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Understanding the Simple Electric Circuit as part of Scientific Literacy through microteaching in Adult Education

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Abstract **–** The present paper refers to the planning of a twenty-minute microteaching, which is integrated in the Scientific Literacy taught in the Schools of the Second Chance of the Adult Education in Greece. Specifically, the microteaching belongs to the thematic field of the electricity whereas the population - goal are the adult students, of different age and with different learning background. The different educational techniques chosen, such as proposition, brainstorming, group work and discussion, and the counterpart educational means used are referred to the planning.

Keywords**:** simple electric circuit, scientific literacy, second chance school, microteaching, adult education

1. INTRODUCTION

The microteaching is a slice of the teaching which gives the teachers, in the frame of a safe and "laboratory" environment, the ability to acquire and perfect their educational techniques and improve their teaching, observing and commenting on the microteachings of their colleagues critically.

The microteaching as a teaching method was developed in the USA and specifically in the University of Stanford in 1960s whereas in Europe it was developed in Great Britain in the University of Stirling in 1968.

The first instigators of the model of Stanford were Allen & Eve (1968), whose first goal was the improvement of the teaching through the connection of theory and action, whereas the variation of the model was developed in the University of Berkley of USA from Borg (Borg, Kelley, Langer and Gall, 1970).

The microteaching was based on the admissions that we learn both from the re meditation of our teaching activity and our participation as students.

2. FRAME IN WHICH MICROTEACHING IS INTEGRATED

2.1 Education program in which Microteaching is integrated and population–goal of the program.

The microteaching which follows is integrated in the Scientific Literacy taught in the Schools of the Second Chance and it belongs to the Thematic Field of Electricity

It is addressed to the adult men students of a Second Chance school. It is about a population–goal who is heterogeneous because the students are of different age with different learning background, different religions, and cultures whereas the countries of their origin vary.

We should mention that the schools of the second Chance are addressed to people who have completed the eighteenth year of their age and they haven't completed the nine-year compulsory education. The goal of the schools of the Second Chance is to be able to offer grounding to people who abandoned the education for many reasons, in order to gain self-confidence (European Committee-white book, 1996) whereas they function with open curriculum studies aiming at the transformation of the schools to a place of knowledge production and not a place of transmission knowledge (Vergidis, 2003).

2.2 Title and duration of the unit in which the microteaching is integrated.

The unit is titled as "Electricity" and its duration are 25 teaching hours. In order to plan the unit, we have to develop and process elements which have to be gathered from the following resources.

- The analytic curriculum of the Scientific Literacy of the Schools of the Second Chance.
- The teachers / introducers of the other Literacy.
- The students.

Also we should take into consideration the students characteristics who will participate in the program, such as age, gender, knowledge relevant to the studies, which will help us to clarify the educational needs and specify the depth of the unit (for example advanced level or not), and they will also help to develop the students participation, to form the context and the partial goals of the unit and choose the appropriate educational techniques.

2.3 The goals of the teaching unit in which the microteaching is integrated.

Educational goals:

Knowledge:

The students:

1. To recognize the phenomena about the electricity
2. To distinct that there are only two kinds of load in the nature and that the homonymous loads repel each other and the heteronymous attract each other.
3. To be able to recognize the insulators and the conductors.

4. To recognize that a small light only lights when its pole connects with the pole of the battery and its second pole with the other pole of the battery.
5. To recognize that a simple circuit consists of a small light, cables and a battery.
6. To define the concept of a closed circuit.
7. To recognize the similarities and the differences between the connection in row and the parallel connection.

Skills:

The students:

1. To use the cables, the small light and the battery in a correct way so that they can construct a simple circuit.
2. To revise the results of the experiment.
3. To use the results of the experiment so that they can state an explanation.
4. To control when there is a short circuit in action.

Attitudes:

The students:

1. To cooperate with each other in the team so that they can end up in common conclusions.
1. To acquire interest for the electricity.
2. To become sensitive about the dangers from the use of the electricity.

2.4 Basic topics of the teaching unit «Electricity»

Topics (subunits)	**Teaching hours**
1. First meeting	1
2. Static electricity	4
3.Electricity	5
4. Conductors and insulators	2
5.Circuit	4
6. Short circuit - security	2
7. Connection of the appliances parallel and in row	3
8. Implementation of electricity in daily life	3
9. Recapitulation - Assessment	1

2.5 Elements of the microteaching which would show interest for self assessment and techniques of self assessment.

We would be interested in self assessing the planning of the teaching unit ,if the goals are clear and if they are combined with the purpose of the total program and also if they cover the needs of the students. Also we would assess if the educational techniques and the means chosen were appropriate, if they activated the students as much as possible an if they indicated the basic concepts of the teaching unit .An important factor is the assessment of our relationship with the students, that's why we would assess if a relationship of trust between the students and between the students and the teacher was developed. To what degree their participation was encouraged and to what degree all their perspectives were indicated. About the educational results we would assess to what degree and what the students learn and how fast.

The techniques which we would use are the following:

1. Observation of the episodes of the educational meeting with the help of the Observation Sheet on which we would note activities and situations.
2. Interviews from the students.
3. Questionnaire.
4. Drawing information through different exercises and role playing aiming at the observation about the degree to which the learning was achieved by the students.

3. THE PLANNING OF THE MICROTEACHING

3.1 Title of the microteaching: simple circuit

The microteaching is integrated in the fifth teaching subunit of the teaching unit "Electricity".

3.2 Educational goals of the Microteaching:

Knowledge:

The students:

1. To recognize that a small light only lights when its pole connects with the pole of the battery and its second pole with the other pole of the battery.
1. To recognize that a simple circuit consists of a small light, cables and a battery.
2. To define the concept of a closed circuit.

Skills:

The students:

1. To use the cables, the small light and the battery in a correct way so that they can construct a simple circuit.
2. To revise the results of the experiment.
3. To use the results of the experiment so that they can state an explanation.

Attitudes:

The students:

1. To cooperate with each other in the team so that they can end up in common conclusions.
2. To acquire interest for the electricity.

3.3 Topics (Subunits) Microteaching 20΄

Topics (Subunits)	**Duration (minutes)**	**Educational techniques**	**Educational means**
1. Connection with the previous knowledge – Goals of the microteaching	2΄	Proposition	Board
2. Proposition	4΄	Brainstorming	Board
3. Planning of a simple circuit	6΄	Individual and group team	Paper sheet
4. Teams presentation – Synthesis and drawing of conclusions	6΄	Discussion with the plenary session	Board
5. Ending –connection with the next language	2΄	Proposition	

3.4 Justification of the choice of the specific educational technique for every topic

For the beginning of the microteaching we chose proposition, which is indicated when we want to introduce a topic and present the goals (Rogers A., 1999).

We move on with the technique of the brainstorming (Brainstorming) aiming at the activation of the students so that they get involved in the procedure of the learning while we write down their views on the board (Courau S., 2000).The brainstorming is a procedure in which the students participate and recall coherently their views they already have for a topic and express their ideas impulsively.

Then the subunit follows in which the students work individually at the beginning and then in groups. With the group work both the critical thinking and the cooperation between the students is developed.

The educational technique of the discussion follows in which we have the synthesis and the drawing of the conclusion.

We end up with the proposition by making a short recapitulation and a connection of the microteaching with the next topic in the next session.

3.5 Justification of the choice of the specific educational means of teaching for every topic

At the beginning of the microteaching in the proposition, we use the board to present our goals. The board is a familiar means to everyone and with this way we are trying to attract the students' attention.

The next technique of the brainstorming follows in which we use the board again to write down the students answers.

We move on with the paper sheet both for individual work and for group work. The advantage of the paper sheet is that they can write and correct the answers of the students from the students on their own.

For the next two subunits we use the board again so that we can note down the results of the team work, to draw the conclusions and make a connection with the next educational unit.

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APPENDIX

SHEET PAPER:

Plan in the below picture how the small light should be connected with cable or cables with the battery so that the small light can shine.

SHAPE:

Compare and discuss your answer with the other members of your team. Are there similarities and differences between the connections you have planned?

After the discussion, end up as a team to an answer and plan the final circuit.