https://doi.org/10.46403/Komplexpedagogia.2025.47

AN ONLINE QUESTIONNAIRE TO ASSESS THE ENVIRONMENTAL ATTITUDES OF PRIMARY AND SECONDARY SCHOOL CHEMISTRY TEACHERS

DÓRA VANCZER VLASZÁTSNÉ DR.
Doctoral School of Education Sciences, Eszterházy Károly Catholic University

Abstract

Teachers in primary and secondary schools pay great attention to the importance of environmental education and do their best to set a good example for their students inside and outside the classroom. Environmental attitude surveys play an important role in the research on environmental education. The development of appropriate environmental attitudes is one of the main goals of environmental education (Thiengkamol, 2011; Lükő, 2003). The greatest challenge facing humanity today is to avoid that the functioning of human civilisation changes the physical, chemical and biological environment of humanity to such an extent that these changes threaten the existence and sustainability of human civilisation itself. Environmental thinking and education consist of a sense of responsibility, an environmentally aware attitude, appropriate knowledge and skills. The role of the family, parents, teachers and teacher training institutions is crucial. A good teacher can develop an environmentally aware approach in their pupils by using appropriate professional knowledge, methods and skills, creativity and experiential teaching. Children are open to the world, curious and receptive, and the most important thing in education is to satisfy their inquisitive eyes and imagination. The aim of our research is to investigate changes in the environmental attitudes and behaviour of primary and secondary school chemistry teachers participating in the Environmental Education Experiments (CEE). The research will be conducted using an online questionnaire. The questionnaire is a 30-item, five-point Likert scale questionnaire for chemistry teachers. The questions are taken from three different attitude measurement questionnaires adapted to Hungarian: the ENV, RevNEP and CHEAKS questionnaires.

Keywords: environmental education experiment series, attitude survey, environmental awareness

Introduction

The starting point for the research problem of my doctoral thesis was NAT 2020 and the Covid epidemic. As a chemistry teacher, my aim is to develop an environmentally aware and experiential approach to environmental education, using food and cleaning products in the household, and to make experiments at home more widespread for primary and secondary school students. One of the means to achieve this is to carry out a series of experiments that I have designed to promote environmental education, combined with digital literacy.

Along these lines, I conducted a student and a teacher input/output questionnaire survey, the main aim of which was to examine the existence of environmental attitudes and the extent of their change in a sample of 800 students, while they were carrying out the above-mentioned home chemistry experiments I designed, from October 2023 to June 2024.

The aim of my study was to assess the development of environmental attitudes of primary and secondary school teachers in Hungary over a one-year period.

Aim and methodology of the study

My hypothesis is: What characterizes the environmental attitudes of domestic chemistry teachers?

Elementary and secondary school teachers pay great attention to the importance of environmental education and do their best to set a good example for their students in and out of the classroom. In addition, one of the practical aims is to develop a series of experiments in environmental education to help develop environmental awareness and attitudes among primary and secondary school pupils, to train teachers to carry out environmental education tasks and to test the method in classroom practice.

The other practical objective is to study changes in the environmental awareness and attitudes of chemistry teachers participating in the environmental education experiment.

I will investigate changes in the environmental attitudes and values of chemistry teachers participating in the environmental education experiment. According to NAT2020, we need to improve, we need to act, and this can only be achieved through emotional engagement.

The survey of chemistry teachers was conducted using an online questionnaire. The input questionnaire was launched in October 2023 and the output questionnaire will be completed in June 2024. The results of both the input and output questionnaires are examined over the course of an academic year. The input questionnaire consists of 30 questions, a series of questions on a six-point Likert scale. The questions are taken

from three different attitude measurement questionnaires adapted to the Hungarian language: the ENV, RevNEP and CHEAKS questionnaires. I processed the results using the statistical program SPSS.

800 students from 12 schools participated in the study, and the schools are located in different counties. 8 of the schools are Eco-Schools. Their aim is to develop an environmentally conscious attitude in the school setting and to recognise that economic, social and ecological processes are interdependent.

The 30-item questionnaire was categorised into three components of environmental attitudes: action, knowledge and emotion, with 9 questions on emotion, 12 on action and 9 on knowledge per category.

Method for processing attitudinal results

The six-point Likert scale used in the questionnaire had the following options: strongly disagree, disagree, partially agree, agree, strongly agree, don't know. For each item, the most environmentally friendly response scored 6 points and the least environmentally friendly response scored 1 point. The attitude scale also included reverse items where the response 'strongly disagree' received 6 points and 'strongly agree' received 1 point.

Results of the environmental attitudes survey

In his book National Environmental Education Strategy (1998), David Attenborough said the following about environmental education, and reaffirmed the importance of teachers' attitudes towards the environment. This is a guide beyond its time, which will begin to mature with NAT2020, where children will be expected to recognise the potential of chemical problems in everyday life, and to contribute to solving them as far as they are able, and to consider the options and alternatives.

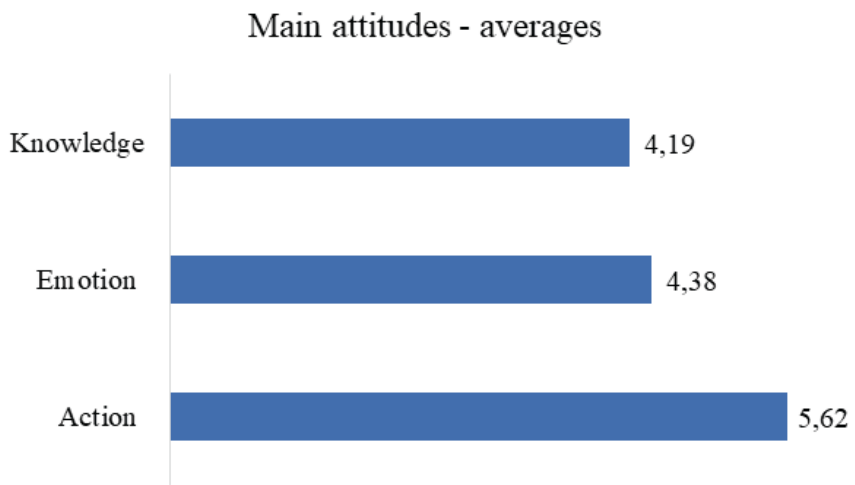
Environmental education is a crucial component of science education, as it helps students develop an understanding of the complex issues facing our planet and the role they can play in addressing them. However, the success of environmental education programs depends heavily on the knowledge and attitudes of the teachers who implement them.

This study aimed to develop an online questionnaire to assess the environmental attitudes of primary and secondary school chemistry teachers. The questionnaire was designed to measure teachers' awareness of environmental issues, their beliefs about the importance of environmental education, and their self-reported behaviors related to environmental protection.

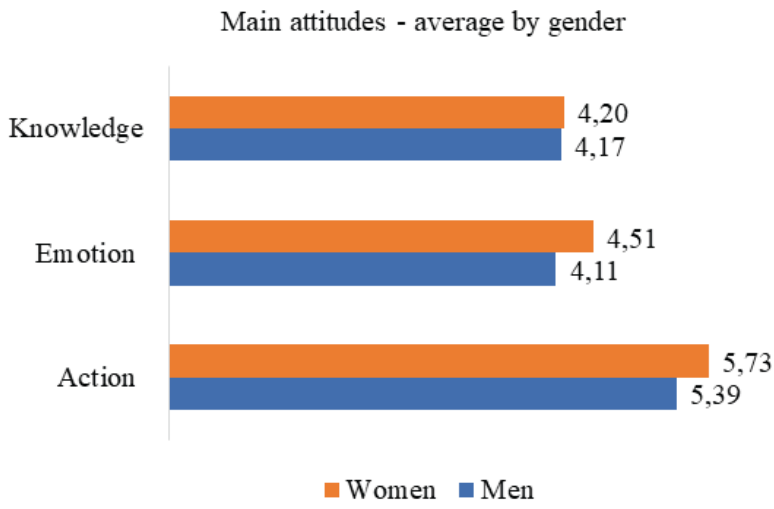
The development of the questionnaire was informed by previous research on teachers' environmental knowledge and attitudes.(Said et al., 2003; Than, 2001) Studies have found that many teachers, even those teaching environmental topics, have significant gaps in their understanding of key scientific concepts related to the environment.(Summers et al., 2001) Additionally, teachers' own environmental values and behaviors can shape the way they approach environmental education in the classroom. (Chordnork & Yuenyong, 2018)

To address these issues, the questionnaire included sections on the following topics: 1) teachers' awareness of major environmental problems and their causes, 2) teachers' beliefs about the purpose and importance of environmental education, 3) teachers' self-reported environmentally-friendly behaviors both at home and at school.

The questions in my questionnaire were grouped into 3 characteristic groups: emotion, knowledge and action. The average of these is shown in the graph (1. figure), as well as the average by gender (2. figure) and the average by school (3. figure). The first figure clearly shows that knowledge is quite outstanding, while emotion and action are close to similar.



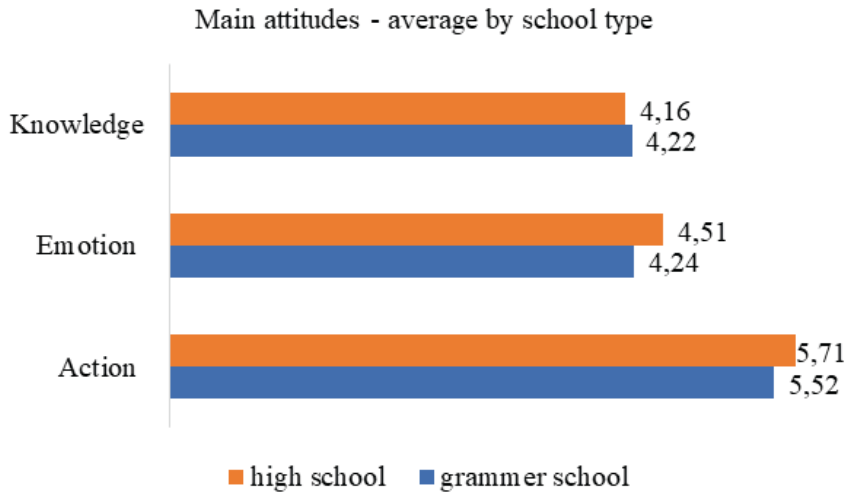
1. Figure: Main attitudes - averages



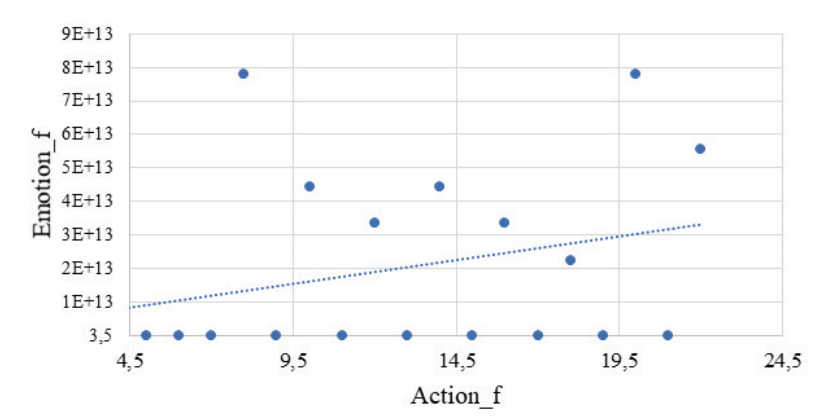
2. Figure: Main attitudes - average by gender

Interestingly, it is observed that action is outstanding according to the 3 groupings, which represent a higher capacity for solidarity, empathy, inclusion, reflecting the emergence of the female analogy. Which helps to approach the environment.

According to the pedagogy of action, our internal (mental) actions are formed through our external, i.e. action actions. So we need to have not only concrete sensory, perceptual experiences (as the pedagogy of contemplation states), but also action experiences in order to increase our knowledge, develop our skills and abilities.



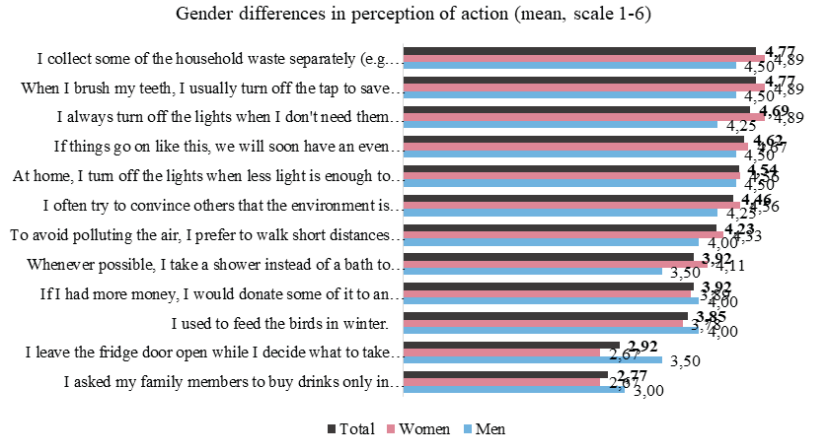
3. Figure: Main attitudes - average by school type



4. Figure: Correlation between emotion and action

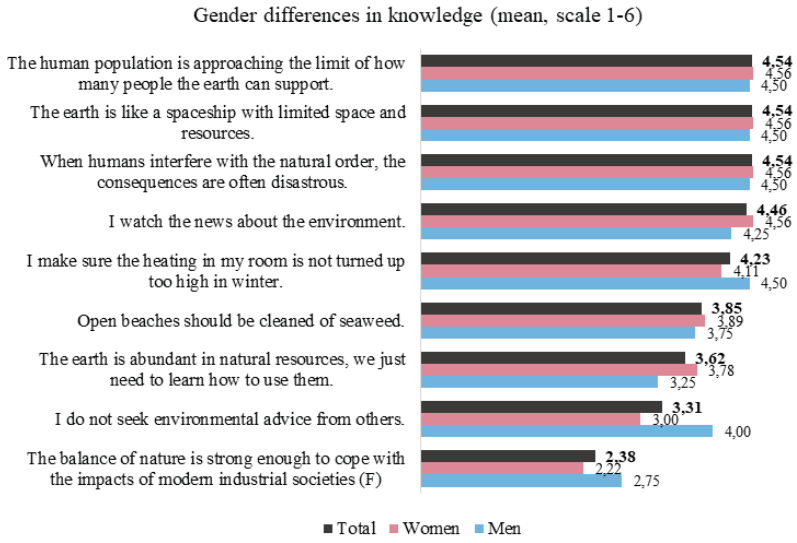
Without emotional commitment, there is no environmental education and the capacity to act, no will to do. Environmental competences are the "capacity to act", i.e. to act in an environmentally conscious way, by taking into account the protection of the environment and sustainability aspects (Figure 4.). Thus, the primary goal of education today is to develop competences and to educate environmentally aware citizens, using environmental education extended to include sustainability.

Figure 5. clearly shows the gender differences in the performance of the action, with women having a higher performance than men. This is more indicative of the female analogy.



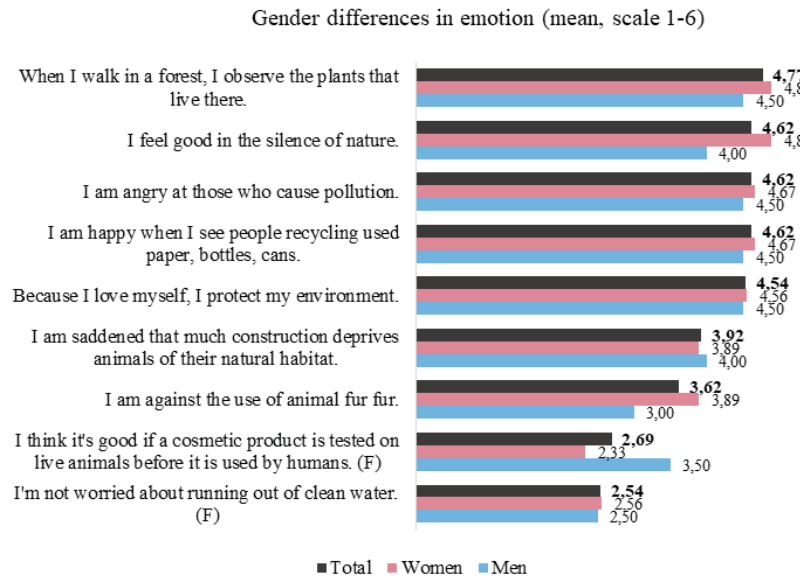
5 Figure: Gender differences in perception of action (mean, scale 1-6)

Figure 6. shows gender differences in knowledge. Here the proportion of male and female responses is almost equal, with no significant difference.



6. Figure: Gender differences in knowledge (mean, scale 1-6)

Figure 7. shows the gender differences in emotion. The teacher's characteristics determine the nature of emotional experiences, and emotions are involved in activating the emotional threshold of the individual. As well, the emotional culture of the school community influences the way individual teachers manage emotions.



7. Figure: Gender differences in emotion (mean, scale 1-6)

Summary

In response to the research question of what characterises the environmental attitudes of Hungarian chemistry teachers, the research thesis is that the teaching community is indeed action-oriented and practice-oriented.

The series of experiments I have created to support environmental education are designed to transmit this emotional engagement, action and knowledge to children.

Teachers have the opportunity to raise a generation of children who will lead them to recognise how they can change their future, their environment, and thus create a more sustainable future.

Reference

Born, B. (2021. November 11). *Gyermekpszichológia*. Forrás: Mindset pszichológia: https://mindsetpszichologia.hu/a-tanulas-csodaja-elmenypedagogia-az-iskolaban#

Chordnork, Y. (2018). Understanding primary school science teachers' pedagogical content knowledge: The case of teaching global warming; *AIP conference proceedings,* 2018;
https://doi.org/10.1063/1.5019505

Csíkszentmihályi, M. (2009). *Az öröm művészete (Flow a mindennapokban).* Budapest: Nyitott Könyvműhely.

D.A., K. (1984). Experiential Education Experience as the Source of Learning Prentice.

Daren, J. C., Christoph, G. S., & Andrea, S. (2020. September). Practical science at home in a pandemic world. *Nature Chemistry*, 780–783.
https://doi.org/10.1038/s41557-020-0543-z

Fidelio. (2020. 08 31). *Fidelio/MTI*. Forrás: https://fidelio.hu/plusz/a-szabad-gyerekneveles-anyja-maria-montessori-150-eve-szuletett-157474.html

Karpudewan, I. R. (2012). Ensuring sustainability of tomorrow through green chemistry integrated with sustainable development concepts (SDCs); *Chemistry Education. Research and Practice*, 2012; Volume 13, Issue 2, Pages 120–127;
https://doi.org/10.1039/C1RP90066H

Kozéki, B. & Berghammer , R. (1991 2. szám). Az Empátia és az impulzivitás motivációs és nevelési aspektusból. *Magyar Pedagógia*, 131–149.

Lovász, K. (2005). Élménypedagógia (a teljességre nevelés művészete). In L. Károly. Szeged: Lectum Kiadó.

Molnár, K. (2016). Élményalapú környezeti nevelés. *Tanulmánykötet Mészáros Károly tiszteletére* (pp. 69-73.). Nyugat-magyarországi Egyetem, Benedek Elek Pedagógiai Kar Társadalom-, Szociális és Kommunikációtudományok Intézet .

Molnár, P. (11. évf. 2. sz. [2013. nyár]). Töprengések az élménypedagógia fogalmáról. *Magiszter*, 90–94.

Nagy, J. (2007). *Kompetencia alapú kritériumorientált pedagógia.* Szeged: Mozaik Kiadó.

Nagy, S., Bencédy , J., Kiss , Á., & Ágoston, G. (1976). *Pedagógiai Lexikon.* Budapest: Akadémiai Kiadó.

Nahalka, I. (1995. 3-4. szám). A természettudományos nevelés és a tudományelméletek. *Magyar Pedagógia*, 229–250.

Permanasari, A., Hamidah, I. & Adriany, V. (2020). Low Carbon Education: *How Students from Lower Level Education Pertain the Good Environment Practices* 2020; https://doi.org/10.2991/assehr.k.200513.037

Said, A. M., Fakhru'l-Razi, A., Paim, L. H. & Masud, J. (2003). Environmental concerns, knowledge and practices gap among Malaysian teachers; *International journal of sustainability in higher education,* 2003, Volume 4, Issue 4, Pages 305–313 https://doi.org/10.1108/14676370310497534)

Sallai , É. (2015/07). *Legjobb motiváció az élménybe vonás.* Budapest: Pedagógiai folyóiratok.

Summers, M., Kruger, C. & Childs, A. (2001). Understanding the science of environmental issues: development of a subject knowledge guide for primary teacher education; *International journal of science education*, 2001; Volume 23, Issue 1, Pages 33–53;
https://doi.org/10.1080/09500690116990

Thân, N. T. (2001). Awareness of Vietnamese Primary Schoolteachers on Environmental Education; *International research in geographical and environmental education*, 2001; Volume 10, Issue 4, Pages 429–444;
https://doi.org/10.1080/10382040108667456