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**CREATIVE VISUALIZATION AND COMPUTER LITERACY IN
TEACHING GEOGRAPHY DIDACTICS TO STUDENTS**

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Abstract

This paper was drawn up based on the motivation to argue the contribution of creative visualization and informatics in the development of intellectual work skills of students and which, during the years of faculty, become didactic competences. The totality of computer elements along with the creative view can stimulate the classes, as students can be asked to follow an educational video, pursue a PowerPoint presentation, search for different information on the Internet, and even communicate within an online group or fill in a blog page with various comments on a subject of geography didactics etc. Applying creative visualization in line with computer science as a technical method of using the power of image and imagination is quite important in the process of teaching and learning the knowledge of Geography Didactics. Teaching Geography with the help of educational software is an alternative method of high relevance and usefulness. Educational software is a software product, available in various formats, which can be used on a computer and which usually represents, having a multimedia and/or interactive character, subjects, themes, experiments, lessons, classes, learning units etc., being alternatives to traditional educational methods. By using the didactic computer techniques, we have laid the basis for the development of the professional activity of the students, including in education, research and innovation. Personal concerns in promoting the geography-computer science-creative visualisation interface for the Education Sciences focused on my entire instructive and educational activity in recent years, especially in Geography Didactics classes, and the conclusion was that the possibilities are unlimited.

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1. Introduction

Information systems evolve in different hardware configurations and allow the development of educational software (software specially designed for learning), appropriate to the purposes, content, time, and integration of the classes taught to the students. In appreciating the importance of computer resources (especially multimedia) in the teaching of geography, in establishing the place they have among other means of passing knowledge, it must be taken into account that geography deals with the study of objects and phenomena which practically students do not have the opportunity to observe directly. In this case, teaching materials are used: maps, drawings, sketches, teaching videos and so on. Typically, these materials present a single object or phenomenon. The presentation is global and static, making it difficult to analyse the dynamic element of the phenomenon, while the multimedia computer is able to present objects and geographic phenomena in varied forms and to reveal at the same time the structure and the way of manifestation.

In addition to the multimedia resources provided by the educational software, the resources provided by the global computer network - the Internet - can also be integrated into Geography Didactics. The pedagogical literature has made an inventory of computer products and even a classification model:

According to the content reported, made available:

- data display: topic lists, keywords, tables, records, catalogues, ordered situations, files, menus, layouts, strings of characters;
- presentation of texts: edited written papers, summaries, document synthesis, worksheets, instructions, plans, programs, messages, scenarios, commented quotes, dialogues, strings of questions, dictionary of terms and names, documentary sheets, assessment tests, games;
- dynamic symbolic presentations: schemes, drawings, maps, static or dynamic graphics studies, static or animated images, charts, simulations, developments, demonstrations, games, applications, visualization.

According to the objectives pursued:

- for diverse documentation;
- for simple, animated, comparative demonstration;
- for practicing algorithms, methods, techniques, applications;
- for simulations of methods, actions, situations, processes, states;
- for consolidation, fixing, recapitulation, systematization;
- for learning through research, analysis, comparison, synthesis;
- for assessment, verification, appraisal, correction;

According to the pedagogical aim pursued:

- to optimize the teaching-learning-assessing strategy;
- to present other information, algorithms, learning paths,

According to the manner in which the information is displayed:

- through text;
- by image;
- through graphics;
- by sound;

- combined;
- through specific technical underlining;

According to the student-computer dialogue mode:

- by using specific commands;
- by asking questions;
- by requesting full or partial programs;
- by displaying and choosing menus;

According to integration into the lecture:

- in relation to the stages of the lecture: in all stages, from the provision of conditions, to the evaluation;

- in relation to available time: from solving a task (few minutes) to using most of the time.

For a uniform methodical use of the computer, a methodological guide for teachers is needed, as well as creating an inventory, an IAC library, always up-to-date, parallel to the technological and methodological advances recorded, by discipline, by objectives, as an aid to school manuals, in covering curricular programs. Each IT application will have a specific presentation sheet (Miu, 2013; Radu & Ezechil, 2005).

2. Problem Statement

As known, computer elements are means for conveying information systems, comprised of a plurality of equipment's, methods, techniques, contents for collecting, recording, retrieving, displaying various information in different ways or combinations. Information systems evolve in different hardware configurations and allow the development of educational software (software specially designed for learning), appropriate to the purposes, content, time, and integration of the classes taught to the students. In education using media sources make changes: for students, it is a new way of interacting with knowledge, facilitating the discovery and construction of knowledge through their own effort (Tudor, 2016.)

In appreciating the importance of computer resources (especially multimedia) in the teaching of geography, in establishing the place they have among other means of passing knowledge, it must be taken into account that geography deals with the study of objects and phenomena which practically students do not have the opportunity to observe directly. In this case, teaching materials are used: maps, drawings, sketches, teaching videos and so on. Typically, these materials present a single object or phenomenon (Cerghit, 2006).

Creative visualization and computer literacy are a method/technique of significant use of the power of imagine and imagination in the process of teaching and learning/geographic knowledge. Possible educational designs that can be developed could include different types of open resources, provided they are adapted to efficiently training (school skills development, reporting to scientific and essential content transmitted to pupils, respecting students individual and age particularities etc.): a set of presentation slides with a few bullets of text per slide; a collection of videos from an actual course, in which the teacher provides the most significant content and answers content-related questions (Tudor, 2017).

In order to understand and use the creative visualization in the process of teaching didactic methodology, we will proceed from the following premises:

- a) image reasoning preceded and precedes thinking with words and in words;
- b) imagination and imaginary, although they are primary forms of geographic reasoning, are used by the human conscious, the superconscious, but also the preconscious in expressing contents.
- c) psychical life, but especially our perception, memory and representations are based on the functioning of links which are visible or not, having meaning or not between things, events, states.

3. Research Questions

The main **objective** of the study is the correct use of the computer, requiring the *prior computer technical training of students and teacher*. This training is necessary for the completion of the bachelor thesis and the draw up of works for the Scientific Communication Session. The presentation is global and static, making it difficult to analyse the dynamic element of the phenomenon, while the multimedia computer is able to present objects and geographic phenomena in varied forms and to reveal at the same time the structure and the way of manifestation (Dulamă, 2017).

Creative view is one of the ways to access the expressive contents of the originality of knowledge, including the didactic knowledge, an answer to the problem of identifying new resources for teaching, learning and training in the Geography Didactics. Let's accept first that, from the point of view of the creative visualization, the geographic imagination means "the ability to create an idea, a mental representation, a feeling about something specific, with the representation of a geographic phenomenon. By using language, the creative visualization, through the imagination or the imaginary, generates an idea, a state, a feeling, by centring and focusing on a certain meaning; we give energy to the motivation to accomplish something real, to achieve the objective that was set - be it physical (comfort, vital energy), emotional (satisfaction), mental (learning ability), spiritual (serenity). The reforms of the education system have as objectives the change of mentality and the formation of flexible teachers; the reasoning of formal education requires us to adjust the relationship with the students and between students, by promoting mutual support and constructive dialogue through new strategies.

Although it proves to be more difficult to implement, the curricular integration model requires strong skills from the teachers, the restructuring of traditional class schedules, and the implementation of institutional resources. The Geography Didactics, as an educational discipline, has many instructive and educational valences, and the interdisciplinary approach of teaching and learning has a positive effect on academic performance. Along other disciplines and with them, geography has an important contribution in educating and training students. All the content to be taught is necessary to be scientific and the teacher has the duty to capture those approaches that can allow moving from an excessive theorization to forming the ability to understand the facts and geographic phenomena. Considering the increase in the volume of information, it is required to extract the informative data, to update it, give up the detail aspects that usually lead to overloading.

As a result of watching these videos, discussions can be conducted; causal or interdependence relations are established, as well as the mutual influence between geographic phenomena. The discussion between teacher and student may include the following types of questions:

- questions asked by students to supply information;
- questions asked by the teacher to allow students to reason out themselves the new information;

- answers given by students or teachers.

The following steps of the class refer to:

- map location of the places shown in the documentary. The teacher will ask the students to show on the map the geographical areas, the localities, the hydrographical network that have been nominated in the film;
- systematization of information. After the discussion based on the video, the teacher organizes graphically and schematically the new information on the board, and the students in the notebooks;
- conclusions are drawn;

4. Purpose of the Study

Computer software application models for Geography Didactics classes and methodical use of software

During Geography Didactics classes, I use the conversational-heuristic-inductive didactic strategy type with the alternative of using the teaching methods. The software presents a set of photographs and geographical explanatory drawings, cartographic supports reflecting the representative relief forms, the physical map of Romania for their location. These means can be materialized through the computer or be associated with it under the form of posters or teaching portfolios available in the classroom. The two factors - the teacher and the student - act through these means. Students are addressed questions to which answers are expected concerning the enumeration and argumentation of the action of agents and predominant geomorphologic processes that generated relief types that are specific to the natural environment. We exemplify a methodical sequence of merging classical methods (conversation, working with the map, demonstration with photos) and the computer. Computerized application products that can be developed in geography and used in IAC are found in all of the above types. These means can be materialized through the computer or associated with it in the form of posters or teaching portfolios available in the classroom. These are shown in Table 01 and Table 02.

Table 01. Overview of genetic relief types

Genetic types of relief	Agents and geomorphologic processes	Representative relief forms	Typical geographic areas
Underwater relief	Erosion and underwater depositions	The continental shelf	Black Sea Continental Shelf
Coastal (Maritime) relief	Erosion and marine depositions (water waves and level oscillations)	Coastline Waterfront, beach Lagoons	The Romanian Black Sea Coast (G. Musura - VamaVeche)
Fluvio-maritime relief	Joint action on river depositions and sea level oscillations	Delta Maritime grind Fluvio-maritime liman	The Danube Delta
Fluvial relief	Erosion action and carrying away of fluvial organisms	Meadows Terraces Depositional fields Fluvial liman	The Danube flood plain River meadows and valleys Western Plain and the Romanian Plain
Piedmonts	Erosion and torrential accumulation at the base of high regions	Piedmont interfluves Plateaus Piedmont fields	Getic Piedmont (Getic Plateau) Western Hills

Glacis and pediments	Recovery of slopes due to denudation	Glacis Pediments Glacis fields	The North of the Dobrogea Plateau (pediment) The Glacis Plain of the Curvature Subcarpathians
Denudation relief	Water action (diffuse or organized)	Torrential organisms Temporary streams, gullies	The Subcarpathians Bucegi Mountains (The Suspended Plateau)
Structural relief	The influence of the structure on the morphogenetic processes	Block Mountains Plateaus and cuestas Monoclinial relief Folded relief Volcano-sedimentary relief	Ceahlău Moldavian Plateau The Curvature Subcarpathians Bucegi Mountains

Table 02. Presentation of the genetic types of relief at the basis of the natural environment

Genetic types of relief	Agents and processes	Representative relief forms	Typical and characteristic areas
Volcanic Relief	The action of forming the relief due to volcanic activity Erosion on volcanic rocks	Building Relief (cones) Erosion relief Explosive relief (craters)	Volcanic Chain of the Oriental Carpathians Metaliferi Mountains
Petrographic relief	Influence of rock characteristics on erosion	Karstic relief Relief formed on conglomerates, sandstones, clays, granite, crystalline shale etc.	Calcareous regions (karstic) Areas with specific rocks
Gravitational forms and processes	Influence of gravity action on some rocks and shapes	Rock-falls Earth slides Mudflows	The Subcarpathians The Moldavian Plateau
Polycyclic modelling relief	The action of external modelling factors over a very long time	Erosion floors Peneplains and pediplains	Southern Carpathians Western Carpathians Casimcea Plateau
Glacial and periglacial relief	Quaternary glaciers Snow Frost - thaw	Ice circles Glacial valleys River floodplains Talus deposits	Southern Carpathians Făgăraș Depression

Use of educational videos in Geography Didactics classes

An educational video can be defined by the phrase “moving images used during teaching-learning”. The educational video with sound stimulates view, attention, hearing, intelligence and creativity. Using educational videos in teaching - learning geography in class hours offers a wealth of advantages, because:

- the knowledge of remote, inaccessible land areas in our country (mountains, caves etc.) is facilitated;

- it presents facts and events that happened a long time ago (the formation of mountains, of natural resources, the formation of the Danube Delta etc.)

Types of educational videos or geographic documentary videos used in teaching the Geography Didactics

Most commonly used educational videos are classified according to the following criteria:

a) According to the support material, there are several types of videos:

- videos on 8mm or 16mm film;

- movies on video tapes;
- videos on electronic support (CD, DVD);
- videos on the internet;
- videos stored on the hard drive.

b) According to the purpose of the educational video, there are:

- the motivational video that aims to keep the students stimulated to study and trigger the need for knowledge and action;
- the lecture video presents: phenomena, processes and events in the order of the course's structure;
- the synthesis video is integrated at the end of a chapter or of a theme, after the video's structured issues have been developed, having a role of summary, systematization and consolidation (Mihăilescu & Pițilă, 2006).

5. Research Methods

Based on my educational practice, I could give some examples of Internet and educational videos. Thus, the Internet has several advantages that give it an important pedagogical potential. Therefore, by using the Internet during classes, the teacher and students can:

➤ document themselves, obtain up-to-date information, especially in areas such as population geography, settlement geography, economic geography, geography of the environment; information can be obtained very easily using various search engines. Google has the world's richest content and has developed many search-related products, out of which, for geography, *Google Image Search*, *Google Maps*, *Google Earth* are very useful;

➤ benefit from multimedia resources made available and downloaded from various websites in the field of geography or related disciplines (e.g., www.geo-net.org, www.geomagazine.fr, www.geo.edu.ro, www.nasa.gov and more);

➤ explore a real world as well as a virtual one; this allows the students to overcome the limits imposed by the immediate reality and to see into the imaginary, into the past or into the future.

The Web space offers infinite research facilities for teachers and students. Simulations and video demonstrations for the water circuit in nature, patterns for pollution or for wind trails can lead to a geography class with a high level of interest and contribution of the student. In relation to training issues, computer resources can be effectively integrated into geography in several situations:

➤ to view information, through the succession of images, displaying of schemes, plans, interactive graphics, presentation of models, dynamic images, assembled as multimedia presentations in Microsoft Power Point;

➤ as an electronic board, for the development of various visual images, simple or in combination: drawings, diagrams, schemes, underlined texts, varied writing;

➤ for simulation of geographic processes or functional models (soil erosion, circuit of water in nature, dynamics of tectonic plates, Romania's relief etc.);

➤ for training and application exercises, usually in the form of a questionnaire, some of which can be presented as a game to learn, for example, the location of some states, relief units or geographic coordinates;

➤ for statistical and/or graphical editing - such as the sorting and processing of meteorological, hydrological, demographic data and the development of appropriate graphical representations: diagrams (histograms, chirographs etc.), cartograms, hydrographs of levels and flows etc.;

➤ for mapping and different cartographic editing, by using special programs that offer map backgrounds (which can be filled in), data files, data processing types, symbol libraries that are very useful for students to learn cartographic notions;

➤ for the analysis of electronic maps within a geographic information system - GIS, which allows the complex and objective characterization of geographical units;

➤ for the analysis and processing of satellite images and obtaining detailed geographic information on some territories;

➤ for editing texts and/or documents: both by the teacher, for the lesson (tests, charts, maps, questions) and by the students, for example for an oral presentation, a paper, a project etc.;

➤ in the projected assessments (initial, continuous, summative) the computer checks, records the results, interprets them from a quantitative point of view, stores banks of items of different categories, performs the automatic correction of the answers. Even if this system facilitates the correction and makes it objective, it is suited only to assess incontestable plain knowledge, for example, locations, names, figures etc. Its most popular form is the multi-choice grid or questionnaire.

The harmonious blending of human intelligence with the artificial intelligence of computers leads to generating new ideas, solutions, technologies, and performance enhancement.

6. Findings

Learning situation during the class, based on watching a geographic video (Bernat, 2003).

Throughout this learning situation, students will be able to:

- observe the production of geographic phenomena (earthquakes, floods, droughts), in a documentary video;

- identify the causes, geographic areas where these phenomena occurred, in a documentary video;

Learning situation by making a geographic documentary video scenario

Throughout this learning situation, students will be able to:

- describe three real geographic scenes intended to be filmed specifying what essential elements will be insisted on during filming;

- to imagine the content to be presented during each scene of the video;

- to create a script based on the chosen subject;

- work will be done by groups of three students. Each group will develop the scenario of a documentary video with geographic content. A topic will be selected and at least three filming locations will be identified;

- students can identify an environmental issue from the local horizon or a subject that will be the theme of the documentary video;

- to draw up a scenario based on the selected topic;

- to draw up the commentary associated with the documentary video;

- to shoot scenes of the environment with the help of a digital camera (Tomescu, 2017).

7. Conclusion

The integration of IT resources in the classes of Geography Didactics can be achieved at all stages of the lecture, from the apperceptive training to assessments and seminars and in all types of classes, resulting in strategic variants depending on the teacher's style.

In terms of time: from solving a task (a few minutes) to using most of the time. In a word, computer literacy is determined by the flows of connections, the optimal learning strategy involving the creation of imaginative associations with the computer, meaningful between different subjects.

The two types of learning - induced (but supported by computer resources) and interactive - can coexist, each in a certain percentage, given the resistance of tradition and some qualities the traditional system has, which is a factor of incitement of intellectual capacities - both as a manifestation and as a development. The harmonious blending of human intelligence with the artificial intelligence of computers leads to generating new ideas, solutions, technologies, and enhancement of performances. Particular attention should be paid to the correlation of geography knowledge with the knowledge acquired in other disciplines in order to facilitate in students the formation of a complete and unitary image of the reality on the environment and to facilitate the interdisciplinary transfer of knowledge.

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