

The guide about the innovative strategies and methods for Vocational Education and Training related to efficient and ecological use of resources

THE PERIOD OF THE PROJECT: 2013-2015

LLP LEONARDO DA VINCI PARTNERSHIP PROJECT

"INNOVATIVE METHODS AND STRATEGIES IN VOCATIONAL EDUCATION AND TRAINING FOR EFFICIENT USE OF RESOURCES AND ENVIRONMENTAL PROTECTION "(INOVES)



PARTNERS :



SC TRAINING CONS 2005 srl – coordinator, Romania



IMPULSA IDEAS, S.L, Spain



Asociacion USIT, Spain



District Governorship of Sultanhisar, Turkey



Association "European Values Institute", Bulgaria



National Agricultural Advisory Centre in Brwinow, Poland



Bolu Provincial Directorate of Environment and Urbanization, Turkey



Department of Biology, University of Florence, Italy



Vocational High School of Mechanical Techniques, Bulgaria

This project has been funded with support from the European Commission This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein

**Coordinator of the guide : SC TRAINING CONS 2005
srl,Iasi,Romania**

- ❖ **Materials from the guide was arranged and assembled by
Solcan Florica Mihaela ,from SC Training Cons 2005 srl
,Romania**
- ❖ **Cover of the guide was realized by Zarka Toncheva ,
Vocational High School of Mechanical Techniques,
Bulgaria**

Description of Innovative Training Methodology used in developing *Topic Environmental problems* from Training Pilot Course for Environmental Engineers and Workers on Renewable Energy Sources

Author: Valia Dankova, European Values Institute, Bulgaria

Introduction: The Module: “Environmental problems - Common issues. Ecological problems of the RES” is the last training module of the training course for environmental engineers and workers on renewable energy sources. It has dual purpose: to introduce the training content of the module and to summarize the content of the whole training and hint further practical applications of it. That is why we have chosen the following combination of training methods: presentation and Knowledge Café.

Objectives of the Module:

- To improve the competencies of the target group, related to the efficient and ecological use of Renewable Energy Sources;
- To perfect the knowledge of environmental engineers and workers on renewable energy sources;
- To discuss and exchange experience in special problems concerning different methods of application and usage of the renewable energy sources (RES)
- To raise awareness about the ecological problems related to the use of RES, the specific legislation related to it and to share good practices in avoiding it.
- To summarize the content of the whole training and hint further practical applications of it.

Training Materials: presentation, flipchart paper, coloured markers

Training Methods: Presentation, Knowledge Café

Duration: 2 hours

Participants: 15-17 people – environmental engineers: local authority representatives and representatives of non-governmental organizations.

Period of implementation: October 2014, Sofia, Bulgaria

Introduction to the training content:

The Module “Environmental problems from Training Pilot Course for Environmental Engineers and Workers on Renewable Energy Sources” is the last module of the training course for environmental engineers and experts in RES and environment.

Content: Ecological risks related to the use of different RES and how they are measured; European legislation governing the ecological aspects of using RES; Good practices in diminishing the ecological risks..

Annotation:

Solar Energy

The construction of energy sites, which use renewable sources of energy, may cause serious ecological problems. For example land sites, which are perfect for building of solar electricity plants, can begin a process of rapid depletion of water resources (see Ecological Internet portal [EcoGeek](http://ecogeek.org/) - <http://ecogeek.org/>).

Similar conflicts between "solar energy projects" come up ever more often in California, USA. The solar power plant needs plenty of water for cooling, while in dry areas where such power plants are being built water resources are not large. Powerful solar stations can use more than 500 million. gallons (about 2 billion. liters) of water a year and in the wastelands of California at the moment there are 35 such large plants. Moreover, the technology of "dry cooling" which uses 90% more water than "wet cooling", is much more expensive, which reduces the efficiency of the solar power plant.

This situation results in a constant battle of "solar" companies with state regulators not only for the price of electricity produced by them, but also for the water which their plants. So you another battle for the preservation of the land should start. The best solution would be to develop a new cooling technology that does not require a lot of water or reduce the efficiency of solar power projects.

We would like to remind that according to European Commission provisions by 2020 the proportion of energy derived from renewable sources should reach 20% share of the total electricity consumption.

Photovoltaic and solar systems are part of the RES, but so far the price (determined by the regulator State Comision for Energy and Water Regulation – in Bulgaria) for the energy to receive from these systems is highest. According to the Bulgarian Photovoltaic Association (BFA), which comprises 17 companies producing and installing such systems, photovoltaic systems have significant advantages in the expected price reduction. In the future, they will be a serious competitor of wind farms, biomass plants and other renewables.

Emissions from large hydropower plants

Practically the production of electricity from water power plants does not issue any direct greenhouse gas emissions, which is why this type of electricity is allocated directly to the energy derived from renewable sources. But speaking globally this type of production also generates indirect greenhouse gases which for the large hydropower plants in Bulgaria range between 37-39 kg CO₂ / MWh.

Emissions from wind and photovoltaic power plants

Like hydropower, electricity generated from wind and solar energy power plants does not lead to the issuance of direct emissions of greenhouse gases. But actually speaking, production and construction of this type of energy facilities also generates indirect emissions of greenhouse gases, according to various international studies ranging: Wind power plants ~ 23 kg CO₂ / MWh and solar power plants ~ 20-25 kg CO₂ / MWh .

In determining the aggregate greenhouse gas emissions in the electricity a single indicator is commonly used - in this case it is accepted this to be the Emission intensity expressed in kg CO₂ / MWh (or g CO₂ / kWh). In order to determine it all factors affecting the production of electricity, and the proportion of each type of electricity generation capacity in total gross production are taken into account.

The total carbon dioxide emissions (direct and indirect) in the production of electricity (kg CO₂ / MWh) of the electricity generating capacities in Bulgaria according to the type of primary energy are shown in the table.

Primary energy source	Direct emissions	Total emissions
Coal (lignite and brown)	1100÷1250	1300-1500
Imported coal (black and	1000	1200
Nuclear fuel	0	60
Natural gas	400	440
Water energy	0	39
Wind energy	0	23
Solar energy	0	18-25

According to research conducted by the European Renewable Energy Council, EU energy demand for electricity, heating, cooling and transport can be provided at 100% by renewable energy. Achieving this goal is not only a question of technology but also a to a large extent a question of political will and long-sighted policy of energy.

RES is governed under Directive 2009/28 to promote renewable energy sources. It sets the general framework for the development of the sector in the EU, including EU-wide target to increase the share of renewable energy to 20% of total final energy consumption by 2020. In connection with these requirements for producers of electricity from renewable energy the following is provided:

- Priority connection to the network.
- Guaranteed purchase of electricity produced.
- Guaranteed returns through preferential prices of electricity.

Reducing greenhouse gas emissions and the development of environmental energy at home can be achieved mainly through:

- Improving energy efficiency in the production and consumption of energy;
- Development and deployment of clean coal technologies in power plants and process equipment for the capture and storage of carbon dioxide;
- Improving efficiency of the production and reducing losses in transmission and distribution of energy through modernization and diversification of electricity production;
- Introducing incentives and mechanisms for direct use of renewable energy in households and industry by building smaller plants on the roofs and facades of buildings connected to the local "smart grids."

Conclusion:

Energy production is one of the vital sectors of the economy. Regardless of the transformation and disturbances facing our economy, energy takes its leading position in its general structure.

The analysis of the environmental impact of electricity generation in Bulgaria shows that at present our national energy system can not be defined as ecological. This is mostly due to the structure of the electricity in the country. It currently prevail and thermal coal plants (with a share currently over 51%), which are the biggest source of greenhouse gases - CO₂, SO₂, NO_x. Exactly the largest share of electricity generation in Central Bulgaria in coal power plants determines the high value of the emission intensity - 555 g CO₂ / kWh (2008) and the value of the ecological equivalent set for final energy consumption of 683 g CO₂ / kWh. The National Energy Strategy of the Republic of Bulgaria for 2020 sets for a decrease of emission intensity to 156 g CO₂ / kWh.

Detailed description of the methodology:

1. Presentation:

- **Goal:** to introduce the new training content for the module
- **Content:** Ecological risks related to the use of different RES and how they are measured; European legislation governing the ecological aspects of using RES; Good practices in diminishing the ecological risks.

2. World Cafe:

- **Presentation of the method**

“Knowledge Café”

Brief description of the method:

“Knowledge Café” is a good method for generation of ideas, gathering of information from the group and discussion or summing up the training content at the end of a training.

The Knowledge Café has minimum 3 tables, respectively 3 groups of trainees (of minimum 3 people each group) and 3 tasks. Every table is assigned a task. Minimum number of trainees for the method 9. Optimum number of trainees 12-16 in max 4 – 5 groups.

For example if the method is used to summarize training content at the end of a training day - Each group or table has the task to summarize everything important that they have learned, know about or think of, concerning the assigned topic (task). For example: what methods they know, when is one or the other appropriate to use and s.o.

The trainees are divided into groups of minimum 3 people. Each group has a table in the Knowledge Café. The group chooses one host of the table – this is the person that never changes place but stays at the table and summarizes all the ideas. The group works together on the topic for a session of 10-15 minutes. Then all the people except the host from table 1 move to table 2, from table 2 to table 3 and s.o. and they work again for a session of 10-15 minutes on the next topic. The cycle finishes when everyone except the host has been on every table.

Then the groups have 10-20 minutes to summarize all the information that has been gathered on their table. Finally one representative of each table /usually the host/ presents the results to all the trainees.

Teaching goals / Suggestions for use:

- method for generation of ideas
- method for bringing larger number of people into a dialogue
- to share experience
- summing up the training content at the end of the training
- method which: helps to share knowledge, stimulate innovative thinking, explore possibilities

Classroom and materials: the size of the classroom depends on the size of the group. There must be tables – the same number as the number of groups with chairs around them, like in a café. The people will move from table to table, so space for rotation will be needed. You can put on each table a flipchart paper and markers, which the group will use to present the results of their work.

Duration of the lesson:

- To divide the groups and **explain the method and the tasks** - about 10 Minutes.
- 15 minutes for each **round** – totally 15 min., multiplied by the number of tables
- For the groups to **summarize** their work – 10 to 20 Minutes
- 10 minutes for each group for presentation and discussion

Total time: depending on the number of groups and tasks – 1,5 – 2,0 hours

Applicability for the subject:

The method is applicable to a large variety of training situations.

No. of participants: optimal.: 12-16 people, modifications of it can be used also for larger groups

- **Goal:** to summarize the training content of the course, to provoke generation of ideas, to provoke thoughts about practical application of the training content, to provoke discussion and exchange of ideas between the participants.
- **How it was applied:**

The participants were divided into 4 groups of 4-5 people. Each group was assigned to a table. Each table had to work upon one of the following RES:

- Photovoltaic
- Small water power plants
- Windmills
- Biomass installations

Each table had the following questions to answer about the assigned topic:

1. Describe the main characteristics of the energy source
2. Identify the main prerequisites for using it
3. Identify the ecological problems that may be created by using it
4. Generate ideas on how to avoid these ecological problems and/or diminish them

All the people except the table hosts worked on each table for 15 minutes. Each host presented to work on his/her table to all the participants for 5 minutes.

Innovative strategy for learning farmers to use the resources efficiently during strawberry farming

Author: Gulhan Kucuk, from Sultanhisar Governorship, Turkey

TOPIC of THE the leasson : THE METHODS OF PLANT NUTRITION IN STRAWBERRY CULTIVATION

General objectives of the pilot course organised:

- Farmers can recognize that strawberry farming is an important agricultural area for small and medium farmers
- Farmers can identify which plant family strawberry belongs to
The farmers know its homeland and the parts of strawberry fruit
- They know the types of strawberries which have buyer markets.
- The farmers can presents the properties of strawberry cultivars which are grown in Turkey and marketed their seedlings.
- The farmers will be able to apply the good agricultural practices in Europe and the certification and the importance of the GAP / GLOBAL GAP.

Concrete subjects of the pilot course organised:

THE METHODS OF PLANT NUTRITION IN STRAWBERRY CULTIVATION

- Soil and leaf analysis?
- Natural Fertilizers:
 - Barnyaed manure
 - compost manure
 - green fertilizers

Actors involved:

- Governorship of Sultanhisar
- Public Education Center
- Strawberry Import Company
- Sultanhisar Agricultural Credit Co-operative
- Emiroglu Logistics, Hothouse, Transport, Food, Industry and Trade Limited Company
- number of the participants of the course:35
- number of the teachers:1

What we do?

1. We help to recognize Good Agricultural Practices on strawberry farming in Europe and in the world
2. They recognize that strawberry farming is an important agricultural area for small and medium farmers
3. They are able to tell the properties of strawberry cultivars which are grown in Turkey and marketed their seedlings
4. Assist the progress of the qualifications and standards of GAP in the world
5. Help to compare national methods and techniques in using the sources efficiently in farming with the other partners?
6. Helps to integrate the good practices and get information about the methods in strawberry agriculture
7. Help the proper dissemination of the farmers' and agricultural engineers and experts' experiences and practices through Europe, provide better knowledge management
8. To get information and experience of best practices to develop their knowledge on using the sources efficiently on strawberry farming and the contents of chemical fertilizers and applying effectively on the right time.

Starting from the priority of LLP to enhance the contribution of education and training to the objectives of the Strategy Europe 2020, we need to improve the outcomes of education and training. The New Strategic Framework for European Cooperation in Education and Training ("ET 2020") supports the Europe 2020 strategy to "increase resource efficiency" because resource efficiency will be the key to securing growth and jobs for Europe and they will provide a qualitative life. Starting from this point, we would like to focus on the cooperation between VET institutions and the world of work in Europe, to involve partners from both sides in order to search new working strategies and fields in this area.

Before two hours of the course, we have to put ourselves some questions about the course participants, such as:

1. How well are the course participants on taking the sample for the analysis of soil and leaf?
2. Can the course participants tell definition of fertigation and know the advantages ?
3. Are the course participants willing to learn more about the contents of chemical fertilizers and apply effectively on the right time?
4. Can the course participants eager to learn getting the natural fertilizers?

METHODOLOGY: Eclectic Way was selected. Demonstration Method were also used during the explanation of the subject.

- Warm-up: Teacher asks some questions about the topic to encourage course participants/to prepare them for the task and the topic of the lesson/to create expectations /to activate pre-existing knowledge);
- Debate/Expressing a choice/final survey- Formative Testing
- Explanation
- Enlargement: connections with other subjects.
- Effective Discussion: thinking, analyzing, defending one side of an issue, slights, news

TEACHING TECHNIQUES:

Cooperative Learning - the classroom is organized into academic and social learning experiences;

Brain Storming - all members will contribute with their own ideas;

Concept mapping - represent knowledge graphic form

Opinion-sharing - learners share ideas;

Participants performance

Questioning activity - Learners ask a wide range of questions, increasing student productivity and motivation

Simulated Immersion - learners simulate a real situation;

Learning by doing.

APPROACHES - A Polymodel (Eclectic) Approach (KACHRU's Model)

1. PPP: presentation/practice/production- ESA model: engage/study/activate;
2. GOPP (a Goal oriented project planning).
3. Outdoor learning(day trips)

CONTEXT :

For: farmers;

Course Orientation: Vocational;

They can:

1. understand information about new skills and practices related to the efficient use of resources
2. watch short and simple texts such as pictures, powerpoint slights-
3. provide simple description about the farming and resources-
4. explain the words about the fertilizers

ORGANISATION OF THE MATERIAL :

Training Preparation - a short introduction to each section to give some ideas about how to prepare training activities on Soil and leaf analysis and Natural Fertilizers

Tools Presentations - sample text and illustrations for Powerpoint slides and recommendations for use of flip charts and other presentation tools;

Tools Handouts –compost samples, a few samples of short handouts about resources(usually 1 or 2 A4 pages); samples of the photos soil and leaf analysis.

Glossary of Terms and a list of References.-farming terms (fertigation,leaf and soil analysis etc.)

EVALUATION OF THE TEACHING ACTIVITY :

LEARNING ACHIEVMENT:

In most cases, the basic objectives were achieved. (The learners turned out to be very adequate for their tasks).

Examination of results: Teacher use the summaries to review the overall performance of the learners.According to the examination results (farmers who get the 50 points), they will get the certificate.

Learners behavior (attitudes and attendance): Teacher highlight the good attitudes and willingness.

For example: taking attendance on the time sheet.

The topic of the lesson:

THE METHODS OF PLANT NUTRITION IN STRAWBERRY CULTIVATION

- Soil and leaf analysis
- What is fertigation?
- What is upper fertilizer?
- Natural Fertilizers:
- Barnyaed manure
- Compost manure
- Green fertilizers

Necessary time:2 hours

The course is designed for farmers who grow strawberries in Sultanhisar. This lesson is aimed at developing the knowledge fort he methods of plant nutrition in strawberry cultivation.

Needs analysis: First of all, farming strawberry is the most popular product which is covered 5338 hectare area, but agricultural spraying is done unconsciously by farmers in 2663 hectare area of it. In order to reduce the adverse effects of the sprays, fertilizers on land and air, in this statement our aim is to inform farmers about the modalities of an efficient use of sprays and fertilizers.

Consuming fertilizers and sprays less keeps the soil productivity, supports economic efficiency for farmers and this way resources can be used efficiently and more ecologically.

As our aim is to increase the awareness of environmental protection and contribute to the reduction of the consumption of resources depending on the development of sensitivity to the protection of the environment by training the volunteer farmers at first. Within this plan to train farmers, suitable groups, more personnel is needed to inform them in the agricultural field from the Agriculture Chamber.

Course objectives: Depending on the analysis findings, the course objectives are subsequently defined and worded in relation to the skills/tasks required on the job, the course of study.

Time: There are usually time constraints in the case of farmers' training, as the need for training must be cost-effective.

Learner expectations: Farmers are more goal-oriented and they are expecting information about the modalities of an efficient use of sprays and fertilizers on farming area.

Materials: Powerpoint slides, pictures are provided by the trainer. Farmers expect to get much more information than the general information. Therefore, the materials for training course or farmers have been developed specifically by our Agricultural engineer to meet their needs.

Methodology: Training course for farmers are related to management training (debate, explanation, demonstration, watching activity, problem-solving, decision-making, effective decision, enlargement), and the trainees may be given numerous opportunities to present and discuss aspects of their work.

Evaluation of progress: At the end of the course examinations are necessarily required. Also evaluation focuses on expressing ideas precisely enough or appropriately enough for a specific situation. Questionnaires are applied during the course period after two hours.

Performance Objectives :

One of the main characteristics for courses is the emphasis on performance – the training must be operationally effective. The priorities of the trainees consist in being able to understand and get the knowledge about strawberry planting, chemical spraying, using the sources efficiently. Therefore, the learners will sometimes want to discuss the course objectives and the methods used to carry out these objectives. Learners should be encouraged to see the trainer as a valuable resource, not be embarrassed about their lack of knowledge and always feel at ease about asking specific questions and be open about their problems.

Actors involved:

The checklist should typically include these skills:

- Giving descriptions and explanations about soil and leaf analysis, fertilizers.
- Receiving visitors/experts
- Showing visitors around (daytrips)
- Entertaining or being entertained about plant nutrients.

- Participating in discussions about fertilizers, soil and leaf analysis.
- Applying the objectives for plant nutrition on their farming areas
- Providing product details about plant nutrition.
- Following instructions concerning what they should do to get natural fertilizers.
- Acknowledging specific requests about fertilizers.
- Following descriptions and explanations about soil and leaf analysis, fertilizers.
- Reading Work papers about fertilizers, analysis.

Specific competencies acquired in the training course:

1. Manage to tell which plant family strawberry belongs to, the parts of strawberry fruit, the properties of strawberry cultivars which are grown in Turkey and marketed their seedlings
2. Manage to say the benefits of good agricultural practices, the knowledge about good agricultural practices in Europe.
3. Know suitable farming area for strawberry cultivation and apply there, the planting time and planting the seedling.
4. They know the contents of chemical fertilizers and apply effectively on the right time.
5. perform the tasks needed to learn how to get natural fertilizers and apply.
6. Be able to know the disease of strawberry fruit, effective cultural and mechanical fight against diseases and apply them.
7. understand the accurate and efficient collection methods while harvesting.
8. Be able to practice regulation on the principles and procedures about the application of plant protection products in the strawberry plants with Good Agricultural Practices.
9. Be able to make the definition of soilless agriculture and observe the Strawberry with soilless agriculture method.
10. Know the problems of strawberry farming and look for the solutions.

Sample materials used during the training course :

Day trips

Powerpoints

Pictures

Materials (Compost fertilizers)



Photos for strawberry planting methods, chemicals etc.

Powerpoints, videos, cd were used during the course.



The cube method

PhD, Prof. Anghel Elena, SC Training Cons 2005 srl, Iasi

The cube method is a strategy that facilitates the analysis of a topic, a situation, from multiple perspectives. This gives to the students the opportunity to develop the needed skills for complex and integrative approach. The method steps:

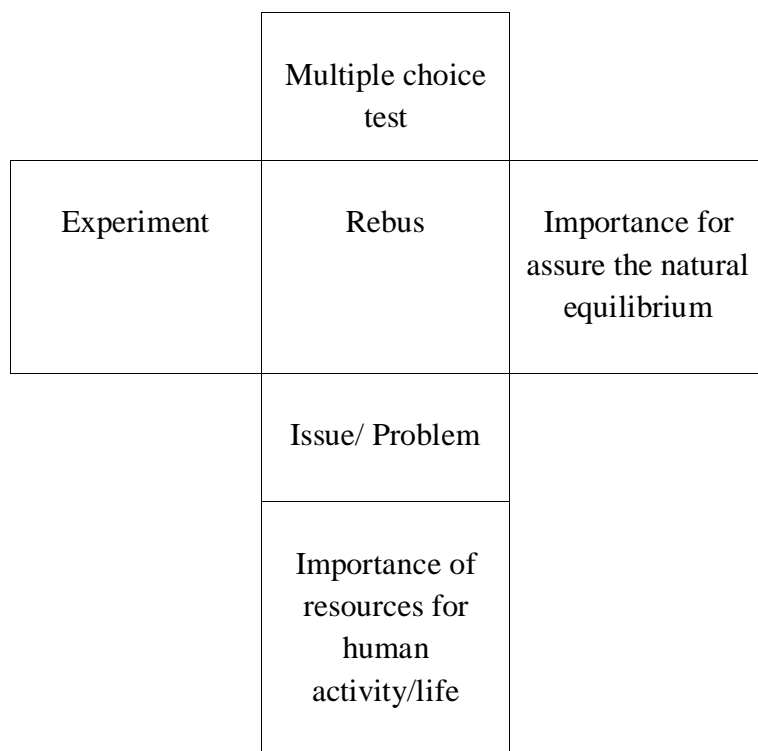
- Create a cube with its sides inscribed with the following words: describe, compare, analyze, associate; apply and argue;
- State the theme or the topic on the roll;
- Divide the class into six groups, each group will examine the theme chosen from the perspective demanded on one of the cube side:
 - a) **Describe**: color, shape, size, etc.
 - b) **Compare**: which is similar, which is different;
 - c) **Associate**: what leads you to think;
 - d) **Analyze**: how it is made, what it is made of;
 - e) **Apply**: What can you do with it? How can it be used?
 - f) **Argue**: for or against, and lists a number of reasons that support your claim.

The Cube method can be used with any subject or any group of age. The cube lesson may also be used as a contest. We have adapted this method to be used in efficient use of resources.

Example 1: The purpose of the activity is to verify and to implement the knowledge gained after finishing the studying of efficient use of resources .

The class is divided in three teams ("WATER", "AIR" and "EARTH"). Each team has a captain, a lucky-person (who throws the dice and chooses the topic threads of questioning) and four members - a total of six members. At each theme, the captain calls a member to explain in front of the class the answers of the questions which they receive (a crew member may be chosen to submit their replies).

For each correct answer he will receive ten points. The lucky-person from each team casts the dice and chooses the topic from the field the team belongs. The areas included on each side of the dice are: the importance for assure the natural equilibrium, the importance of resources for human activity/life, experiment, crossword, multiple choice test problem. For each of the five areas (excluding the test) there are three variants, denoted by 1, 2 and 3. For each area it is given a time for thinking and a time for presenting the response.



The teacher tell the students the partial results, after completing the five areas and the level. He explains them that the so far obtained score is the base point for their final grade, obtained after the quiz.

The final assessment is given after correcting the tests.

Example 2: The cube method - used on the lesson „The efficient use of the renewable natural resources”.

The activity of the six groups is based on the experimental observations.

The activities for the six groups of students are:

Describe: WATER, AIR, and EARTH – as natural resources

Compare: ECONOMIC EFFICIENCY of use these resources by using modern methods/technologies;

Associate: Importance of respect the rules of the environment by using the resources efficiently;

Analyse and answer why the use of the „green” energy „is assuring a clean and healthy environment, but also an economy of natural resources;

Apply: after the observations done and the discussions had above, what you can say about the air, earth and water’s pollution by using the conventional economical technologies;

Extrapolate: on the basis of the information obtained and the observations done, try to explain why the nonconventional economical technologies are non pollutant or less pollutant;

The operational objectives are followed:

- Differencing between the pollutant and nonpollutant technologies;
- Correlation of environment protection and efficient use of resources;
- Explain the advantages of green technologies;
- Form the habitudes to argue efficiently;
- Form competences to observe and interpret correctly the data obtained by observation method.

Panel Discussion Method

Author: **Toncheva Zarka, Vocational High School of Mechanical Techniques, Bulgaria**

Method to exchange views and seek solutions in a complex problem. Work in subgroups, each receiving a specific task - discussion on the part of the general problem. The solution of the complex problem is the sum of individual solutions in subgroups that are presented. An additional effect of the method is the tripping of the group, as each of the subgroups has its place in achieving the end result, which increases the responsibility of all about it.

1.1.3. Application of the method

Objective: organizing and discussing the problem on "For and against renewable energy sources" in a group of 15 students.

Stages of carrying out:

Discussion of the problem formed by the trainer is "renewable energy sources or conventional fuels"

Students are divided into micro groups of 5-6 people who are placed in the audience in a circle. The first group highlighted the shortcomings of RES:

- high initial capital cost
- потенциалното местоположение
- increasing impact on the environment

The second group highlighted the shortcomings of conventional fuels:

- Social issues
- Damage to the environment
- Lack of sustainable development.
- We need energy sources that are timeless and do not harm the environment

One of the students is selected President of the micro group who under discussion will defend their position.

In 15-20 minutes in the micro group discussed the problem and a common solution is chosen.

Presidents of micro groups gather in the center of the circle and have the opportunity to defend their positions. Other students to follow the course of the discussion and how accurate it is the general solution.

Panel discussion ends after the allotted time, or after the decision. Our panel discussion ended at the end of the allotted time and adopted a final decision that renewable energy sources are much more perspective and safeguard the environment.

Required resources: Presentation made by the trainer, reports from students, diagrams, charts, panels and tables showing stocks of fuels worldwide.

1.1.2.Methodological steps for applying the method:

- trainer selects an appropriate issue for the panel discussion;
- defined subproblems;
- formed subgroups distribute roles and subproblems for discussion;
- instruct learners on "procedure of discussion, reflection and presentation of results;
- determined the time for discussions in the subgroups;
- conducting the discussions in the subgroups;
- presentation of the results by a speaker;
- summarizing the the final result on the board or a poster - by the trainer or by a student if desired.

1.1.3.The most common methodological errors:

- determining unequal subproblems;
- poorly distinguished subproblems - overlapping content;
- insufficient time allowed about discussions in subgroups;
- poor distribution of roles between the members of the subgroups;
- inappropriate formed groups;
- bad time management.

Aquarium Method

Author: **Toncheva Zarka, Vocational High School of Mechanical Techniques, Bulgaria**

This is a method to achieve a common decision by consensus. The aquarium is limited space in the center of the classroom: in which sit a group of students - experts ("fish") to discuss a given problem.

As a technique the aquarium can be used for monitoring and commenting on a role playing game, interview or simulated consultation.

Two approaches are possible to implement the process.

At the first trainer identified several of learners who form 'aquarium', and others are observers.

At the second approach the problem can be discussed in subgroups. Each subgroup emits an expert. At a signal from the trainer experts sit in the aquarium and express the views of their own group. Other of learners have a specific task - to observe and take notes on the content and process of discussion, interpersonal dynamics, the strategies used about decision making, appeared questions, etc.

In one of the approaches observers may interfere in the discussion of the experts at any time - open option. Following the teacher's instructions in a predetermined by him time, students can participate with comments or questions.

When one of the experts is in difficulties outside observer can "come to the aquarium" and help him, then returns to the group of observers. For this purpose an empty chair is placed in the aquarium. Experts may take into account or ignore the comments and advice of observers. Another approach is when they may interfere only after the discussion of the experts - closed version.

1.2.1. Application of the method “Aquarium”

Objective: Students are included in the free discussion
Етапи на провеждане

Students with the teacher form two circles external (observers) and internal (active participants) and consider about the topic “Electric vehicles, Hybrid vehicles and Hybrid gasoline-electric vehicles”

Members of the inner circle actively discussed why electric cars can not solve all problems:

- Electric Vehicles need parking spaces
- They are still expensive
- Have problems with range - up to 150 km.
- Do not be mass produced
- Use electricity, and it comes where from?
- From traffic management to mobility management
- From "own" to "use"

After discussing the problem led to the following summary solution:

- Electric motors have no emissions, which is good for the environment. But the energy source may be from fossil fuels in most cases. They are also limited in distance about transition to the next battery charge.
- Hybrid vehicles offer reduced fuel consumption and therefore lower CO₂ with potentially positive effect on air quality.
- Hybrid gasoline-electric vehicles - an electric motor that provides power at low speeds and move gasoline at high speed. They are good at driving mostly urban. The batteries are recharged while driving - hybrids use regenerative braking systems, which means that energy moved back to the battery during braking. This significantly improves energy efficiency.
- Hybrid diesel-electric is still under development, but achieves even better fuel economy.

1.2.2.Methodological steps for applying the method:

- trainer considering the topic of discussion;
- formed the group of Aquarium;
- specifies the time for discussion;
- specifies the rules;
- assign tasks to observers - it is better to be recorded;

1.2.3.The most common methodological errors:

- selection of "incompatible experts" Aquarium (enough to have one with the attitude to dominate, not to get discussion);
- incorrect instruction of observers;
- poor time management;
- little control over the behavior of observers during the discussion in the aquarium (for larger groups of observers. it is better several people to be assigned the role of a "guardian of order and discipline").
-

1.3 Discussion

Appropriate method of acquiring knowledge, repeating the facts and figures from a different aspect, training skills of argumentation and communication.

It is the basis for the realization of a number of methods (e.g., "Aquarium"), but can also be used as a separate method. - Frequently used discussion - type "mosaic" (open discussion) at which individually or divided into subgroups trainees express their views and position on the issue discussed.

The trainer should direct students to observe some basic rules such as:

- To think in advance what position will protect;
- To think and speak briefly and clearly; .
- To speak only what they think and what excites them personally;
- Do not try to prove anything they don't believe in;
- To argue honestly, no insults, no labeling without increasing voice;
- To respect the opinions of others;
- To prove their thesis with facts and arguments.

In the role of facilitating the learning process (moderator) trainer should begin the discussion, to direct it, manage it, to decide when and how to interfere.

When using the method of discussion trainer gave up its position as a leading (authority) and provides time and opportunity for students to consider the opinions and express them. A good start might be the use of leading questions on the topic. The trainer makes a short introduction that ends with a question like "What would help us solve this issue / problem?", "What do you think?", "What should we do in the beginning?" If students are silent, he continued with prompting or instruction or a direct question to a specific student.

Trainer must predispose students to gradual taking control of the discussion and the responsibility for their own expression. It shows that you really expect them to talk. It is possible that in the beginning they prefer to ask questions. Best response is it to divert questions or ask the target group to answer - this is part of controlling the process. The trainer can ask students to write down questions to be discussed at the end of the discussion.

The most difficult for a trainer is to hold a discussion without dominating. Often trainers are afraid that if they let the students talk more during the session can be accused of "not trained". The fears are vain - in the discussion students think and attempt to find an answer to questions that in further ahead will be more useful to them than ever to get ready all the answers. Training should teach students to think themselves and talk.

The trainer maintains the balance in the discussion, ensure that it does not deviate from the subject order to respect the time, to be created conditions all students to express their opinion, the discussion returns to points needing clarification, provoke alternative ways of thinking, respect the preliminary plan of the session (and discussion).

In more complex discussion (with more planned discussion questions) some information may be prepared in advance of leaflets. Along with learners trainer arranges priority issues and began discussing very important ones, followed by a very important and important questions. Explain in depth key issues and the trainer explains to the trainees how much of the planned material is not passed and where to find the necessary information.

Inovative Strategy and method for learning students about global environmental problems

Author: Ertuğrul ÜSTÜNDAĞ , from Bolu Provincial Directorate of Urbanization and Environment, Turkiye

Topic of the the lesson : Global Environmental Problems

Introduction: The Topic of Global environmental problem is one of the main issue in our lives, as the earth is getting warmer and warmer by the time. The fact that earth's average temperature is increasing mainly due to the activities held by human beings like releasing greenhouse gases to the atmosphere.

Concrete objectives of the pilot course organised: After the course the attendees are expected to learn global warming, causes and effects of global warming problems, global laws and regulations taken to decrease the human beings based global warming problem, precautions taken to minimize global warming and greenhouse gases effect, long term strategies taken about global warming problem.

Concrete subjects of the pilot course organised: Global Environmental Problems (global warming, climate change, depletion of ozone layer, acid rain, wastes and conservation of natural resources etc.)

Training Materials: Presentation, video about global warming and other presentation tools;

Training Strategy, Method and Technique: Expository Teaching Strategy(David Ausubel's models), Explanation Method, Questioning and answering technique is used.

Actors involved: Bolu Provincial Directorate of Urbanization and Environment; Abant İzzet Baysal University

Duration: 3 hours

Participants: 22 people. The course is designed for Environmental engineers students and engineers in Bolu. This lesson is aimed at developing the knowledge for the methods of global environmental problems.

Date of implementation: August 2014, Bolu, Türkiye

Introduction to the training content:

Content: Based on Global Environmental problems following contents are informed: Evidences, causes and effects of climate change; The United Nations Framework Convention

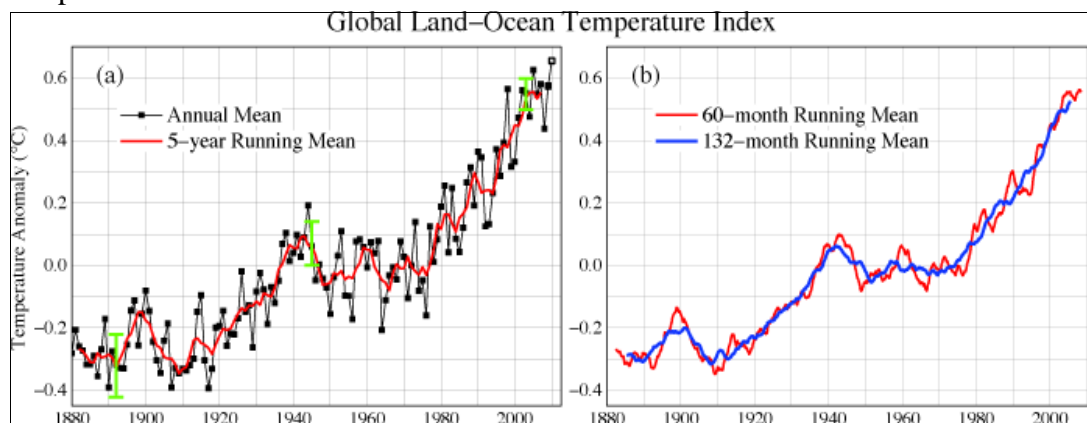
on Climate Change (UNFCCC); Regulations and laws in Turkiye against climate change; Climate change activity plan in Turkey.

What we do?

9. Help to recognize the significance of the Global environmental problems and its effects on Turkiye as well as to the world.
2. Help to attendances' to learn about the international conferences and regulations about global environmental problems like global warming.
3. Help to compare national methods and techniques in solving global environmental problems with the other partners'.
4. Helps to integrate the good practices and get information about the methods in global environmental problems.
5. It can increase the cooperation among the participating institutions
6. Help the proper dissemination of the Environmental Engineers students and Environmental engineers and experts' experiences and practices through Europe, provide better knowledge management
8. Extent the methods of cooperation between individuals (students and Engineers) to motivate team work and project work
9. Better understand the accurate and efficient use of sources.
10. Encourage experts to share their experience at local ,regional and international level
11. To get information and experience of best practices to develop their knowledge on using the sources efficiently to decrease the global warming.

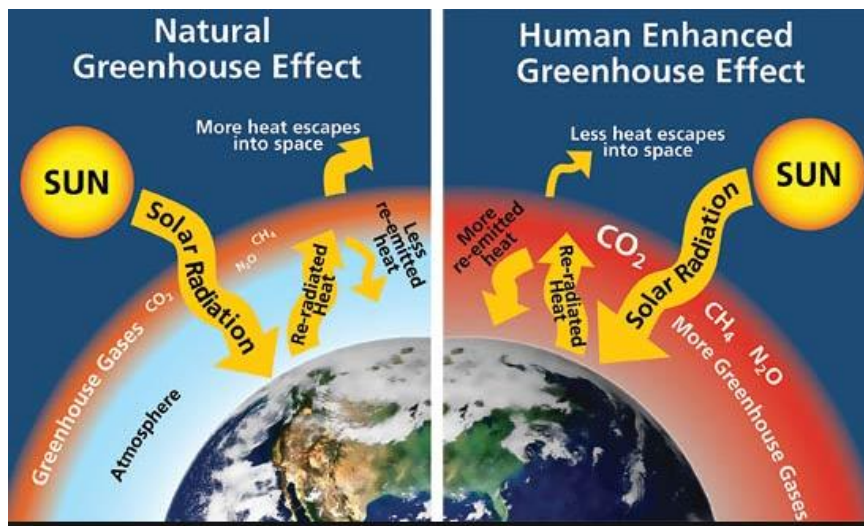
Annotation:

Global Warming: The Earth's climate is changing from the beginning of the past. There are significant scientific evidences for warming of the Earth's climate. Some technologies like earth-orbiting satellites have enabled scientist to observe many diffirent types of datas related with the Earth. Analysing these datas for years demonstrated that our climate is changing. Ice cores decreasing in Greenland, Antartica and some mountains demonstrate that the Earth is responding against climate change related with the increasing greenhouse gas levels. These events olsa shows that climate changes occured very fast. As it can be seen global Land and Ocean Temperature is increased to 0.6-0.8 C since 1880. Especially in 20th century with the increasing industrial development that contributed to rapid change on the Earth's mean temperature.



The other evidence is that global sea level increased to nearly 17 cm in the century. Especially, this increase is significant for the last decade. Diminishing ice cover over the Greenland and Antarctic region is the evidence for climate change. According to NASA's Gravity Recovery and Climate change Greenland ice is decreasing 150-250 Km³/year between 2002 to 2006. This value for Antarctica is around 152 km³/year between 2002 to 2005. The width and the thickness of the Arctic sea ice getting thinner and thinner by the time recently. Nearly all the ice cap of well-known mountains like the Alps, Himalayas, Alaska, Africa and s.o. diminished or disappeared. For the last decades in United States extreme events like high temperature events and rainfall events increased, however low temperature events has decreased. The other evidence is that especially with the Industrial Revolution, the acidity amount of oceans surface increased nearly %30 due to the human beings carbon dioxide releasing to the atmosphere. This carbon dioxide then absorbed by the ocean water. The final evidence is that satellite observation showed that Northern Hemisphere spring snow cap is decreased.

Causes of Global Warming: Many scientists agree that main cause of the global warming problem is human based greenhouse effect resulted from atmosphere keeps heat radiating from the Earth against space. The Gases in the atmosphere that blocks heat radiating from the earth to the space causes the greenhouse effects are water vapor, carbon dioxide(CO₂), methane, nitrous oxide, Chlorofluorocarbons (CFCs). Water vapor is the most abundant greenhouse gas. The Earth's atmosphere temperature is increased with increasing water vapor amount. Carbon dioxide is less in the atmosphere but its effect is much more. Human activities such as burning fossil fuels, deforestation, volcanoes, and respiration release carbon dioxide. Especially, human increased carbon dioxide concentration by 1/3 of all activities for the last century. Methane is more active greenhouse gas than carbon dioxide but it is much less abundant in the atmosphere. Methane gas is produced from natural sources and human activities like decomposition of the wastes, agriculture, rice cultivation, s.o. Nitrous oxide is also active greenhouse gas. It is produced after soil cultivations practices like fertilizer, biomass burning and fossil fuels burning. Chlorofluorocarbons are synthetic compounds and used for some industrial applications. It is also greenhouse gas but also harmful to the ozone layer so now it is being restricted by some regulations. In fact, it must be understood that human needs adequate greenhouse effect to live but it's amount in the atmosphere mustn't be too much or less. Nearly, 1/2 of the light from the sun passes through the atmosphere and reaches to the Earth's surface. %90 of passing light absorbed by the greenhouse gas and reflected back to the Earth surface to keep the surface average temperature of 15 degrees Celsius. When the amount of greenhouse gas become too much global warming occurs like Venus. If the greenhouse gas become less frozen occurs all over the surface like Mars and with both cases there can't be any life evidence.



Effects of Global Warming: The Earth is warming, and the effects of increasing temperatures aren't waiting for the future. They are all becoming right now. Some effects of rising temperature are already occurred. Mountain glaciers, west Antarctica and Greenland ice sheet covering and Arctic sea ice are decreasing. The Adelie penguins on Antarctica is decreased to 32.000 breeding pairs to 11.000 pairs in 30 years. For the last century sea level is rising faster. Some animals and plants have shifted to higher and cooler areas. Rain and snowfall has increased. Other effects can happen later if global warming increases. Storms are possible to be more drastic. Sea levels likely to rise to 18-59 cm till the end of this century and if melting goes on like this, at poles sea level likely to rise to 38-79 cm. Floods and droughts could become more common. Ethiopia rainfall decrease by %10 worse than at the moment. Malaria disease caused by mosquitoes will increase. Some species could become extinct like polar bears due to the lack of sea ice (IPCC, 2007).

Conclusion: Global warming is one of the significant topic for our planet. This problem can be solved if international consensus has been obtained. United Nations Framework Convention on Climate Change (UNFCCC) is an international environmental treaty negotiated at the United Nations Conference on Environment (UNCED) held in Rio de Janeiro in 1992 to obtain consensus. It entered the force on 21st March 1994. The main objective of the treaty is to "stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate systems" (UNFCCC, 2005). Türkiye has become party to this agreement on 24th May 2004. After the signing the UNFCCC treaty Parties have met at conferences to negotiate how to achieve these aims. At the 3rd Conference of the Parties (COP-3) entered the Kyoto Protocol in 1994. Türkiye has entered the Kyoto Protocol in 17th February 2009. By this Protocol following precautions are applied: greenhouse gas concentration will be reduced below 5%. New regulations will be applied to the Industry, fossil fuels machines, heating systems to reduce the greenhouse gas effect. Heating with less energy, less energy consuming vehicles, less energy consuming technology systems will be provided to industry. In transport and waste storage environmentalism will be the basic principles. Decreasing the rate of methane and carbon dioxide released to the atmosphere can be dropped by using alternative energy sources. Instead of fossil fuels, such as bio diesel fuel will be used. In thermo-power plants less carbon releasing technologies will be used. Renewable energy sources will be used more to reduce carbon dioxide emission. Taxes will be proportional according to the amount of

carbon dioxide people released to the atmosphere. Türkiye is aim to reduce energy consumption in buildings nearly 10% till the end of 2015 and 20% till the end of 2023. As a result of this redevelopment nearly 4-5% carbondioxide released to the atmosphere will be dropped. Also, Türkiye's target is to obtain at least 20% of its energy needs will be obtained by renewable energy sources untill 2017.

Overview of Questioning and Answering Method: Questions and answer method is the main part of finding information and getting persuasion. Questioning and answering method gives learners the chance to reflect their inquiries and their needs for further information. Also, by supporting answers instructor learns class situation about their knowledge about the topic. People are generally tends to investigate unknown in their lives so they are likely to be curious about different and strange events. So question and answer (Q & A) metod draw students attention to the lesson and contents. Questions also used to keep the facts in mind and memory. When a students encouraged to ask a questions they feel like the class is their own class not the others. This feeling increases the students motivation and also their learning capacity. Q&A helps students to communicatin skills and promote them to engage the lessons actively. It also supplies feedback, correction, repetition and reinforcement. Thats why Q&A method is selected.

Organization of the materials:The conference room is established according to the number of attendees. There must be overhead projector in the seminar room to show the powerpoint slides includes chart, graphics and video. Also, audio system should be well adjusted for effective communication. Visual tools are very important tools to enhance the effectiveness of the lessons. So, keywords, photographs, tables, charts, diagrams, drawings and graphics are used in the lesson. These tools supplies positive effects to teachers speech.

How it was applied: The topic is divided into 3 part. In first part global warming evidences are presented supported by video, diagrams and tables (45 Minutes). In second part causes and effects of global warming is introduced and finally, in the 3rd part result and solving problems with consensus is introduced. After each part 15 minutes breaks are given.

Specific competencies acquired in the training course:

11. Manage to tell what are the causes and effects of global climate change to the Word.
12. Manage to say the benefits of energy efficient practices, the knowledge about energy and efficient use of energy.
13. Manage to tell the causes of global green gas emission.
14. Be able to know that global enviromental problems can be minimized by strong cooperation between allies.
15. Be able to practice regulation on the principles and procedures about the application of global environmental problems in community.
16. Be able to tell alternative solutions to minimize the global enviromental problems.

Innovative method for learning farmers to use the resources efficiently during soilless agriculture farming

Author: Gulhan Kucuk, from Sultanhisar Governorship, Turkey


Lesson Plan: One day trip

Teacher : Sevtap Erbilek

Date of lesson: March , 2014



Topic of the lesson:	Soilless agriculture
-----------------------------	----------------------

<p>General objectives of the pilot course organised:</p>	<p>Farmers can make the definition of soilless agriculture. -They can easily know the way of soilless agriculture. -They know peat, vermiculite, rock wool and describe them. -They recognize the advantages and disadvantages of soilless agriculture. -They observe the Strawberry with soilless agriculture method .</p>
<p>Concrete subjects of the pilot course organised:</p>	<p>-Soilless agriculture -Organic and inorganic environment -the method of soilless agriculture</p>
<p>Actors involved: -number of the participants of the course: -number of the teachers:</p>	<p>-Governorship of Sultanhisar -Public Education Center -Strawberry Import Company - Sultanhisar Agricultural Credit Co-operative -Emiroglu Logistics ,Hothouse,Transport,Food,Industry and Trade Limited Company 35 participants ,1 teacher</p>
<p>What we do?</p>	<p>The course helps to integrate the practices of soilless agriculture and get information about the methods in it. Course participants can make the definitions of the soilless agriculture and explain the specific properties of it.</p>
<p>Before two hours of the course, we have to put ourselves some questions about the course participants, such as:</p> <p><u>ESSENTIAL QUESTION:</u></p> <p>What is the MOST important concepts or skills?</p> <p>With key questions if necessary.</p>	<p>5. How well are the course participants on knowing information about soilless agriculture?</p> <p>6. Can the course participants tell definition of soilless agriculture and know the advantages and disadvantages ?</p> <p>7. Are the course participants willing to learn more about the contents of the method of soilless agriculture?</p> <p>8. Can the course participants eager to learn organic and</p> <p>9. inorganic environment and growing requirements for environment?</p> 



Activating Strategy:

How will you activate your lesson or link to prior knowledge?

(Examples: KWL, work maps, Wordsplash, etc.)

METHODOLOGY

Eclectic Way was selected.

Warm-up

Expression about soilless agriculture

Explanation

sampling

question-and-answer

comparison about the applications.

dialogue and group work during the daytrip

strategies and methods applying on the soilless agriculture application

open-ended questions and evaluation by using the samples

brochure

agricultural publications about soilless agriculture give the farmers.

ACCELERATION STRATEGIES:

(Focus on content maps and key vocabulary for next lessons)

Soilless agriculture:

Organic and inorganic environments

-Growing requirements

-Advantages and disadvantages of soilless agriculture

- peat, vermiculite, rock wool

TEACHING STRATEGIES:

What instructional strategies will you use in your lesson?

(Examples: graphic organizer, distributed guided practice,

Brain Storming- all members will contribute with their own ideas before the daytrip;


Opinion-sharing- learners share ideas;

Questioning activity- Learners ask a wide range of questions, increasing student productivity and motivation

Learning by doing.

APPROACHES - A Polymodel (Eclectic) Approach (KACHRU's Model)

<p>distributed summarizing, collaborative pairs)</p>	<p>A LEARNER CENTERED APPROACH.</p> <ol style="list-style-type: none"> 4. <u>Communicative Approach</u>: (by communicating information) 5. <u>Outdoor learning(day trips)</u> <p>CONTEXT : For: farmers; Course Orientation: Vocational; They can: 1. <u>understand information about new skills and jobs related to the efficient use of resources and the methods of soilless agriculture</u> –<u>ORAL COMPREHENSION;</u> <u>2.provide simple description about soilless agriculture- ORAL PRODUCTION;</u> <u>3.analyzing words after the daytrip- WRITTEN PRODUCTION.</u></p> <p>ORGANISATION OF THE MATERIAL : <u>Glossary of Terms</u> :farming terms: soilless agriculture, peat, vermiculite, rock wool ,organic and inorganic materials,</p>
<p>LEARNING ACHIEVMENT:</p>	<p>In most cases, the basic objectives were achieved successfully by evaluating the daytrip with the questions such as -What is soilless agriculture? -What are the advantages of it ? -Give the description of the farming terms etc. The learners turned out to be very adequate for their tasks.</p>
<p>Needs analysis:</p>	<p>We need to save energy and use the sources efficiently in every sides of the life . With the aim of these,we will save -Water (by measuring the water in soilless farming it is not wasted) -Spending energy (technological and automated systems are used) We will prevent -Disese and weed control(Since the plants are grown in a controlled environment –water and solid-there is no weed problem With this plan farmers will have a chance to observe the soilless agriculture applying area</p>
<p>Course objectives</p>	<p>With the help of the analysis,using the sources efficiently is the main aim of the course .</p>
<p>Time:</p>	<p>One day</p>
<p>Learner expectations:</p>	<p>Course participants expect to get information about using sources efficiently on soilless farming and also observing the main points.</p>

Materials:	Brochures
Methodology:	<p>Eclectic Way</p> <p><u>Warm-up</u></p> <p>Expression about soilless agriculture</p> <p><u>Explanation</u></p> <p>sampling</p> <p>question-and-answer</p> <p>comparison about the applications.</p> <p>dialogue and group work during the daytrip</p> <p>open-ended questions and evaluation by using the samples</p>
Evaluation of progress:	Question and answer drill is applied at the end of the daytrip.
Performance Objectives :	<p>The priority of the farmer participants are to understand and get the knowledge about soilless agriculture and recognize the role for using the sources efficiently. Because of this, farmers will encourage to ask questions and be open about their problems.</p> <p>They make the definition of soilless agriculture.</p> <p>-They know the way of soilless agriculture.</p> <p>-They know peat, vermiculite, rock wool .</p> <p>-They know the advantages and disadvantages of soilless agriculture.</p> <p>They observe the Strawberry with soilless agriculture method .</p>
Learning activities :	<ul style="list-style-type: none"> - Giving descriptions and explanations about soilless agriculture - Visiting around the soilless agriculture applying area (daytrip) - Understanding product terms - Learning advantages and disadvantages of soilless agriculture. - Acknowledging specific requests about saving the sources. - Following descriptions and explanations about soilless agriculture and observing the practices - Reading brochures about saving energy, soilless agriculture. <div style="text-align: center;">  </div>

<p>Specific competencies acquired in the training course: <u>SUMMARIZING</u> <u>STRATEGIES:</u></p> <p>How will students summarize what they are learning during the lesson and at the end? (Examples: Ticket out the Door, 3-2-1, etc. Answer the EQ)</p>	<p>The farmers will summarize what they learned during the trip with the evaluation questions –What is the definition of the soilless agriculture? -What are the patterns of soilless agriculture? -Describing organic and inorganic environments giving short information about growing requirements for environment -What are the advantages and disadvantages of soilless agriculture? -Explaining strawberry farming with the method of soilless agriculture</p> 
<p>Sample materials used during the training course :</p>	<p>Brochure,equipments using in the farming area</p>

Inovative Strategy and method for learning students about Energy Efficiency in the Buildings

Author: Ertuğrul ÜSTÜNDAĞ , from Bolu Provincial Directorate of Urbanization and Environment, Turkiye

Topic of the the lesson : Energy Efficiency in the Buildings

General objectives of the pilot course organised: General objectives of the pilot course is to define energy and its sources, to explain relationship between energy and environment and to explain new and clean energy sources-renewable resources.

Concrete subjects of the pilot course organised:

Energy (energy sources, relationship between energy and environment, new and clean energy sources- renewable resources etc.)

Concrete objectives of the pilot course organised:

* To describe the basic concepts related to energy and its sources.

* To describe energy sources and sustainable energy efficiency procedures.

* To describe what are the precautions can be taken to minimize energy loses in our lives.

* To explain what can be done for conservation of energy loses from the building.

Actors/Institutions involved:

-Bolu Provincial Directorate of Urbanization and Invorement

-Abant İzzet Baysal University

-ESER Company

-number of the participants of the course:22

-number of the training instructor:1

What we do?

10. Help to recognize the significance of the Energy and Energy efficiency in Turkiye and also in Europe and in the world
2. Assist the progress of the regulations and standards about Energy Efficiency
3. Help to compare national methods and techniques in Energy and Energy efficiency with the other partners'
4. Helps to integrate the good practices and get information about the methods in Energy Efficiency buildings.
5. It can increase the cooperation among the participating institutions
6. Help the proper dissemination of the Environmental Engineers students and Environmental engineers and experts' experiences and practices through Europe, provide better knowledge management
7. With increasing the rivalry in the field of European Vocational Education, inspire and increase performance
8. Extent the methods of cooperation between individuals (students and Engineers) to motivate team work and project work

9. Understand the accurate and efficient use of sources and best practices in the building.
10. Encourage experts to share their experience at local ,regional and international level
11. To get information and experience of best practices to develop their knowledge on using the sources efficiently to decrease the energy loses.

Before three hours of the course, we have to put ourselves some questions about the course participants, such as:

1. How well are the course participants on energy efficiency and it effects on our economy?
2. Can the course participants tell definition of energy efficiency and know the advantages of it on the economy?
3. Are the course participants willing to learn more about the contents of energy efficiency and efficient practices?
4. Are the course participants aware of the significance of the efficiency to their lives ?

APPROACHES : Expository Teaching Approache(David Ausubel's models) is selected.

1. Deductive method- Information is given to learners more general to more specific.
2. Questioning activity- Learners ask a wide range of questions, increasing student productivity and motivation
- 3- Samples- informations are explained to learners with samples to merge learners knowledge.
- 4- Planning- all information should be logical, well organised and appropriately.

METHODOLOGY : Explanation Method

1. Subject is given to the trainees or students step by step and regularly.
2. The aim and importance of the training course about the energy efficiency and its effects to our country and also to the world is given to learners obviously.
3. Teacher is well prepared and has a good communication skills.
4. More information is given to learners in short time.
5. Efficient method for learning from the time and work consuming.
6. Easy to control learners.
7. For group work it is more efficient.
8. Learners get habit to listen and take notes.

TEACHING TECHNIQUES:

1. Opinion-sharing- learners share their ideas;
2. Brain storming: Learners say their ideas when there is inadequate energy sources and causes and effect of energy loses to their economy.
3. Questioning and answering activity- Learners ask a wide range of questions, increasing student productivity and motivation

CONTEXT :

For: students and engineers;

Course Orientation: Vocational;

They can:

1. They can understand commonly used terms about efficient use of resources
2. They can know commonly used applications
3. They can evaluate common mathematical expression about efficiency.

ORGANISATION OF THE MATERIAL :

Training Preparation - a short introduction to each section to give some ideas about how to prepare training activities on Energy and Energy efficient practices.

Tools Presentations - sample text and illustrations for Powerpoint slides and recommendations for use of flip charts and other presentation tools;

Tools Handouts –compost samples, a few samples of short handouts about resources(usually 1 or 2 A4 pages);samples of the photos of Energy efficient practices .

Glossary of Terms and a list of References.-Technical terms (Energy, Gray water purification, renewable energy, heat pump, etc.)

EVALUATION OF THE TEACHING ACTIVITY :

LEARNING ACHIEVMENT:

In most cases, the basic objectives were achieved. (The learners turned out to be very adequate for their tasks).

Examination of results: Teacher uses the summaries to review the overall performance of the learners. After the evaluation questionnaire, they will get the certificate.

For example: taking attendance on the time sheet.

The topic of the lesson :

1-ENERGY EFFICIENCY

- Economic water armatures
- Gray Water Purification System
- Rain water collection systems
- Renewable energy systems
- Insulation
- Heat pump systems
- Daylight glasses
- Waste management system



Necessary time:3 hours

The course is designed for Environmental engineers students and engineers in Bolu. This lesson is aimed at developing the knowledge for the methods of energy efficient practices.

Needs analysis: First of all the needs of the students need to be assessed and the level of knowledge about Energy and energy efficiency must be clearly defined. Their level about the topic should be clearly evaluated.

Course objectives: Depending on the analysis findings, the course objectives are subsequently defined and worded in relation to the skills/tasks required on the job, the course of study.

Time: There are usually time constraints in the case of students' training, as the need for training must be cost-effective.

Learner expectations: Students are more goal-oriented and they are expecting well informed about the energy efficiency.

Materials: Overhead projector, computer, pictures, diagrams and graphics are used. Therefore, students expectation about the meeting is to be met.

Methodology: With explanation methodology used in training course, students are well informed with many different types of useful samples. The topic is supported with schmatic views and graphics to easy understanding for students. The students may have a chance to get habit to listen and take notes about the topic.

Evaluation of progress: At the end of the course questionnaires are necessarily required during the course period. Also evaluation focuses on expressing ideas precisely enough or appropriately enough for a specific situation.

Performance Objectives :

One of the main characteristics for courses is the emphasis on performance – the training must be operationally effective. The priorities of the trainees consist in being able to understand and get the knowledge about energy efficient practices. Therefore, the learners will sometimes want to discuss the course objectives and the methods used to carry out these objectives. Learners should be encouraged to see the trainer as a valuable resource, not be embarrassed about their lack of knowledge and always feel at ease about asking specific questions and be open about their problems.

Specific competencies acquired in the training course:

17. Manage to tell what are the criterias required for energy efficienct practices.
18. Manage to say the benefits of energy efficient practices, the knowledge about energy and efficient use of energy.
19. Manage to tell about the economical importancy of the efficieny to our country also to the World.
20. Be able to know the causes of energy losses.
21. Be able to practice regulation on the principles and procedures about the application of energy efficiency in community.
22. Be able to tell alternative energy sources and practices.
23. Be able to know the causes and effects of energy loses in our country and be able to propose solutions.

Brainstorming method

Author: **Toncheva Zarka, Vocational High School of Mechanical Techniques, Sliven, Bulgaria**



1. Principle of the method

This is one of the most popular methods for finding a solution through uncritical presentation of different opinions - method of "generating ideas". Brainstorming as a technique can be used for a quickly provocation of associations about a topic for a short time - from 1 to 5 minutes. The teacher writes the associations on the board or a flipchart. Then the word-associations can be used for different purposes:

- To summarize the views of the group;
- The words as support for writing or orally creation of a composition;
- To develop a network of concepts;
- To find a solution to a complex issue;
- For making mind maps.

Brainstorming is a group technique for generating new, useful ideas, for making decisions and for enhancing the creativity. This technique can be used as an aid to define a task on which is worked; identifying specific problems; finding solutions and research how far they are reliable.

At the beginning of the each project, the team working on it, have to answer a number of questions such as "what", "why" and "how"? One of the best ways this to be carried out is by performing the so-called brain attack.

1.2 Defining the term

The brainstorming is used to stimulate the creative activity of students on a subject or a question. The work is performed with a group of students and includes: generating ideas, analyzing the problematic situation, assessment of ideas and generating the opposite ideas. Jokes, remarks and casual atmosphere are encouraged. Students freely express ideas or opinions without any evaluation or discussion of their ideas or opinions. These ideas are recorded by the teacher on the board or on a poster, and brainstorming continues until students run out of ideas or the brainstorming time finish. The most appropriate of all these ideas are chosen to use in practice.

1.3 Participants

There are three key roles of the participants in the brainstorming:

- team leader;
- a person who writes
- team members.

The team leader is necessary to be a good listener. At the beginning, in order to help the participants, the team leader has to give them the reasons of using the brainstorming and increase their activity. The leader should determine the basic rules and guide the process of generating ideas.

The writing participant records word for word the all ideas. This role may be performed by the leader.

The team members should not be less than 5 or more than 10. It is preferable the team to be of six or seven members.

1.4 Rules for conducting

- It is needed to accumulate as much as possible ideas from participants, without they being criticized or judged, while the ideas are formed.
- All ideas are welcome, no matter how illogical or away from the subject matter they seem.
- The ideas are discussed after the brainstorming is over.
- The participants must not be criticized. Producing sounds, making faces and mocking is not desirable. All ideas are equal in the brainstorming.
- The participants should try to add to each other's ideas.
- All ideas are recorded so that the whole group easily see them.
- The time for brainstorming should be limited, for example about 30 minutes.

1.5 Consistent of the conducting

- The group members review the topic of the brainstorming using the "why", "how", "what".
- Everyone should consider the question at ease for a few minutes. The participants can write down quickly their ideas.
- Each of the participants announces their ideas and they be recorded by the writer.
- The ideas are discussed and categorized.
- There are three important factors that determine the success of a brainstorm.

First, the group aims to create a large quantity of ideas, as this increases the probability they to find the best possible solution. Second, the group should certainly resist criticizing the ideas while they share them. A negative thinking of a member of the group can make others less willing to participate and thus can lead to failure the entire process. Third, the group leader should create a positive atmosphere for brainstorm and guide the creative energy of the other members in the same direction.

1.6 Stages and rules of brainstorming

The properly organized brainstorming includes three binding stages:

1.6.1 Preliminary stage

formulation of the problem . At the beginning of the second stage problem must be precisely formulated.

1.6.2 Generating ideas

This is the main stage of the whole brainstorming on which depends the success. It is important to observe rules during this stage. They may be as follows:

- the essential is the quantity of ideas and no limits should to be imposed, because the greater is the quantity of ideas, the higher is the quality of the solution of the problem;
- criticizing and a positive evaluation are absolutely prohibited until the expressing of the all ideas is not over;
- unusual, original and even absurd ideas are welcomed, as well as analogies after giving all proposals;
- after that follows combination and improvement of the each idea: original ideas can be developed, and old ones - to be modified, amended or united in the new;
- it is obligatory the absence of malignant conflicts and the imposition of leaders;

- all participants are equal, which includes the encouraging the timid participants and the retaining the most active and respected;
- the discussions are held hierarchically: at the beginning at the most widely and after evaluation of the opportunities of the options is narrowed by selecting the best ones;
- the team leader is using a democratic style of performing the method as taking the role of mediator and is responsible for the successful implementation of the method, which is required to build a creative, focused and conflict-free atmosphere and the ability to steer the course of the discussion.

1.6.3 Grouping, selection and evaluation of the ideas

This stage is often forgotten, but it was that allowed to select the most valuable ideas and to see the final result of brainstorming. In this stage, unlike the previous, the evaluation is not limited, on the contrary - is welcome. Methods of analysis and evaluations of ideas can be very different.

1.7 Variations. Fictitious group technique

This is a type of brainstorming that encourages equality between all participants in the process. It is used to create an ordered list of ideas. Each participant records their idea anonymously. Then the group leader collects the ideas and each of them is put to the vote of the group. The vote can be very simple - as a rising hand in support of the idea. This process is called distillation.

After distillation the ideas with the highest ranking can undergo brainstorming in the group or in smaller subgroups. Sometimes ideas that were dropped in the early stage of evaluation, can once again return to the discussion after the reevaluation of ideas.

1.8 Passing through the group technique

Everyone in the group records on a piece of paper an idea and submit the paper to the next person in a clockwise direction, which respectively add any thoughts about the idea. This continues until everyone got back their pieces. After this process is quite possibly the group had been reviewed each idea in detail.

1.9 Electronic brainstorming

This is a computerized version of brainstorming. This may be realized by e-mail, web-based or peer-to-peer software. The team leader sends the questions to the team members and each of them send independently their ideas. Then the group leader collects a list of these ideas and send it to the group for a feedback. One of the advantages of electronic brainstorming is that it allows the participation of more people than would normally be able to participate in a standard session of brainstorming.

1.10 Sources

- Brainstorming, San Diego State University
- Page for brainstorming in Answers.com (multiple resources, including a detailed explanation of the term, historical facts, schematic representation of the process and other information)
- Eight Tips for Better Brainstorming, Robert Sutton, BusinessWeek, 26 July 2006
- <http://www.brainstorming.co.uk/tutorials/tutorialcontents.html> - The site contains interesting historical facts relating to the development of approaches to brainstorming, rules, software and many examples
- Brainstorming- Creative problem solving from MindTools.com - The site contains a description of the individual and group brainstorming, historical facts and examples

1.11 Topic:

New technologies in motor transport equipment

Held in two parts

1.12 Part I. Electronic brainstorming

How to classify the improved systems in the motor transport equipment?

This is a computerized version of brainstorming. This may be realized by e-mail, web-based or

peer-to-peer software. The team leader sends the questions to the team members and each of them send independently their ideas.

The received ideas are discussed, grouped and after selection is got the following solution:

(fig.1)

1.12.1 Active safety:

- ABS- antilock braking system,
- ancillary [AUX] parking system,
- “blind spot” bliss
- Projected braking attendance (PBA) Прогнозиращо асистирание при спиране
- Predicted Collision Warning (PCW) Прогнозиращо предупреждение за сблъсък
- Predictive emergency braking (PEB) Прогнозиращо аварийно спиране

1.12.2 Passive safety:

- safety belts
- airbags
- combined system pyrotechnic safety belt and front airbags

1.12.3 Security and management

ECBF - electronic control of braking force

Electronic Stability Program ESP ®

MSR - drive braking torque of the engine

EBD - distributes braking force between front and rear axles depending on the load

HBA - hydraulic system pedal in an emergency

ASR - antiskid, addition to ABS, regulates excess torque under acceleration on soft slippery road

- 4 Motion– Electronic distribution torque between the engine axles
- SR ("Cruise Control", tempomat, CC, FGB)
- Speed regulator of movement
- Engine control on autopilot

1.12.4 For comfort

- automatic transmissions:
 - Infinitely, with torque converter and planetary gears
 - Multistage - with automatic electronic
- adjusted suspension
 - Maintaining a certain level of body
 - Active suspension
 - Hydraulic, pneumatic or hydropneumatic

1.12.5 Smart board computers - navigation systems

- Adjusting headlights

xenon headlights

VARIO Xenon , AFL /Adaptive Forward Lighting/

rotation of the beam of light from the lighthouse in the direction of motion and there is a second lamp in the reflector that illuminates the cross road when cornering

- Electronic steering control system

1.13 Part II. A group technique

2.13.1 What input parameters are ideal for ABS and which parameters ABS has not yet responded to?

Everyone in the group records on a piece of paper an idea and submit the paper to the next person in a clockwise direction, which respectively add any thoughts about the idea. This continues until everyone got back their pieces. After this process is quite possibly the group had been reviewed each idea in detail. After distillation the ideas with the highest ranking can undergo brainstorming in the group or in smaller subgroups. Sometimes ideas that were dropped in the early stage of evaluation, can once again return to the discussion after the revaluation of ideas.

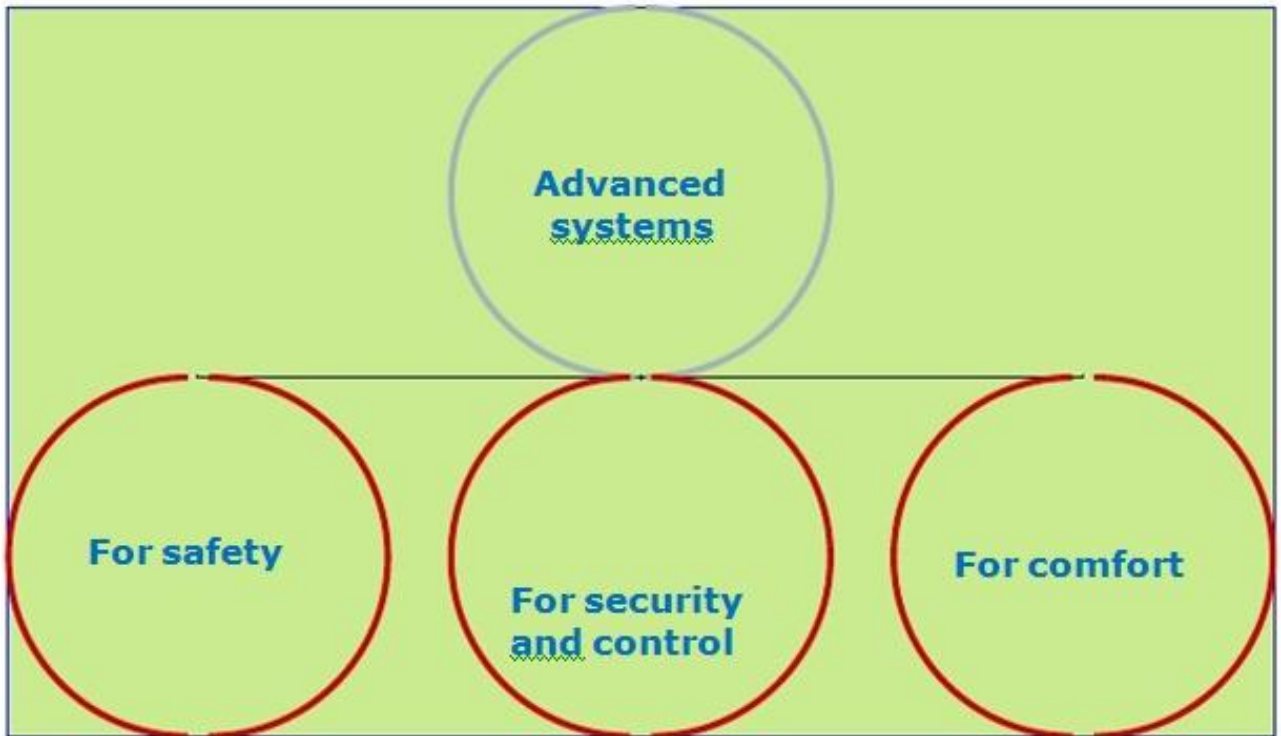
2.13.2 The ideal solution for ABS is to react to the four basic input parameters:

- The angular delay of the wheels;
- The speed on which process starts stopping;
- The loading of each wheel;
- The coefficient of friction (traction) of the wheels with the road.

2.14 The most common methodological errors:

- To determine the order of speakers during the brainstorm (association is a spontaneous process) and to require compulsory response;
- To replace the associations with explanations like "Why do I think just like that?"
- To criticize, dispute and irony others' opinions;
- To be allowed to conflict of interest in making a decision.

APPLICATIONS:



(fig. 1)



Description of Innovative Training Methodology – Project Based Training on RES and Energy Efficiency

**Authors :Serge Angelov and Valia Dankova ,European Values
Institute, Sofia ,Bulgaria**

Content :

- Introduction
- Essence of the Project Method
- The concept Project Method
- Advantages of the method
- Implementation of the method for topics related to RES and Energy Efficiency
- Common characteristics of educational projects for RES and Energy Efficiency.

Introduction:

The real problems of the renewable energy sector in our society today raise many questions to the pedagogical community. They are related to rethinking the objectives of vocational and academic education and to change the character of pedagogical interaction, with the drawing of new priorities in the didactic strategies and technologies. How to train professionals from the industry, on what principles to guide training to meet modern requirements? What methods and forms of work to be used for training to be attractive, to stimulate the creative potential of students and at the same time to ensure high quality of their education?

The present paper focuses on training through projects as a possible modern way to achieve a new type of pedagogical interaction, learner-centered, creating conditions for better exploiting the personal and professional potential.

The realization of the idea of the project based training will help overcome excessive academism, detached from the social context, and related to low personal commitment. In "project-based" learning activity learners are committed to a real social context, take responsibility for their own actions, are taught by accumulating experience and through experiencing of what is happening. Thus the practical application of the training project is a reliable way to manage the mechanisms of self-organization and self-regulation in the learning process.

Essence of the Project Method

When applying the project method in the process of "training - learning"

continuously interaction between teacher and students exists. Learning has a strong individual character and each of the students does it in different ways: some cannot show the acquired knowledge, another on the contrary, based on previous experience demonstrates remarkable abilities, while others adopt a certain attitude towards the subject and "does not want" to learn. The individual perceptions (or perception) of the teacher about the student and vice versa, which also affects the process of learning cannot be denied.

Teaching also has individual character. Teaching is affected by emotional judgment, values, priorities and experience of the teacher. In traditional teaching methods, the teacher is the central point of knowledge transfer. Here resides the problem of developing the creative thinking of the learners and raising their motivation to learn. This problem is solved through the project based learning, by avoiding the dominant role of the teacher in the learning process.

Introducing in the pedagogical process elements of research activity allows the teacher not so much to teach, but to help the student learn and to guide his/her learning activity.

The concept “Project Method”

By definition, the project is *a set of specific actions, documents, preliminary texts; plan to create a real object; to create a different kind of theoretical product*. This is always a creative activity. (Schreyer, 2007).

The project method in vocational education is seen as an alternative to the classroom system. The modern project of the learner is a didactic tool for activation of cognitive activity, to develop creativity and also for the formation of certain personal qualities.

The Project method is a pedagogical tool, which is aimed not at integrating factual knowledge, but to its practical application and acquisition of new knowledge. Active involvement of the learner in the creation of one or other projects allows him to master new ways of human activity in the socio-cultural environment.

The main task of the method is the research of the problem area together with the teacher. Everything students do they have to make by themselves (alone, in a group with the teacher, with other people): to plan, implement, evaluate and, of course, to understand why they do it.

Advantages of the method

1. Students are motivated, because they are involved into active and purposeful activity, with obvious practical application
2. They can develop independent thinking and creative approach
3. When working in groups students develop communication and collaboration competences
4. The method allows developing research capacity and learning-to-learn competence

Implementation of the method for topics related to RES and Energy Efficiency

Main requirements for implementation of the Project Method

1. Important and challenging task, contributing to achieving the learning goals but also of interest to the student
2. Practical, theoretical and learning importance of the expected results (*example*: plans for locating RES power plants, scenario for developing RES in a certain geographic region, ...)
3. Independent (individual, in pairs or groups) activity of the learners.
4. Definition of the final goal of the project.
5. Definition of the basic competencies in different areas, necessary for implementation of the project
6. Structuring (planning) the content part of the project with defined results for every stage
7. Use of research methods and idea generation methods

The most difficult moment in the implementation of training projects in the learning process is the organization of this activity, and especially the preparatory stage.

The accuracy in shaping the project is determined by the clarity and specificity in setting goals, evaluating the results. Is very efficient to use methodical recommendations or instructions, which state the necessary and additional literature for self-education, the requirements of the teacher regarding project quality, the form and methods of qualitative and quantitative evaluation of the results. Sometimes it is possible to note the algorithm of the project design or any other phase-separation of the activities.

The choice of the topic of the projects can be different in different situations. In some cases, these issues can be determined by specialists in the field of education in accordance with approved programs. In others, offered by industry experts as they take into account situations in their experience, natural professional interests, interests and abilities of students. In the third case, the theme of the project can be offered by the students themselves, who are led by their own interests, not just purely cognitive, but also creative and practical.

The topics of the projects may concern some theoretical question from natural science - the foundation of RES in order to deepen their knowledge in this matter, to differentiate the learning process. Most often, however, the themes of projects, especially those that are recommended by the business concern a practical issue for the industry, and furthermore, require the application of knowledge of the trainees not only on the specific subject but from different areas, as well as creative thinking and research habits. Thus achieving a perfectly natural integration of knowledge.

Main stages of implementation of project based learning in RES

In applying the Project Method for solving various tasks related to RES we can define 6 main stages of implementation, which are presented in Table 1. Stages in Project Implementation

Table 1

Task	Activity of the Learners	Activity of the teacher
Defining the topic, setting goals, defining working groups	Specify the information, discuss the task	Motivate learners, explain the purpose of the project, monitors
Analysis of the problem, identifying the sources of information, formulation of objectives and criteria for evaluating the results, the sharing of responsibilities in the group.	Formulate the tasks, specify information (sources), choose and justify their own criteria for assessment	Helps in analyzing and summarizing (if necessary), monitors
Collect and specify the information, discuss alternatives ("brainstorming"), choose the optimal variant, specify the plan	Work with information, synthesize and analyze ideas, perform research	Monitor, advise
Project execution	Perform research and work on the project, the project form	Monitors, advises (by request)
Analysis of the implementation of the project results (successes and failures), the reasons for this, analysis of the achievement of objectives	Participate in collective self-analysis and self-assessment of the project	Observes, directs the process of analysis (when necessary)
Preparation of the report, informing about the implementation process, explaining the results obtained, the collective project presentation, evaluation of results	Prepare the report, inform about the implementation process, explain the results obtained, present the project, self-assessment	Participate in collective analysis and evaluation of the project results (optional) observes

Common characteristics of educational projects for RES and Energy

Efficiency.

The educational RES project is a joint educational-cognitive, creative or play activity of the partner-learners, organized on the basis of a project implementation that has a common goal agreed methods, ways of working and is directed towards achieving learning results.

The specifics of renewable energy projects primarily consists in the fact that they are always cross-disciplinary. Solving the problem embedded in each project, always requires the use of integrated knowledge. But renewable energy projects usually require a deeper integration of knowledge, which involves knowledge not only on the subject of the research problem, but of national culture of the partner and especially his perception of the world.

Range and content of renewable energy projects must be such that their performance quite naturally requires the application of fundamental knowledge of the natural sciences. In other words, not all possible objectives as they are interesting and important in practical terms, can match the nature of the renewable energy projects.

RES projects are appropriate from pedagogical perspective when in implementing them:

- numerous, continuous, systematic or one-time observations on one or other natural, physical or other phenomena that require data collection in different regions in order to solve the problem raised, are foreseen;
- comparative study or research of one or another phenomenon, a fact, an event that occurred or have a place in different areas, in order to detect a trend for decision making, idea creation, is foreseen;
- comparative study of the efficiency of use of the same or different (alternative) ways of solving a problem is foreseen, a task for finding the most effective and acceptable solution for all situations, ie to obtain data for objectively and efficiently solving the problem;
- incorporates creative development of a task, be it purely practical work (choice of solar modules in various climatic zones) or creative work (evaluation of RES - resources for a geographical region, proposals for improving the training course, investment analysis of the applicability of a given technology, etc.);
- is expected to be held joint, entertaining, adventure games and competitions.

Contents

1. Description of Innovative Training Methodology used in developing *Topic Environmental problems* from Training Pilot Course for Environmental Engineers and Workers on Renewable Energy Sources ,by **Valia Dankova** Page 3
2. Inovative Strategy for learning farmers to use the resources efficiently during strawberry farming by **Gulhan Kucuk**..... Page 9
3. The cube method by **Elena Anghel** Page 16
4. Panel Discussion Method by **Zarka Toncheva** Page 19
5. Aquarium Method by **Zarka Toncheva**..... Page 21
6. Inovative Strategy and method for learning students about global environmental problems by **Ertuğrul ÜSTÜNDAĞ** Page 25
7. Inovative Strategy for learning farmers to use the resources efficiently during soilless agriculture farming by **Gulhan Kucuk**..... Page 30
8. Inovative Strategy and method for learning students about Energy Efficiency in the Buildings by **Ertuğrul ÜSTÜNDAĞ** Page 36
9. Brainstorming method ,by **Zarka Toncheva**..... Page 40
10. Description of Innovative Training Methodology – Project Based Training on RES and Energy Efficiency by **Sergo Angelo** and **Valia Dankova**Page 48

