

Abstracts

for

**The XLVth National Scientific-Methodological
Session “Educational Methods and Means for
Chemistry”, Iasi, Romania**

May, 14, 2016

TABLE OF CONTENT

C1. Algorithm-a Way to Increase Accessibility of Concepts Taught in Chemistry.....	53
Luminița Iurașcu, Dănuț-Gabriel Cozma	
C2. Analysis of the Effects Produced at the Level of Target Schoolchildren as a Result of the Activities Held in the Integrated Optional Class Belonging to the Mathematics and Science Curriculum Area	54
Gabriela Ungureanu, Dănuț-Gabriel Cozma	
C3. Chemistry - „the Game with Colored Beads” and the science of managing the proportions	55
Violeta Vasilache	
C4. Milk Analysis – a Starting Point for Teaching – Learning and Assessment of Certain Aspects of Chemistry	56
Monica-Anca Crețu, Liliana Oniciuc, Violeta Vasilache	
C5. Research Project – Interactive teaching-learning-assessment method of Chemistry.....	57
Monica-Anca Crețu, Liliana Oniciuc, Violeta Vasilache	
C6. The Monitoring of Virtual Education Influence in Chemistry Teaching.....	58
Brîndușa Roman, Dănuț-Gabriel Cozma	
O7. Chemistry and Technical Disciplines.....	59
Cristina-Amalia Dumitraș	
O8. Chemistry- between Professional Contentment and Personal Development.....	60
Alina-Mihaela Nistor, Dănuț-Gabriel Cozma, Carmen Mita	
C9. Teacher-between respect and career.....	61
Alexandra Marcu, Dănuț-Gabriel Cozma	

**Organizing committee of XLVth National Scientific-Methodological Session
«Educational Methods and Means for Chemistry»:**

Organizing committee of The XIVth National Scientific-Methodological Session «Educational Methods and Means for Chemistry»:

- **Prof. Ph. D. Ionel Mangalagiu** – Dean of Faculty of Chemistry, «Al. I. Cuza» University of Iasi, RO
- **Assoc. Prof. Ph. D. Ionel Humelnicu** - Faculty of Chemistry, «Al. I. Cuza» University of Iasi, RO
- **Lect. Ph. D. Carmen Mita** – Faculty of Chemistry, «Al. I. Cuza» University of Iasi, RO
- **Assoc. Prof. Ph. D. Doina Lutic** - Faculty of Chemistry, «Al. I. Cuza» University of Iasi, RO
- **Lect. Ph. D. Dan Maftei** - Faculty of Chemistry, «Al. I. Cuza» University of Iasi, RO
- **Teacher Ph. D. Cecilia Foia** - School Inspector Of Chemistry, C.S.I. Iasi, RO
- **Teacher Liliana Iftime** - «Haralamb Vasiliu» Technological High School of Podu Iloaiei, Iasi, RO
- **Eng. Gabriela Pavelescu** - Faculty of Chemistry, «Al. I. Cuza» University of Iasi, RO
- **Mast. Alina-Mihaela Nistor** Faculty of Chemistry, «Al. I. Cuza» University of Iasi, RO
- **Mast. Diana Petrovki** - Faculty of Chemistry, «Al. I. Cuza» University of Iasi, RO

Scientific committee of The XLVth National Scientific-Methodological Session «Educational Methods and Means for Chemistry»:

- **Assoc. Prof. Ph. D. Danut-Gabriel Cozma** - Faculty of Chemistry, «Al. I. Cuza» University of Iasi,
- **Prof. Ph. D. Alexandru Cecal** - Faculty of Chemistry, «Al. I. Cuza» University of Iasi, RO
- **Prof. Ph. D. Pui** - Faculty of Chemistry Aurel, «Al. I. Cuza» University of Iasi, RO
- **Prof. Ph. D. Gabi Drochioiu** – Faculty of Chemistry, «Al. I. Cuza» University of Iasi, RO
- **Prof. Ph. D. Doina Humelnicu** - Faculty of Chemistry, «Al. I. Cuza» University of Iasi, RO
- **Assoc. Prof. Ph. D. Dalila Belei** – Faculty of Chemistry, «Al. I. Cuza» of Iasi, RO
- **Lect. Ph. D. pr. Bogdan-Constantin Neculau** – Faculty of Psychology and Educational Sciences, «Al. I. Cuza» University of Iasi, RO
- **Teacher Silvia Pruteanu** – School Inspector of Chemistry, CSI Bacau, RO
- **Teacher Olivia Gornea** – «Nicolae Iorga» Theoretical High School of Botosani, RO

C1. Algorithm-a Way to Increase Accessibility of Concepts Taught in Chemistry

Luminița Iurașcu,^a Dănuț-Gabriel Cozma^{b*}

^a*1 Secondary School, Tanacu, Vaslui county, Romania*

^b*Faculty of Chemistry, "Al. I. Cuza" University, 11 Carol I Blvd., 700506 Iasi, Romania*

The researches in psychology made by F. F. Gayaraki, G. Lariccia, P. Gherardini, L. N. Landa, C. Bastien, etc. noted that there is a spontaneous tendency in both adults and children, to build an algorithmic structure when facing the necessity of solving problems. Investigations related to this method founded the "algorithmic pedagogy". The authors appealed to experimental teaching methods to determine in what extend the algorithmization is a teaching method that increases accessibility of taught knowledge and if it lead to a more efficient teaching – learning – assessment process. For this purpose, during the 2014-2015 school year, the concepts contained in "Solutions – percentage concentration" and "Chemical formulas" learning units were taught differentiated: in the witness class (VII A) algorithmization was used and in the experimental class (VII B) the algorithmic method had been replaced with the explanation, conversation, exercise and problem solving, worksheets.

Assessment of knowledge assimilated of the two classes' students was performed by applying tests with similar content. The results were compared with the initial premise and average marks obtained in Physics in the previous school year.

The paper also includes a study on the influence of external factors on the academic situation of students from VIIth and VIIIth grades.

The results obtained from this study were statistical evaluated using the SPSS data analysis package.

Keywords: teaching method, algorithmization, statistical interpretation

* Dănuț-Gabriel Cozma, e-mail address: dcozma@uaic.ro

C2. Analysis of the Effects Produced at the Level of Target Schoolchildren as a Result of the Activities Held in the Integrated Optional Class Belonging to the Mathematics and Science Curriculum Area

Gabriela Ungureanu,^{a*} Dănuț-Gabriel Cozma^b

^a*Calafindesti Secondary School, Calafindesti, Suceava county, Romania*

^b*Faculty of Chemistry, "Al. I. Cuza" University, 11 Carol I Bvd., 700506 Iasi, Romania*

The interdisciplinary approach of knowledge in the integrated optional class belonging to the Mathematics and Science Curriculum Area relies on the fact that 8th grade pupils are at the appropriate age when they are able to notice the multiple relationships existing between Chemistry, Physics, Mathematics and Biology. They can use the knowledge they have learnt in these subjects, as part of the common core curriculum in the optional course put forward by the teacher and chosen by parents and pupils – “The Human Body – A Living Laboratory”.

The optional course mentioned above consists of knowledge pupils have already assimilated during courses which belong to Mathematics and Science curriculum area. They have had the possibility to express themselves relying on individual abilities so that information passes via the filter of their mind and soul. The final result has been a better understanding of the human body perceived in a unitary manner.

Taking into consideration that the knowledge which has already been assimilated may be used in everyday life for a better self-understanding, the teacher may offer pupils the possibility to find out that their efforts of learning are not useless and the knowledge previously learnt can be used in a variety of practical activities. The pupils will realize the utility of the notions they have learnt at other subjects to solve the tasks they have in the optional course proposed, interpreting information from an interdisciplinary point of view, being able to analyze and compare notions to choose consciously the field of study they consider appropriate for themselves.

The applicability of this paper consists in an interdisciplinary approach to notions, using not only classical teaching-learning-assessment methods but also modern teaching methods which combine technology, information and communication in digital lessons, that is AeL and TIC. This aspect has led to the correlation between traditional assessment methods and the modern ones – oral and written assessment used in the chemistry lessons and less formal assessment methods such as portfolio (consisting in handwriting or typed information), essays, projects and self- assessment.

The centralization of information acquired after the assessment constitutes a starting point in building a thorough database which will reflect the learning progress and the factors which influence it. The teacher’s intervention will be performed adequately for each pupil taking into account his/her present and future needs.

Keywords: optional, interdisciplinarity, curriculum area

* Gabriela Ungureanu, *e-mail address:* gaby_luk_ung@yahoo.com

C3. Chemistry - „the Game with Colored Beads” and the science of managing the proportions

Violeta Vasilache*

„Stefan cel Mare” University of Suceava, 13 University str., Suceava, Romania

During my years of teaching I ascertained real difficulties from gymnasium and high-school pupils as far as understanding the fundamental concepts in chemistry. Difficulties regarding the understanding of nature’s structure from chemistry’s point of view can also be observed from technical faculties graduated students. About graduated students of humanistic faculties it is too much to discuss, neither about citizens without superior studies. I found even in academic medium, including professors and engineers from technical faculties, cases of ignorance in chemistry, below the level of first years of study of chemistry in gymnasium.

Chemistry continues to be a big unknown, something about you must carry out in everyday life, in particular means that everything containing “chemicals” that is to say bad, toxic and illness. But people, regretful we have to admit, do not understand that everything existing in nature is composed by “chemicals”, even these are naturals, extracted from nature or synthesized through diverse technological processes. Without exaggeration, we have to get a tough conclusion, namely “the king is naked” regarding learning of chemistry fundamentals. This true fact is not referring to our country particularly, but to the whole terrestrial globe, because in all the countries in the world, including the most developed ones, there exist real deficiencies in education of the masses from technical-scientific point of view in general and from the chemistry one in particular.

Trying to give a small contribute to the fundament of a new education in chemistry domain we started a project based on two simple ideas. The first is referring to “colored beads”, collocation inspired from the title of a notorious novel wrote by Nobel Prize for Literature laureate, Herman Hesse, namely “The Glass Bead Game”. We shall present the chemistry, not simpler or out-of-the-way, as a “game with colored beads”. The second idea is to prove that mathematical apparatus used largely in chemistry, but in the whole science furthermore, is those of proportions. Besides, all the laws of the universe are expressed by different forms of writing proportions.

Once the “play rules” of “the game with colored beads” combined clearly by proportions will be learnt thoroughly, it could be possible to progress in study of chemistry and its refinements, but this study will be performed only by some certain students. But the great majority of the people will remain with solid bases in chemistry, useful for life and nature understanding.

Keywords: chemistry, education, colored beads, proportions

* Violeta Vasilache, e-mail address: violetav@fia.usv.ro

C4. Milk Analysis – a Starting Point for Teaching – Learning and Assessment of Certain Aspects of Chemistry

Monica-Anca Crețu,^a Liliana Oniciuc,^b Violeta Vasilache^{c*}

^a“Vasile Lovinescu” College, 10 Maior Ioan str., Falticeni, Suceava county, Romania

^b“Nicu Gane” College, 105 Sucevei str., Falticeni, Suceava county, Romania

^c„Stefan cel Mare” University of Suceava, 13 University str., Suceava, Romania

Foodstuffs can be used as teaching material, but also as a source for innovative project of teaching and learning evaluation of certain units in high school Chemistry curriculum. The advantages of their use in chemistry study are varied: available and known raw materials, familiar to the students; wide issue of food processing and preservation; source of new ideas and innovative project and, interconnection of theoretical knowledge with practical applications of the studied phenomena. For example, the study of milk composition and properties can be a real support in understanding of some concepts such as: buffer solution, acid-base titration, solution pH. The milk is a complex product, important both in terms of composition and nutritional values. The milk complexity can be a starting point in the proposal topics of group project such as: “Is milk emulsion, colloidal dispersion or solution?”, “The freshness of milk is better expressed by pH or titratable acidity?”

Because it is a valuable product, milk is in the top five of the most falsified foodstuffs from the food sector. Because not all producers have the cooling tanks for fresh milk, at acquisition of raw material from producers, one of the most common methods of milk falsification is by adding of neutralizing substances. The milk is predisposed to an accelerated natural acidification process due to transformation of lactose in lactic acid under action of milk microflora, especially during warm seasons. In this case, many manufactures prefer to resort to fraud, operation encouraged and by the actual permissive legislation. Thus, in order to neutralize the free lactic acid from milk the neutralizing substances (Na_2CO_3 , NaHCO_3 or NaOH) are deliberately added. In current practice, the discovery of these frauds can be done easily by determining the milk pH or acidity. The literature data indicate values of 6.6 - 6.8 for pH and 15-19 ⁰T for the acidity of freshly milked milk, any value outside of these point out an non-compliant milk for industrial processing.

This information about a common product, consumed daily, can be useful for the design of active method of teaching, learning and assessment of some learning units’ – part of XIIth curriculum, technological route, such as: “Acid-base titration”, “pH of acids and bases solutions”. In this case, it can propose different educational methods: from the case study – monitoring the evolution of acidity and/or pH of milk samples stored under different conditions of temperature (refrigerator and room temperature) to complex subjects for group project – “Milk falsification and chemical methods for the identification of counterfeits”.

Keywords: milk falsification, chemical analyses, interactive teaching-learning-assessment methods

* Violeta Vasilache, e-mail address: violetav@fia.usv.ro

C5. Research Project – Interactive teaching-learning-assessment method of Chemistry

Monica-Anca Crețu,^a Liliana Oniciuc,^b Violeta Vasilache^{c*}

^a“Vasile Lovinescu” College, 10 Maior Ioan str., Falticeni, Suceava county, Romania

^b“Nicu Gane” College, 105 Sucevei str., Falticeni, Suceava county, Romania

^c„Stefan cel Mare” University of Suceava, 13 University str., Suceava, Romania

The study of Chemistry can become a true passion if the chemistry teacher succeeds in passing the barrier of knowledge and information transmission, seemingly abstract, without a direct link with the surrounding reality. For today's student, “attacked” with all kind of information, on all channels (TV, internet, radio, telephone, etc.), the real challenge is given by the selection of that information. The main criterion applied by the students to achieve this selection is their applicability in daily life practice.

The educational method is the instrument by which the teacher can help “students to find their own way in rediscovering its truths, in finding the necessary solutions, to solve the theoretical and practical issues with which they deal in the learning process” (Cerghit, 2006). Modern method, that have earned a place in current educational activity, are interactive methods of teaching-learning-assessment. These methods are based on the participant's interaction both through cooperation and competition in achieving proposed objectives. Classification of interactive group methods include: interactive teaching-learning methods applied in group; methods of establishing and systematization of knowledge; assessment methods; methods for solving problems by creativity stimulation; research methods in team.

When we want to apply the project method in teaching chemistry is very important for the teacher to propose to the students an authentic research and action case, because it is a global and interdisciplinary method able to help the harmonious development of students' personality. For example, at the end of electrochemistry topics study it could propose some project themes such as: „Conversion and storage of chemical energy”, „Can the cell and accumulators be an effective response to the global crisis energy?”, „Impact of energy consumption on the environment” – themes that provide a new perspective on learning concepts. From the same approach, the chapter about solutions can become more attractive from interdisciplinary perspective by a theme such as „The blood – a vital aqueous solution” – theme focus on blood cell counts, blood glucose and natrium serum.

In addition, the importance of themes for group projects, it must emphasize the important role of teacher in detail planning out of tasks, continous communication, objective and right analysis of project results.

Keywords: interactive methods of teaching-learning-assessment, group project, interdisciplinarity

* Violeta Vasilache, e-mail address: violetav@fia.usv.ro

C6. The Monitoring of Virtual Education Influence in Chemistry Teaching

Brîndușă Roman,^{a*} Dănuț-Gabriel Cozma^b

^a"Ioan Grigore Teodorescu" Secondary School, Ruseeni, Neamt county, Romania

^bFaculty of Chemistry, "Al. I. Cuza" University, 11 Carol I Blvd., 700506 Iasi, Romania

"Consider the students a torch to light so as later they will shine with their own light."

Plutarh

This paper presents the results of a research undertaken in February 2013. The data was obtained by applying a questionnaire of interest to voluntary students - a sample of 162 respondents who answered positively to the request of the applicant teacher. Throughout the conducted research we had the support of the school management who appreciate that such initiatives might lead to strengthening of the relationship between students and teachers, increasing confidence and use of instruments that would facilitate students' path to knowledge, self-awareness and tonic motivation. Regarding the sampling of respondents group we can say that the classes have been fully studied taking into account the principle that classes are non-random. We also mention that there is no structure of parallel classes, therefore researched classes fully reflect the school attributes of the respective locality.

The present survey been attempted to identify aspects considered significant by authors on the issues of teaching / learning chemistry in rural schools regarding the interest for Chemistry in five rural schools (Village Izvoare, Com. Dumbrava Rosie, Village Cut, Com. Dumbrava Rosie School - Dumbrava Rosie, Village Luminiș, Com. Soimului, Village Poieni, Com. Soimului, Neamt County) manifested by middle school students using traditional methods versus virtual/modern methods.

The questionnaire analyses the "Perception of students on using the virtual learning of Chemistry, under the aspect of rights / obligations ratio" and started from the use and integration of computer as assisting tool within chemistry classes to motivate students regarding this discipline, in particular, and to increase the learning level, in general.

The study pointed out the impact of „virtual” resources in the learning process of some disciplines, involving study, seriousness, dedication and constant volute effort.

Keywords: monitoring, virtual teaching tools, questionnaire

Acknowledgements: The author thank to Mrs. Adina Dumitrașcu for support in collecting data.

* Brîndușă Roman, e-mail address: brindusa.roman@yahoo.com

O7. Chemistry and Technical Disciplines

Cristina-Amalia Dumitraș*

„Latcu Voda” Technical College, 15A Latcu Voda str., Siret, Suceava County, Romania

Evaluation plays an essential role in education and its importance increases in permanent education. Increasing the quality of educational evaluation is one of the objectives to date.

Therefore this work aims to highlight students' cognitive and formative aspects as a result of the use of alternative evaluation methods. It aims to increase students' interest in this subject and the promotion of civic values and objectives, such as the civic and aesthetic spirit, by creating an interdisciplinary project. The project targets high school students and not only. The project initiates and promotes values and objectives such as citizenship, caring for ourselves and those around us, awareness of the role of young citizens. The general objective of the project is to develop each student's knowledge and experience with the goal of creating added value in the community. The ultimate goal is of charitable nature, followed by purposes such as developing creativity and observation spirit, asserting an appropriate civic attitude and especially awareness of their peers with physical and mental disabilities.

By realizing this project we have enriched students' knowledge and highlighted their skills in chemistry and technical subjects, the students who were members of the project team being from the technical profile, specialization technician in the textile industry and, moreover, we have induced a positive attitude towards people with physical and mental disabilities.

Keywords: students; project; chemistry; interdisciplinary; interest; discrimination.

* Cristina-Amalia Dumitraș, *e-mail address:* hutanu_amalia@yahoo.com

O8. Chemistry- between Professional Contentment and Personal Development

Alina-Mihaela Nistor,* Dănuț-Gabriel Cozma, Carmen Mita

Faculty of Chemistry, "Al. I. Cuza" University, 11 Carol I Bvd., 700506 Iasi, Romania

Young students differ widely between them, both by different personalities and from the socio-economic point of view. For a better understanding of factors influencing the professional path chosen by students of the Faculty of Chemistry from "Alexandru Ioan Cuza" University of Iasi, a questionnaire was applied to 72 respondents. The respondents vary in social background, residency and study year both in bachelor and master cycles. Prior to admission to Faculty of Chemistry their training was different: they were high school graduates from exact sciences or socio-human profiles. Through this questionnaire we tried both detection of objective or subjective factors that determined the choice of Chemistry study, and to what extent the chosen professional field meets previous expectations. Testing was performed in term of intrinsic and extrinsic motivating factors.

Based on statistical analysis it was estimated to what extent the respondents are satisfied by their choice, how they fulfill their professional tasks and how much they want to continue their education in the same field: Chemistry. The students' availability to explore new opportunities in institutions and enterprises abroad was also tested, as a job or just for an intership or exchange experience, respectively.

Analysis of results obtained by this questionnaire could partially reveal to what extent the education in chemistry field manages to improve the values sistem of students and contribute to their personal development.

Keywords: option, professional route, personal development

* Alina-Mihaela Nistor, *e-mail address:* alina.nistor@chem.uaic.ro

C9. Teacher-between respect and career

Alexandra Marcu,* Dănuț-Gabriel Cozma

Faculty of Chemistry, "Al. I. Cuza" University, 11 Carol I Bvd., 700506 Iasi, Romania

The paper presents the results of a multiannual questionnaire, addressed to the undergraduate students from the Faculty of Chemistry, regarding the delicate problem of selecting a professional route after graduating - a career in the educational system?

From the beginning, we consider the role of the motivation, going beyond the classic dichotomy between intrinsic and extrinsic motivation. The first is the motivation which comes from the inside the ego of a person and not from the material benefits, such as money, presents or hierarchical ascent at the work place. We may talk about the motivation of an individual as coming from the satisfaction that he receives when fulfilling a task without expecting a material reward or from a feeling of satisfaction when working on a project, he succeeds with his own power, even given the fierce competition typical for a job nowadays.

The second type of motivation refers to the motivation that comes from the rewards and the gifts offered by different persons. In this way the external motivational factors appear, under the form of rewards, money or grades, which offer satisfaction and recognition. The discussion is somehow extensive, as the decision of following a career concerns a longer period of time, and the educational system offers contradictory aspects to those aspiring for a job here, the aspects were included in the items of the applied questionnaire, in different years, for 3 series of undergraduate students from the Faculty of Chemistry, which followed an optional program of pedagogical training for teaching career.

The hesitation of the respondents also comes from insufficient knowledge (so a partial awareness) of the skills, without which the difficult road from a debutant to pedagogical craftsmanship will be without an end.

An ideal teacher should have the next skills, according to his profession:

- *Methodological competencies* (to properly utilize competencies and theories from the educational sciences, to apply concepts and modern theories regarding the formation of the knowing capabilities, to design instructional and educational contents, to organize educational activities appropriate to the dominant type of lesson, to utilize appropriate teaching methods and strategies for individual features and group lesson purpose and type);

- *Competencies of pupil assessment* (to use appropriate strategies for individual or group assessment, to develop assessment tools according to the purpose and peculiarities of an individual or a group, to use specific methods of critical thinking).

Keywords: career, motivation, competences

* Alexandra Marcu, *e-mail address:* malexandra_home@yahoo.com