Edu World 2016
7th International Conference

APPLICATION OF THE GEOGRAPHICAL RESEARCH COMPETENCY WITH STUDENTS USING INTERACTIVE DIDACTIC TECHNIQUES

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Abstract

The present paper has been elaborated as a motivation to support the development of students' brainwork competencies (formed in the high school cycle) which, during the university years become scientific research competencies. In order to achieve the objectives of the paper, I have performed a didactic experiment with 10 students involved in the elaboration of their graduate theses and articles for the Students' Scientific Conference who used interactive didactic techniques such as: the Venn diagram, brainstorming, the algorithm, SWOT analysis, etc. As a result, the paper focuses upon practical and methodological aspects of the research activity performed with students. I shall present selectively, in this article's contents, the methodological- practical concept of the research activity on students. The research activity's practical model refers to: research technique's application algorithm, competency to select theme-suitable research methods by applying interactive techniques, competency to process information sources, set out relationships between objects, correlate geographical processes or phenomena. Also, competencies to draw conclusions, manner of drafting and presenting a paper can be achieved during research. By using interactive didactic techniques I have constructed the basis to develop students' professional activity, including in the field of education, research and innovation.

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Keywords: Key competence; geographical research competency; research plan.

1. Introduction

The present day European educational system lays the emphasis on the formation, promotion and development of students' necessary competences in order to successfully enter the professional activity. The documents elaborated by the European Commission stipulate the following: *a key competence refers*

to a set of multifunctional and transferrable knowledge, in our case geographical knowledge, abilities and attitudes all individuals need for personal development, social and professionalintegration.(http://keyconet.eun.org/c/document_library/get_file?uuid=947fdee6-6508-48dc-8056-8cea02223d1e&groupId=11028). The research competency is important for a future specialist, based on a variety of specific competencies for research plan: the identification of the research issue, the formulation of goals and research objectives, the elaboration of the working hypotheses, the selection of information, the choice of strategies, the design of research, the presentation of results, the application of competencies, the evaluation of the research process and of the obtained product.

2. Theoretical Foundation and Related Literature

A competency is *"the certified capacity to select, combine and use knowledge, abilities and other acquisitions (values and attitudes) adequately",* with a view to solve successfully a certain activity or learning situation. The competency is detailed from the perspective of responsibility and autonomy similarly as in the European Qualification Framework (the recommendation of the European Parliament and of the Council of the 23rd April 2008 as regards the European Qualification Framework for Lifelong Learning). The competencies are classified into two categories:

1) Professional competence represents the certified capacity to select, combine and use knowledge, abilities and other acquisitions (values, attitudes) adequately, with a view to solve certain categories of working or learning situations successfully, under efficiency and performance conditions;

2) Transversal competences are the competencies which transcend a certain domain or program of studies, having a transdisciplinary character. They include teamwork skills, oral and written communication skills, maternal and foreign language communication skills, ICT skills, problem-solving and decision-taking skills, diversity and multiculturality understanding and respect abilities, autonomy learning, initiative and entrepreneurial spirit, opening for lifelong learning. (Dulamă&Ilovan, 2013)

3. Methodology

The main objective of the study was the developing of a wide range of specific research competencies to students through the progression of the elaboration stages of the graduation papers, of the papers for the Scientific Conference for students and of the elaboration of the methodical-scientific papers for the didactical qualification –level one, by using interactive didactic techniques.

*The working hypothesis***:** if the students is actively involved in the experiment for the elaboration of the graduation papers, of the papers for the Students' scientific conference and for the methodical-scientific papers for the didactical qualification –level one, through using interactive didactic techniques, then develop geographical research competency.

The Procedure used in the achievement of the study refers to the choice of a number of10 students who were elaborating their graduation papers, of 10 students who were preparing the papers for the Students' scientific conference and of 10 teachers from Primary and Preschool education cycle who were elaborating methodical-scientific papers for the didactical qualification-level one.

The didactic experiment for students and didactic staff had been developed during the university year 2014-2015 at the Education Sciences Department from the Faculty of Education Sciences, University of Pitesti, Romania.

4. Results and Discusions

The practical model of the research refers to:

o ***The competency to formulate the research theme, the aim and objectives and the algorithm of applying techniques.*** The choice of the theme, the projection of the research activity, and the didactic method used was brainstorming. This method represents the formulation of many ideas as a response to a given situation, following the principle that quantity generates quality (a large creative capacity is necessary in order to reach viable and unedited ideas. The stages of brainstorming are (Miu, 2013):

- The choice of the theme and of the working task;
- Brevity in expressing all ideas and with no censorship. Critical references will not be allowed;
- Exposure of all ideas in writing (on the blackboard and flipchart);
- Announcing a break for clarifying ideas (from 15 minutes to one day);
- Restate the ideas presented and their arrangement into categories, symbols, keywords, images representing different criteria;
- Critical analysis, evaluation, argumentation, re-argumentation of the previous ideas, at the class level or smaller groups;
- Selection of original ideas or of the closest feasible for the topic under discussion;
- Posting the resulted ideas in many varied and original forms: words, sentences, collages, images, drawings, songs, role-play, etc.

The advantages of this interactive method are (Miu, 2013):

- Active participation of all students and teachers;
- Developing capacities of living certain situations, to analyze them, to take decisions as concerns the choice of the optimal solution;
- Expressing one's personality;
- Exercising creativity and certain open attitudes at the group level;
- Developing interpersonal relations through the exploitation of individual ideas;
- Achievement of a warm and emulative climate.

Limits:

- Its efficiency depends on the moderators' quality to handle the generation of ideas;
- The ideas/solutions expressed by students and teachers can have an idealistic character;
  - In the first part, I proposed students and teachers to formulate themes which could interest them in the elaboration of the graduation papers, papers for the Scientific conference or methodical-scientific themes for the didactical qualification- level one, being entered in the following table subsequently;

- In the second part, the students and teachers presented their themes, completing the first column from a proposed table. After that, the most scientifically relevant themes had been debated, corrected, selected and entered the second column of the table;

- The third part included the research process which stays at the base of the research proper according to the following stages (Dulamă, 2008,2013):, the choice of the research theme (the selected theme), the elaboration of the research plan (investigations in the local level, accumulation of material, the methods used), paper elaboration, paper presentation according to the schedule, paper evaluation.

o ***The competency to select adequate methods for the chosen theme, the scope, the objectives and the algorithm of applying interactive techniques.***

- In the first part, I proposed to students or to teachers to study a text about the methodology of research methods used in the geographical research and to choose the relevant ones for their own research.

- In the second part, the students and the teachers selected the methods used in the research. They brought arguments for the use of interactive methods such as: brainstorming, projection, case study, laboratory practical activities, activities developed in nature, exercise, modelling, the experiment, algorithm, logical-mathematical modelling, the debate, computer assisted instruction, comparative study, documentation, investigation, monograph, creative learning, report, presentation, scientific paper, discovery, simulator learning underlining the strong and the weak points.

- *The exercise* represents a learning method in which the practical/real interactive action prevails. This method involves the automation of didactic action through the consolidation and improvement of basic operations which ensure the achievement of a didactic task at specified and recurrent performance levels. Efficient under pedagogical organization it supports the acquisition of specific geographical information and capacities by forming certain skills which can be permanently integrated at the level of different teaching-learning-evaluation activities.

The pedagogical value of the exercise reflects the integration level of the acquired skill in the design and achievement structure of the learning activity. This allows a permanent intervention of the exercise in the learning sequences which requires the control, retrieval, application and analysis of the subject in terms of concrete objectives which targets not only the consolidation of skills but also the development of operative capacities of re-actualized/profound information and capacities in different didactic contexts with a view to eliminate or to prevent the interference or obliteration of notions, rules, formulae, principles, laws, theories, etc. Didactic exercises can be classified according to their degree of complexity (simple, semi-complex and complex) or control exercises of automated action (controlled, semi-controlled, self-controlled exercises). The use of this method to a large extent led to a classification based on the share of intellectual capacities necessary for their solving:

• knowledge exercises of some notions, formulas and methods;

• applied exercises of certain known algorithms or formulas;

• exercises which allow the acquisition of a notion.

The advantages of the method are seen in the results of its application: by forming a productive thinking, it offers the possibility of an independent work and activates the critical and self-critical sense to students through self-appreciating the results and the working methods. This method does not only contribute to the formation of working skills and abilities but it also brings a considerable infusion to the

development of a flexible and operative reasoning. The third part emphasizes the conclusions that followed the application of interactive techniques which contribute to the arrangement of thoughts, to the development of imagination, to constructive ideas for the research theme, to originality. We present some interactive group methods below:

The cube- represents a technique through which a theme is studied from several perspectives. The sides of the cube contain interactions the students have to solve: describe, compare, analyze, associate, apply and argue.

The WENN diagram is made up of two ellipses which superpose partially. Similarities are grouped in their intersection and differences between two elements, ideas, phenomena will be noted in the inside of each ellipsis.

The cluster is a brainstorming method which impel students to identify the connection among ideas and which develops following the next steps:- the teacher writes a word (which refers to the research theme) in the middle of the blackboard;- the students enumerate and communicate all ideas, structures or information connected to the respective theme. The teacher notes them around the initial word, making the necessary connections;- in the shaped cluster, new words and ideas are written and the apparently related words are united by lines;-the activity ends when ideas run low or when the time limit is reached.

The diagram of causes and effects in a research offers the possibility of emphasizing the sources of a problem, of an event or of a result. The diagrams are used by the research group as acreative process of generating and organizing the main(primary) causes and minor(secondary) causes of *an effect*. The organization *rules* and the execution *stages* of the diagram of causes and effects are the following:

- The group of students is divided into working teams;

- The matter to be discussed is established which is the result of a special event or happening and namely the effect. Each group must analyze an effect;

- The debate takes place in each group in order to discover the causes leading to the effect;

- Building the diagram of causes and effect is described as it follows: - effect is figured in the main axis of the diagram; - major(main) causes of the effect corresponding to the 6 questions: WHEN, WHERE, WHO, WHY, WHAT, HOW? are put on the arms of the main axis; Minor(secondary) causes are analyzed and put on a smaller arm which is deduced from the one of the major cause;

- The list of causes generated by each group is analyzed, conclusions are drawn and the importance of major causesis determined.

o **The competency to elaborate a working hypothesis and the algorithm of applying interactive techniques.** The working hypothesis is elaborated according to the research theme by students in writing. The paper was read, corrected and commented upon within the group. The applying this techniques allow students to systematize their thoughts, to develop imagination, to accumulate constructive ideas for the research theme, to approach the subject in a personal manner in a relatively short period of time.

o **The competency to process information sources and the algorithm of applying interactive techniques.** In applying this competency we used scientific documentation and selection of bibliography, the study of information sources, denoting and systematization of information. Scientific documentation includes a set of self-instruction techniques through which one can acquire and develop the research competency. In achieving this stage, students and the other participants to the scientific research need

following skills: to understand a text in the lecturing process, to elaborate and support the arguments and counterarguments, to systematize and structure the ideas and information, to interpret the information and all materials, to self-evaluate. The students work with the information sources using *"Source processing worksheet"* this one being used successfully in elaborating accounts, articles, graduation or dissertation papers, methodical-scientific papers, etc.

    o   ***The competency to establish relations among objects, to correlate processes and phenomena and the algorithm of applying interactive techniques.*** Defining basic terms and key concepts of investigation is important for the respective research**.** This working stage had been achieved by using the technique *"Key-terms -revised"* which aims at settling relations among these terms, from cause to the effect or the sequence of events, or among different phenomena presented in the text, such as the correlation or description of a process or phenomenon described (Dulamă, 2002,2008). Hereafter, papers are verified, mistakes are corrected where necessary and strong and weak points are debated. By applying interactive techniques, the students and other researchers get used to differentiate and define the basic terms, key concepts of their research.

    o   ***The competency to formulate conclusions and the algorithm of applying interactive techniques.*** For the complex research of a geographical object or phenomenon we used the technique *"SWOT analysis"*. The materiality of the SWOT analysis lies in the fact that the internal characteristics of an object, phenomenon or process, strong and weak points are analyzed concomitantly, then external influences. Positive eternal factors or conditions are considered as possibilities or opportunities and the negative ones as dangers, hazards and threats (Dulamă, 2008). By applying interactive techniques, the students and other researchers get used to delimit and define basic terms, key concepts of their subsequent research. In a SWOT analysis, one can distinguish two categories of components grouped according to their location environment. Thus, in the internal background, one can identify *the aces (A)* or strengths**,** through which the area or the respective domain can achieve a rapid implementation of the phenomenon and the *weaknesses (W),* which restrict the implementation of the geographical phenomenon or process. These depend on the internal characteristics of the geographical phenomenon or on the external background where one can identify *opportunities(O),*represented by the conjuncture which support the implementation of the elaborated strategy and the *risks(R),*meaning those threats which might influence the achievement of the set goal.

Through the SWOT analysis, students develop their competency to analyze a geographical object, process, phenomenon or aspect from four different perspectives, to support their opinion, to settle causal relations among objects, processes and phenomena, to anticipate and predict the evolution of certain systems.

    o   ***The competency to elaborate a paper or to write a paper and the algorithm of applying interactive techniques.*** This working stage used the technique *"The paper"*, which consists in elaborating a paper based on individual investigation, which synthesizes the essence of a problem or of an idea from a work having the same theme, in a written form, including personal opinions on the subject. The content of the paper has to be logically structured, with argument presentation for the support of the ideas presented. During seminars, I explained the algorithm of paper elaboration to students with: - choice of the theme, documentation (selection, study of information sources, plan of ideas, elaboration of a bibliographical sheet, elaboration of a plan of structuring the selected ideas. The next stage contains the

elaboration of the paper, following the devised plan, respecting orthography, punctuation, etc. Writing a paper takes a long period of time, from a few weeks to months, according to the designed objectives. Through *"Papers"* students develop intellectual work competency and individual research manner.

o **The competency to present a paper publicly and the algorithm of applying interactive techniques.** A paper elaborated through research by students can be presented in several ways, using techniques of graphical organization of information. In this case, we proposed the technique *"Poster"*. This technique is a presentation of a paper under the form of a poster and is an interdisciplinary transfer method of assigning information. It can be applied in a group or individually using diverse didactic materials: photos, drawings, illustrations. The images ca be accompanied by adequate verbal structures: During the seminars I informed the students about the methodology of elaborating a performance P*oster* with: - content (short title, written in capital letters, abstract, methods of research, results obtained presented through essential ides, general conclusions, selective bibliography, illustrations, carts, diagrams, maps, name of the student and contact data);-manner of presentation (dimensions of the poster, scientific and linguistic correctness, illustrations have to be of good quality and aesthetic and correctly positioned in the content.

Through the *Poster* techniques students develop the competency to present the materiality of the studied paper in a synthetic, logic and aesthetic form. Its use has the following consequences:

- Valorizes the diverse types of intelligence: uses different didactic materials: photos, drawings, illustrations;
- Favors communication due to cooperative activities; identification of characteristic elements of a theme which target situations, processes, phenomena, communication and relational contexts;
- Contributes to creating varied verbal structures: curiosities, messagesand reflections;
- Cultivates team spirit;
- Obtained products are based on a synthesis capacity.

5. Conclusions

The promotion of professional competencies of the future specialist who is expected to know, understand and guide his student represents the goal and the objectives of educational program at curricular disciplines and extracurricular activities. After having applied this didactic experiment we found out that the strategy applied in the research activities of students and teaching staff was very efficient through the fact that:

- Certain difficulties can be avoided during the research;
- We monitored and appreciated students'activity through analyzing their manner of solving the working tasks permanently;
- We succeeded to create a rapid feed-back by applying an active working and individual research style;
- Applying the research competencies for students through the use of interactive didactic techniques, we formed the basis for the development of professional activities in the field of education, research and innovation.

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