



UNIVERSITY OF WEST HUNGARY
FACULTY OF FORESTRY
KITAIBEL PÁL ENVIRONMENTAL SCIENCE DOCTORIAL SCHOOL
ENVIRONMENT PEDAGOGIC PROGRAM

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**THE PEDAGOGICAL METHODOLOGY OF THE
ENVIRONMENTAL MEASURING IN THE PROFESSION
EDUCATION**

PhD thesis booklet

Consultant: Dr. habil Lükő István

Sopron
2010.

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1. Introduction

The experience studying and ICT (Information and Communications Technologies) using have been estimated in the environmental breeding and education between its ordinary aims and activities. The environment-technics and measuring of several environmental parameters are in centre of curriculum especially in the high and intermediate educations of the environmental specialists.

An environment specialist can solve real problems, he need to know the monitoring of the environmental elements. He has to know the technics of the sampling from the water, the air, the soil, the waste, etc., and the felicitous classical and instrumental analytical methods.

He has to know the evaluation of the measuring results and the standards because of the limit values. Student's competences have been able to develop with the expansion of the theoretical and the tutorial knowledge and activities to do the professional measuring. That's all are in the nature of curriculum.

The modern studying cannot spare integrated using of the computer so the ICT is very important in the teaching-studying of the measuring. Especially a measuring-accommodations which can visualize high-technical, with inter-face (we can read and store the results).

In the professional bibliography have been missing the environmental methodology for the engineer-, and profession-teachers in the intermediate environmental education.

This PhD Thesis is the first step to compensate this deficiency, that disclose the theoretical background, the monitoring of the real conditions in professional and pedagogical-methodology in the schools.

The chosen theme is in the integration of the technician-, and breeding-science that raises the specialty methodology of the technician-technological breeding from the ordinary pedagogical approach.

2. The aim of the search

The aim of the search is to disclose requirements, curriculums of the environmental methodology from qualifications of the National Training Catalog. To analyze the conditions of the students and teachers in the environmental measuring - technics. By right of the aim, and results we have made a chapter of a methodology course book and a study-aid for the profession-, and engineer-teacher.

3. The subject of the search

The aims compose such as function-system that meant research-matter on diversified areas by several methods. These are the next topics as assignment:

- Digestion of requirements, curriculums of the environmental methodology from qualifications of the National Training Catalog.
- Audit, that the environmental-measuring-technical how appear in the modular-system of environmental qualifications. Their inside subject-matters, and topics.
- Studying of the professional bibliography of the professional and theoretical background of the measuring; of the professional activity, species; of the division of the analytical measuring and its methodology.

- Studying of the measuring as activity of the students and teachers, as brains, mere activities, as experience-study and project-work in the ordinary pedagogical-didactics context.
- Measurement of the instruments of the environmental technical colleges, in empirical audit of the student and teacher activities in the chosen schools. (Applied methodologies, adaptation of the ICT, course book using, motivation, etc.)
- Teacher directions of the simple and the most important instruments.
- Curriculum of moving graphics and its efficiency assay for the teachers.
- Efficiency assay between a “conventional” and a “high-technical” instruments.
- Writing a chapter of a methodology course book by the conclusion of the results of the empirical research.
- Also by the results of the research writing a study-aid for the profession-, and engineer-teacher with visualizations of the topics.

4. Questions and problems of the research

1. Have been more effective develop of the environmental measure-competences by the using of modern and intelligent instruments and its attachments?
2. Does the digital bag help multi-faceted preparation of the students? (Not only during the measuring and the evaluation, but during the back-up, documenting and using the technical of the presentations.)
3. Is necessary a faster and simpler evaluation, presentation of the measuring results during the intermediate education?
4. How didactics methodologies do the teachers use during the instruments practical lessons?
5. Is necessary the diagrams using during the instruments practical lessons?
6. How didactics methodologies do the students expect during the instruments practical lessons?
7. Is necessary the interactivity during the education of instrumental measuring?
8. Are the moving graphics efficient both in the teaching and the studying?

5. Hypothesis of the research

1. The complex systems of the environmental protection mean compound educational and pedagogical exercises in the vocational training. Opening of the technical literature of environmental measuring help the complex organization of teaching-studying, the expansion of the culture of methodology.
2. The studying of curriculum of the environmental technician by National Training Catalog is indispensable, because the rate of number of theoretical and practical lessons and the competence areas determine the functions, direction, and topic of professional methodology. By our hypnotize, the analysis of the matched documents (NTC, SZVK, Training Programs) help the methodology of such teaching-studying, which is built the activities.

3. Account of modern instruments and ICT has been increasing in the ordinary education, and the environmental vocational training too. By our assumption teachers prefer the conventional accommodation in turn students prefer the modern instrument and actions. The latter make more effective and efficient the education and the study.
4. In the curriculum of the environmental measurement there are a lot of elements, which deal with the construction, functional principle, adaptation, and function of the instrument. The visualization can bring along a breakthrough in these curriculums. The interactive moving graphics can increase the base of the motivation; the comprehension and the acquirement can be more quick and efficient.
5. The pedagogical, professional preparation can be helped greatly by a methodology book and the teacher-guides.

6. Methodologies of the research

- Assay of the documents to know the theoretical background information of the didactic methodologies and measuring of the experience study
- Studying of educations, curriculums, requirements of environmental professions
- Processing of the profession bibliography with the theoretical of the measuring and instrument
- Quantitative measurement in printed form with closed questions, and anonym filling by students and teachers.
- Efficiency assay of the instrument using between the conventional and the modern digital bag by the students and their measurement and study results.
- Efficiency assay of effect of visualization moving graphs.

After the processing of the items we used the next methodologies:

- Statistic assay, percentile distribution of items
- Quantitative measurement, answers of the students and the teachers and appraising assay of the verbal interrogation

7. Issues and conclusions of the research

1st. Thesis: We have systematized the aspects and several structures of the environment education. We have made overall tables of the curriculums, which are not concluded in NTC. These tables help the pedagogical aspect, because they contain the epitomes, educational elements, and methodological parameters of the structures (1st. supplement in the dissertation). We have disclosed - over ordinary cognitions of environmental measures – its system, types and relationships with its organizations. We have found that the classification, methodologies and elements of the analytical measurement has been processed in the most comprehensive and profound way in the national course books. We have arranged the types and application areas of the intermediate vocational training in tables. So we would like to help to the vocational teachers in the making of the curriculums and the developing of the student's competences. (3.2.2. Chapter in the dissertation)

2nd Thesis: We have found the environmental trades in the NTC, set out their intersection in the measurement subjects. There is a table in the 2nd supplement, which contains the number of theoretical and technical lessons in the measurement. The units of the curriculums segments to elements, which gives identifier numbers and particular description of the skills, competences, activities, training-period and places. By the reason of impoundment of the theme the curriculums of environmental measurements have been analyzed from previous divergences and modules. The audit of output requirements gives useful pivot for the methodology construction (in the 3rd supplement). These contain the measuring activities, the environmental technical instruments, which gives the base for the moving graphics.

3rd Thesis: One part of our empirical assay have leveled at the survey of instruments of the training schools, the other one has analyzed the relation of teachers and students during the conventional and modern (with ICT) measurements. By results, we can say that teachers prefer the conventional methodologies during the introduction of the instruments and the conceptual knowledge that can not explained by the absence of instruments. On the one hand digestion of the instruments has shown disharmony, for another thing we have been able to establish that the conventional instruments available in force, the instruments of the complex measurements available in small number and they are not recent. An efficiency survey of the modern accommodation has proved that it can give more efficient and fast measurement like using of a conventional instrument (in the 4th Chapter in the dissertation).

4th Thesis: After systematize of the measurement we have chosen those themes, which demand special presentation in a way of the available, parameters, instruments of the measurement. By the help of the Macromedia Flash Program we have visualized the more instruments of the water-, air-, and solution-monitoring. In the themes of the environmental technical we have made the efficient assay by the moving graphics of the air cleaning-instruments. By this assay we can say, that these moving pictures help the association abilities, the study of their theoretic, part and function of the instrument, and they are one of the most motivation supporting in the theoretical education. These results have based our assumptions, because between the motivations the visualization has increased the speed of the teaching has helped the faster acquirement and thinking (in the 4th Chapter in the dissertation).

5th Thesis: The teacher guides have been made for the simple instruments and accommodations of the Multimedia- and Environmental Methodology Lab in the University of West Hungary, the Benedek Elek Pedagogical Faculty, and Professional Teacher training Institute. These guides give a pedagogical aid in these themes: subject, categories, and relationships with other subjects, elements, motivation, competences, methodology, aims, studying situation, and necessary instruments and matters. Along with all a measuring chapter of a professional methodology book has been in edit, its content is contained in the dissertation. This chapter is absence-remount for engineer and professional teachers. Its independent study-aids have been useful and effective during the training of engineer teacher.

8. The practicability of the results

The intermediate education has to give a qualitative knowledge, so the deep instrument-cognition is indispensable. Not every technical college can get the every instrument for their students, so teachers and pupils have to use the tools of ICT. The learning by ICT is more effective, and the pupils solve the problem easier, and their minds are developed. The immediate feedback is materialized by ICT. It can help the cooperation studying, because it effaces the teacher, and gives place for the pupils.

New didactical methodologies should have been added in the technical colleges that the projector and interactive table are used not only for projection of pictures of course books but for the demonstration and practice too.

The program of the research can give an interactive method in every school where there is not interactive table. So the “detrimental” places will have not been at disadvantages, and a new, opener and deeper vocational training can start at the protection of environment.

The estimate of the recognition of the social and informatics interaction is very important because the informatics have been converting the whole society, and people can feel good in this variable world if they understand the changes and their inducement.

The prepared and applied methods, guides of the research:

- Describes of the instruments of the Multimedia-, and Environmental-methodology Labor (Its topics: measuring parameters, mechanisms, functional principles)
- Teacher-guides (Its topics: subject, topic, relationship, motivation, competences, method, aims, attitude of studying, tools.)
- Moving pictures of the environmental-instruments and theoretical topics of the technician exams (9, 11, 12, 14, 17, 18. themes.) and its efficiency assay
- Moving pictures of the theoretical subject of the measurements.









9. Limits an further exercises of the research

Every intermediate age-group can use these methods of the research, and any teacher can study them without any new courses. The using of these methods are not forced for anybody, so it's up to the engineer-teachers' opened skills.

These questionnaires and methods in the dissertation is a convenient basic. The installment of the research is a longitudinal assay, so we need a punctual configuration of the data and system, that we use them all technical colleges and in superlative educations in the country too. The interactive program has been able to extend to software for the interactive tables, that the activities would have been faster.

10. The publications of the candidate in the theme of the PhD. research

Conference books with ISBN number

-  Márföldi A. (2007): The international assay of the relationship the forest and the protection of the environment the society between the intermediate age-group. Sciences for the Environmental Breeding Conference Book, University of Wes Hungary, Sopron pp. 157.
-  Márföldi A. (2008): Presentation of the pedagogical roles of the environmental measuring by the instruments of Multimedia-, and Environmental-methodology Labor. International Protection of Environmental and Development of Region Student Conference Book. Szolnok College, Mezőtúr pp. 70.
-  Márföldi A. (2008): Presentation of the pedagogical roles of the environmental measuring. Trust for the Future Study volume, Komárom pp. 64-73.
-  Márföldi A. (2008): Pedagogical methodology of the environmental measurement in the profession training. National Searcher Teacher Conference Book, Fellowship of National Searcher Teacher Budapest. pp 28.
-  Márföldi A. (2008): The pedagogical methodology of the protection of the environment especially the environmental measuring in the profession education. VIII. National Breeding-Science Conference issue, MTA, Budapest, pp. 192.
-  Márföldi A. (2008): Didactical tips for the themes of the technician exam. Conference Book. University of Wes Hungary. Sopron pp. 87.
-  Márföldi A. (2009): Integration of some curriculum of the natural science to the environmental education. IX. National Breeding-Science Conference issue, Veszprém, pp. 228.
-  Márföldi A. (2010): The new aspects of the environmental methodology. Teaching, education, Life long learning Conference issue, Breeding Science Fellowship, Budapest, pp. 55.

Inland conference performances

- ❖ Márföldi A. (2006): The international assay of the relationship the forest and the protection of the environment the society between the intermediate age-group. TDK school exercise, Sopron
- ❖ Márföldi A. (2007): The international assay of the relationship the forest and the protection of the environment the society between the intermediate age-group. Sciences for the Environmental Breeding Conference, Sopron
- ❖ Márföldi A. (2008): Presentation of the pedagogical roles of the environmental measuring by the instruments of Multimedia-, and Environmental-methodology Labor. Environmental Trust for the Future Conference, Komárom.
- ❖ Márföldi A. (2008): Presentation of the pedagogical roles of the environmental measuring by the instruments of Multimedia-, and Environmental-methodology Labor. International Protection of Environmental and Development of Region Student Conference, Mezőtúr.
- ❖ Márföldi A. (2008): Pedagogical methodology of the environmental measurement in the profession training. National Searcher Teacher Conference Győr.

- ❖ Márföldi A. (2008): The pedagogical methodology of the protection of the environment especially the environmental measuring in the profession education. VIII. National Breeding-Science Conference, Budapest.
- ❖ Márföldi A. (2008): Didactical tips for the themes of the technician exam. Renaissance of the Environment in Science and Breeding Conference. Sopron
- ❖ Márföldi A. (2009): Integration of some curriculum of the natural science to the environmental education. IX. National Breeding-Science Conference, Veszprém

Learned journal

- Márföldi A. (2009): Measurements in the environmental profession training. In: Szakoktatás 59./2009/7. pp. 15-20.

Others:

Márföldi A. (2008): Environmental measurements In: Compiler Dr. Lükő I.: Course book of environmental methodology Szaktudás Publisher Plan during advent, 95 pages