

STUDIES ON TEACHING BIODIVERSITY BY THE USE OF ONLINE INTERACTIVE IDENTIFICATION TOOLS

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Abstract. *Modern teaching methods and learning with educational soft allow education to adapt to current and future needs of modern society. Computer-assisted learning for specific biodiversity study with on line K₂N tools facilitate the work of learning capacity for observation, consolidation of knowledge and intellectual skills. Interactive educational tools are innovative educational solutions, student-centered, replace conventional identification keys of identifying the organisms and exploit the interdisciplinary character: digital skills, concepts of plant morphology, systematic botany. Through modern and accessible design makes easier the learning process of main morphological characteristics of living organisms, allowing the correct identification and recognition of the species studied. E-Learning development platform, availability of instruments in various forms is particularly important because students can access the tools outside the classroom, the study of ecosystems or visits home, strengthening the knowledge. Following the comparative study conducted at two classes of students using the teaching with K₂N tools approach to one class test results showed the effectiveness of their particular teaching-learning-evaluation.*

Keywords: biodiversity, teaching approach, e-learning assessment, on-line teaching tools

INTRODUCTION

Biodiversity represents the variety and variability of living organisms, ecologic complexes, being a dimension of variety at gender's, species' and ecosystems' level [4]. Every species has a place and a very well defined role in the natural ecosystem's frame. The relations between the ecosystems' species are very complex, of different kind, feeding habits, reproduction, defend, so that the disappearance of some species can bring huge imbalance in the ecosystem [2]. Knowledge of biology diversity through curriculum and extra-curriculum activities is one of the main objectives of environment education. Respect cultivation for biodiversity is distinctively important, the students have to be aware that every specie has its own place and role in the maintenance of ecologic balance, biodiversity makes safe the order of the planet, as it intercedes in climate adjustment, keeps the air clean, gives us food, resources, medicines and potable water. The study of biodiversity is a complex process, supposes the blend of classic educational methods: observation, simulation, explanation, study visits in natural, anthropic, botanic gardens, zoological museums, vivariums ecosystems with the modern ones: educational softwares, questioning, research team-projects. These allow the forming of some abilities in measurement, phenomenon recognition, ecosystems characteristics' research, species' defining, environmental adaptation.

EDUCATIONAL PROCESS

Didactic methods

Didactic methods- recruited and used skillfully- lead to systematic and progressive enrichment of knowledge, so educational methods can be defined as

"ways of acting with which the students can independently or under the guidance of teachers acquire knowledge, build up their skills, abilities and attitudes, the world and life outlook [5].

Modern methods of teaching and learning with educational soft wares help students providing a large amount of well organized and structured opportunity for practicing skills, use of information and training of operational skills in various fields of knowledge, allow simulation of processes and phenomena hard or impossible to access directly [1], [3].

We conducted a comparative study on two classes of students in teaching Spermatophytes. Teaching methods used in those two classes were identical: observation, modeling, study tour, explanation, botanical atlas work, worksheets, and at one class I used a computer assisted learning, key determination: Trees and shrubs and a tool that we developed with team K₂N: Gymnosperms spontaneous and planted in parks [7].

Computer-assisted learning in specific biodiversity study with the help of on-line K₂N tools [6] facilitate the learning developing the capacity of observation, enhancing knowledge and intellectual skills (Fig.1).

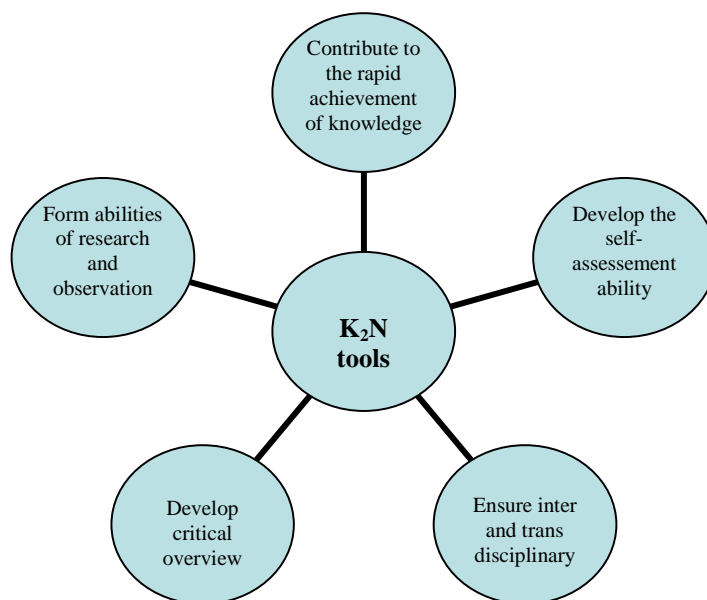


Fig. 1. The advantages of using K₂N tools

Learning Activities

Learning activities has as purpose students' achievement of some knowledge concerning the environment, general characteristics, representative species and the economical and ecological importance of Spermatophytes. The contents were planned to be studied during two lessons for each systematical group: gymnosperms and angiosperms. The competences that were followed up during the learning activities were: to identify the general characteristics, to describe the flower and the inflorescence, to identify species that belong to gymnosperms and angiosperms, and to sustain the importance of Spermatophytes.

Up to now, I will call Grade A and Grade B the classes where I used the tools K_2N in order to identify the species. There were two lessons for studying the gymnosperms. During the first lesson I taught the general characteristics of gymnosperms, the students were divided in four groups, they have studied the biological resources, they noticed the morphological characteristics of leaves and cones identifying the main characteristics of Gymnosperms, that were written on the work sheet. During the second lesson, Grade A used the botanic atlas in order to describe five representative species of gymnosperms. Grade B studied during the second lesson in the Informatics Lab, they worked in teams of two and three students. After introducing K_2N tools – **Spontaneous and Cultivated Gymnosperms**, I gave the students the vegetal stuff and we identified together the *Taxus baccata*, the students filled in the specie's characteristics in the Worksheet.

The students identified four more species of gymnosperms and filled in the worksheet their characteristics. The learning activities for angiosperms were the same as for gymnosperms. The tool used to identify species at Grade B was: **Arbors and scrubs** on the K_2N platform. The next lesson took place in Parcul Feroviarilor, near the school. During this studying visit, the students identified the species described in the lab, they compared the characteristics of different species, they noticed their acclimation.

Methods and Tools for Evaluation

Knowledge evaluation was made through alternative methods: systematic observation, self assessment, practical evaluation – identifying some species using K_2N tools, as well as through classical methods: written papers. The evaluation tool used was a test paper with the main kinds of objective items: short answer items, double choice items, pair items, identifying and classifying, structured questions. The objectives of evaluation were: recognition of leaves and flowers morphological characters of gymnosperms and angiosperms, describing the general characteristics of Spermatophytes and recognizing the species. The both grades have the same test paper. The first objective, identifying the morphological characteristics of leaves and flowers, was followed through many items in the test paper. After analyzing the results, we can notice that the students in Grade B who learned through K_2N tools identified the morphological characteristics of the leaves (Fig. 2) because the determination keys follow these characteristics and gave more wrong answers concerning the morphological features of the flower (Fig. 3).

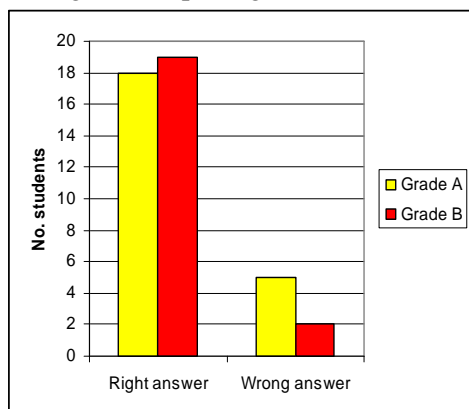


Fig. 2. Item – leaves morphology

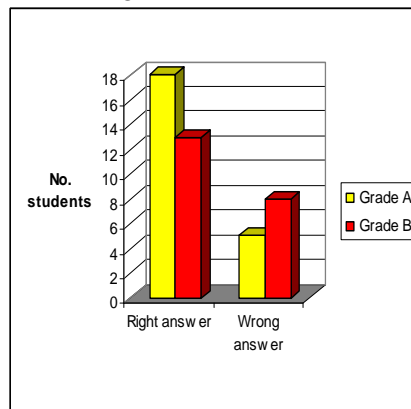


Fig. 3. Item – flower morphology

The objective concerning the general characteristics of Spermatophytes was checked through short answer items, and double choice items. The test paper contains four affirmations concerning gymnosperms and four concerning angiosperms. After analyzing the results we may conclude that the students from Grade B gave many right answers, they found the characteristics of Gymnosperms because they are a smaller group, with some features different from other Spermatophytes: acicular leaves and flower grouped in cones.

The last objective of the test was for the students to make connections between morphological characteristics and the right systematic group, they had to identify and to enclose correctly four species of gymnosperms and four of angiosperms. Students from Grade B had better results, most of the students identifying and enclosing correctly all the species (Fig. 4).

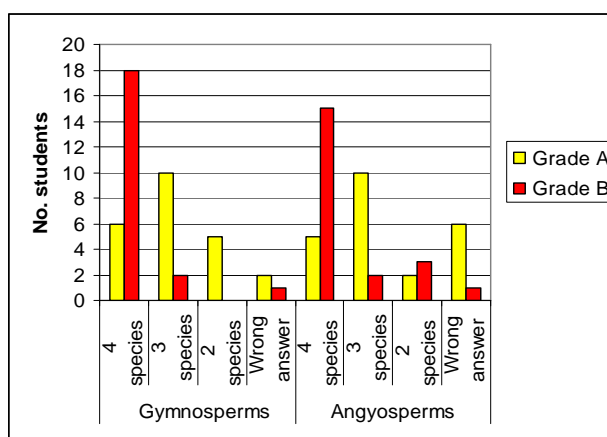


Fig. 4. Systematic recognition and classification of species

Results of evaluation show that the use of identification keys for the study of biodiversity is appropriate, because it allows students to develop observing skills, research and analytical skills, to enhance their intellectual work and to improve digital skills.

CONCLUSIONS

The study of biodiversity in the context of sustainable development is a very important process, conservation of biodiversity is one of the major goals of the scientific community, economic and European policy. Achieving this goal is possible through trans-disciplinary approaches by bringing together traditional methods with innovative teaching, the student are put into new learning situations using modern technology based on observation and analysis, not learning by heart.

Computer assisted teaching by K₂N tools for the study of biodiversity is one way to increase quality and efficiency of teaching-learning-assessment, as the result of the presented didactic process shows. The use of these interactive multimedia tools to identify living PDA on mobile devices held on computers or CD during the visits and study tours made by students, improve the efficiency of training-educational activity to develop research skills, to boost capacity of analysis and observation.

Modern methods of teaching and learning with educational softwares allow education to adapt to current needs and provides career opportunities in today's society.

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