondent 50]

The statements illustrating respondents' views on the role of the Coordinator of Environmental Education assume the quality of environmental propaedeutics at individual schools. Some responses are based only on respondents' view of the position of such a coordinator, as many schools do not have any coordinator. Our findings are consistent with the statement of M. Svecova (2012), who reported from her own experience, that only less than half of vocational schools have a Coordinator of Environmental Education.

Conclusions

The results of the exploratory survey show that:

- concerned it can be assumed that teachers have met with environmental education at their secondary vocational schools or they are convinced of its importance;
- for teachers who do not implement environmental education in their subjects or are not sure how to integrate it into their teaching it is essential to support and guide them to a willingness to analyse and think about the content of the subject they guarantee, to look for contexts related to environmental issues;
- as for the function of the Coordinator of Environmental Education the situation at secondary vocational schools has not improved significantly in recent years; in our survey, the presence of the coordinator at secondary vocational schools was confirmed by less than a third of the respondents; not everyone had a clear idea of the role of such a coordinator;
- results of the analysis of individual responses of the teachers contributed to the innovation of the course Environmental Education which is a part of the curriculum of the study programme Specialization in Pedagogy for the fields of study focused on “Teaching of Practical Vocational Training” and “Teaching of Vocational Subjects at Secondary Vocational Schools and Training Institutions”, especially to clarify individual pedagogical categories in relation to environmental propaedeutics and to the importance and objectives of environmental education;
- in the context of teacher training, it is necessary to show examples of optimal environmental education school programmes and to deal with the possibilities of application of the cross-curricular theme “The Human Being and the Environment” into the content of vocational and practical subjects;
- it is desirable to include teaching methods and forms in teacher training to help teachers motivate and activate students to enhance their professional and personal pro-environmental orientation;
- it is advisable for headmasters to recommend Coordinators of Environmental Education specialization studies reflecting the focus of their workplace (secondary vocational schools).

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