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THE IMPORTANCE OF EVALUATION IN TEACHING SCIENCE; APPLICATIONS IN THE STUDY THEME: ALKANES

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SUMMARY. The major aim (goal) of this didactic research is the role of continuous evaluation on the two experimental classes focused on learning "The Saturated Hydrocarbon Alkanes". The didactic investigation was preceded by an initial test having the role to diagnose the level of the students and the differences that persist between the two classes. As a result of the initial test, each class was divided into two groups, teaching being done differentially. The investigation (research) took into the consideration two progress tests, one for each group and a final test. The results of the experiment, the analysis and the interpretation of the four evaluation tests were interpreted drawing the histogram of the Gauss Curve showing the students ' progress, which has been the hypothesis of this didactic research. The heuristic strategies used in the experiment are made to assure that the learning is focused on the student (the student is in the centre). Thus the student will be able to become professional, to improve his knowledges.

Key words:continuous evaluation,heuristic strategies,learning focused on student.

ZUSAMMENFASSUNG. Das Hauptziel der Didaktikforschung besteht aus das Verfolgen der staendigen Pruefung der Schuelern im Rahmen der beiden experimentaellen Klassen waehrend der Lehretappen die sich auf das Thema "Alyphatische, gesaettigte Kohlenwasserstoffe -Alkane " bezieht.Nach dem didaktischem Experiment folgte einen anfangsTest der eine Diagnosisrolle hatte da es den Vorbereitungsniveau der Schueler und die Unterschiede zwischen den beiden Klassen verdeutlicht. Im Folge des Testes, wurde jede Klasse in zwei Niveaugruppen eingeteilt, und es wurde auf Gruppen gearbeitet. Das Experiment bestand auch aus zwei Zwischenpruefungen Fortschrittproben und eine Endpruefung. Die Ergebnisse des Versuches, die Analyse und die statistische Interpratation der vier Auswertpruefungen wurden durch eine Histogrammanalyse der Gaussschaubilder zusammengefasst, welche die Fortschritte der Schueller hervorheben; diese werden in den letzten Teil des zweiten Abschnittes vorgestellt. Die Schluesse der didaktischen Forschung wurden in einem anderen Abschnitt zusammengefasst. Die euristischen Strategie die benutzt waren, Vefolgen einen interaktiven Lehrgang, der sich auf den Schuelern bezieht so dass, er sein eigener Leistungsverstaerker wird und dass er tuechtig wird, sein Wissen selbst zu aufzubauen konstruieren.

Stichwoerter: Naturwissenschaftslehrer, interaktives Lehrgang, euristischen Strategie, Zusammenarbeit mit der Klasse

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1. INTRODUCTION

We need to show an extraordinary attention to the problems that the didactics of different branches of science presents. In this context, the evaluation has a major role in the educational reform. The educational reform suggests as a main element the reorientation of didactic measures and this will be a continuous dialogue between these measures and teachers. The contribution that pedagogues and philosophers of education are producing since decades recently joins the interest in developing techniques for stimulating students' intrinsic motivation in learning science and participating in the scientific debate.The didactic measures means communication, the social transmission of the information with the student as the receiver. The teacher realizes the dialogue, selects and structures the material, conducts the most properly the student's activity.

Teaching has importance (meaning) only if it is a communication with the other two functions of the education: learning and evaluation. The learning theories offer many possibilities which are adaptable to the characteristics of the whole class, of each student and of each teacher who plans the didactic measures in conformity with the objectives (aims) and the competence (the abilities). The organization of learning activities has to be in conformity with the objectives, competences and the contents in order to establish an active learning. The teacher has different ways of organization the classroom activities in conformity with the characteristics of the whole class, of the individuals, these activities help the teacher to see the progress of the students in learning chemistry or other sciences. So, the Chemistry teacher has to develop the specific thinking of his students so that the students can be good at other scientific and technological science. In instructing and teaching the students, the teacher has to have some abilities: a correct and scientific knowledge, a critical analysis of the scientific facts, to motivate and stimulate the students, the project the didactic measures of the learning units in conformity with the students need, the projection of on objective to practice the diagnosis, summative, evaluation, to initiate the students to practice lockstep, individual work .Evaluation has to use plenty of theories and more evaluating instruments. The forms of evaluation (oral, written and practical) are focused on the objectives, so that the feed-back takes place in each teaching sequences and thus the continuous evaluation is essential.

2. SOME CONSIDERATIONS ON EVALUATION IN SCIENCE EDUCATION

Viewed from the perspective of Romanian education in a complex reform at all levels "educational evaluation is the systematic collection, oriented by the defined objectives, of specific data on the evaluation suggested by the situation assessment, the contextual interpretation of these data and the elaboration of them".(Stoica, A., 2001)

As H. Pieron said “Evaluation has an important role in education. It is directly or indirectly to the progress of education”(Ionescu, M., 2000).

Evaluation is a complex development which measures and appreciates the results of education, the effectiveness of resources, of conditions and operations involved in school activities comparing the results with the main objectives necessary to take decisions for the activities from the next stage.

In education, the evaluation’s functions are established in conformity with some psychological, sociological and docimological criteria. (Jinga, I., Gavota, M., Petrescu, A., Stefanescu, V., 1996):

Control function – is the evaluating function of establishment and appreciation of the results in education, by which it is established the level of education regard the objectives trying to find the factors influencing positively or negatively these objectives. Evaluation serves as a feed-back.

Input function – function assessment and guidance which tries foreshadowing the activity in system and anticipation of the results as a result of measures taken.

Adjustment function – is the improvement function of the improvement of the results found in the common measures of the evaluators (assessors) and of those who are examined to make the necessary corrections for the control and appreciation to driving that execution.

Classification and selection function – function of competition to ensure classification of the students regard the ratio value of performances within a group. It gives the satisfaction and reward to the students by obtaining grants, getting the contest a place in a new profile or higher grade in education.

Social – economic function – that function which points out the efficiency of education to the individual, value and performance of each student preparation, the efficiency of socio-economic education that influences decisions on the development and improvement education.

Educational function – that function which motivates and stimulates the interest for ongoing study, for improvement of education and for obtaining better performances. (Naumescu, A., Bocos, M., 2004).If to evaluate means to measure, this doesn’t mean that the evaluation is not only a mere instrument of expressions quantitative student’s performance, it is the “enigme” of a learning unit, a sign for the teacher in each moment of the lesson.

In the teaching – learning science process, the new knowledge will be introduced systematic in an interdisciplinary approach so that the students to be able to realize connections between concepts, to solve various problem situations.

In a modern didactics, we shouldn’t avoid the educational finalities, especially the students role educational finalities, especially the students role to build the new knowledge with the help of the teacher.

In this way we can form and develop the young's personality capable of taking decisions in different economic and social fields.

3. DIDACTIC RESEARCH

The didactic experiment took place at School Group Borşa, from Borşa - Maramureş, in the school year 2008-2009 the first term. Two classes were taken in the experiment: X-A class and X-B. The tenth classes, A and B, profile: Informatics- Mathematics, with two hours classes a week., with 27 students and respectively 28 students. Both of them were experimental classes.

The **main objective** of the didactic research was: the influence of continuous evaluation on the study theme "The Saturated Hydrocarbon – Alkanes".

The **hypothesis** of the didactic experiment was:the continuous evaluation will influence the level of the two experimental classes and make the possibility to follow up the feed-back at the end of each lesson.

The didactic experiment was preceded by an initial test, with the role to diagnose the student's level of knowledge and level differences between the two classes. The heuristic strategies want to provide an interactive education focused on the student, so that the student to be able to make his own knowledge. It was intended if students know:

- to do reasoning, skills, analogies, deduction
- to operate with concepts, rules, definitions
- to establish a connection between theory and practice
- to solve different problems..

All the results were summarized in an analysis by plotting the histogram and Gauss Curves shows the evolution of students.

The assessment objectives which are subordinate to the initial test items are:

1. to indicate the types of links and chains that form the carbon, based on prior knowledge
2. to define isomers and molecular formula based on prior knowledge
3. to identify structural molecular formula based on prior knowledge
4. to calculate de percentage and the equivalent of the corresponding algorithms
5. to identify links σ and π based on prior knowledge
6. to identify the types atoms the carbon, based on prior knowledge

The initial test was given to the students from the tenth grades, at the beginning of the learning unit "Alkanes":

- class X-A, Informatics – Mathematic profile from School Group Borşa
- class X-B, Informatics – Mathematic profile from School Group Borşa

In the school curriculum in 2008-2009 for Chemistry provided a total of two hours / week.The difference was done by groups of level classification:

- the students with score of 8-10 is the group level A
- the students with a lower score than 8 is the group level B

Table 1.

The results of initial test for the tenth grade A (experimental class, 27 students)

Notation interval	***Number of students***	***The percentage (%)***	***General mean***
1 - 2	0	0	**7,85**
2 – 3	0	0	
3 – 4	1	3,70	
4 – 5	1	3,70	
5 – 6	3	11,11	
6 – 7	5	18,51	
7 – 8	8	29,62	
8 – 9	4	14,81	
9 - 10	5	18,51	
Total	27		

Table 2.

The results of initial test for the tenth grade B (experimental class, 28 students)

Notation interval	***Number of students***	***The percentage (%)***	***General mean***
1 - 2	0	0	**7,50**
2 – 3	0	0	
3 – 4	2	7,14	
4 – 5	2	7,14	
5 – 6	4	14,28	
6 – 7	5	17,85	
7 – 8	6	21,43	
8 – 9	5	17,85	
9 - 10	4	14,28	
Total	28		

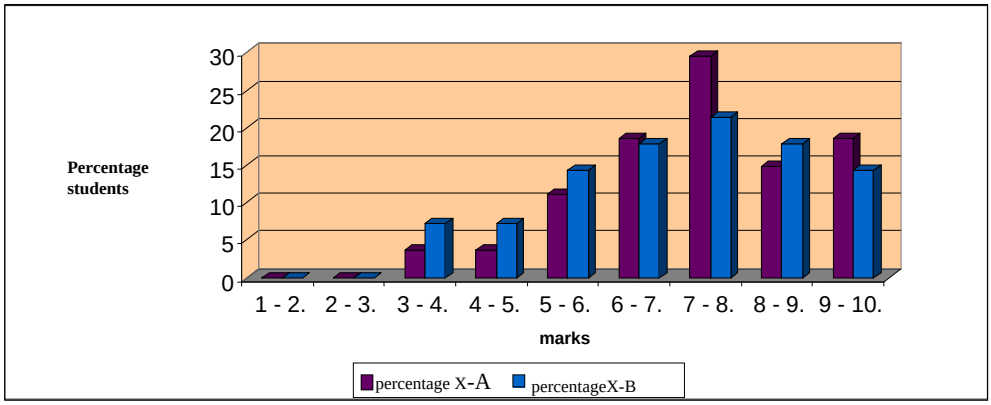

Figure 1. The histograms scoring for classes X-a and X-B

Turning the two histograms in the Gauss probability curves, the obtained results can be compared and the following conclusions are presented below.

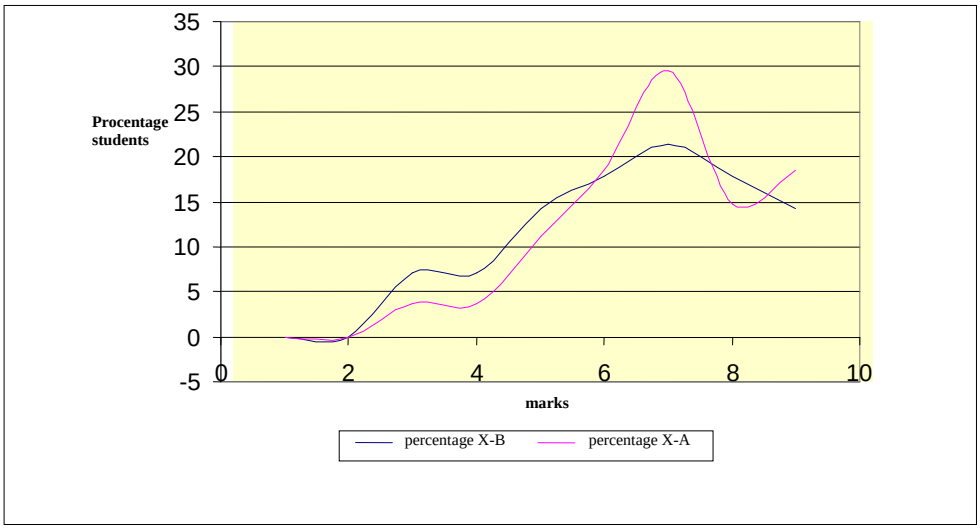

Figure 2. Gauss Curve comparative scoring for the tenth grades, A and B

From the analysis of the curves, it is observed that for class X-A, the percentage is higher, the rate for the marks between 9-10 is 18,51 compared to X-B where the rate for the marks between 9-19 is 14,29. We can observe the existence of marks between 3 or 4 for both classes. For the class X-A general mean is 7,85 higher than the general mean for the class X-B which has 7,50.

To conclude the class X-A presents a better smoothing of the curves and a more uniform grading, it has a maximum between 7 and 8.For the class X-B also has a maximum between 7 and 8.

After the initial test, the two parallel classes were divided into two level groups, by known criteria: So in the class X-A, there are 17 students in the group at the level A, and 10 students in the group at the level B. In the class X-B, there are 15 students in the group at the level A and 13 students in the group at the level B.

Table 3.

The results of final test for the group level A

Notation interval	**Number of students X A A_1**	**The percentage (%)**	**Number of students X B A_2**	**The percentage (%)**
1 - 2	0	0	0	0
2 – 3	0	0	0	0
3 – 4	0	0	0	0
4 – 5	0	0	0	0
5 – 6	0	0	0	0
6 – 7	0	0	1	6,67
7 – 8	1	5,88	3	20
8 – 9	7	41,18	6	40
9 - 10	9	52,94	5	33,33
Total	17	100	15	100
General mean	9,47		9,00	

After the final test, both classes had the general mean over 9, more exactly X-A – 9.47 and X-B -9.00, which shows the accumulation of knowledge and progress.

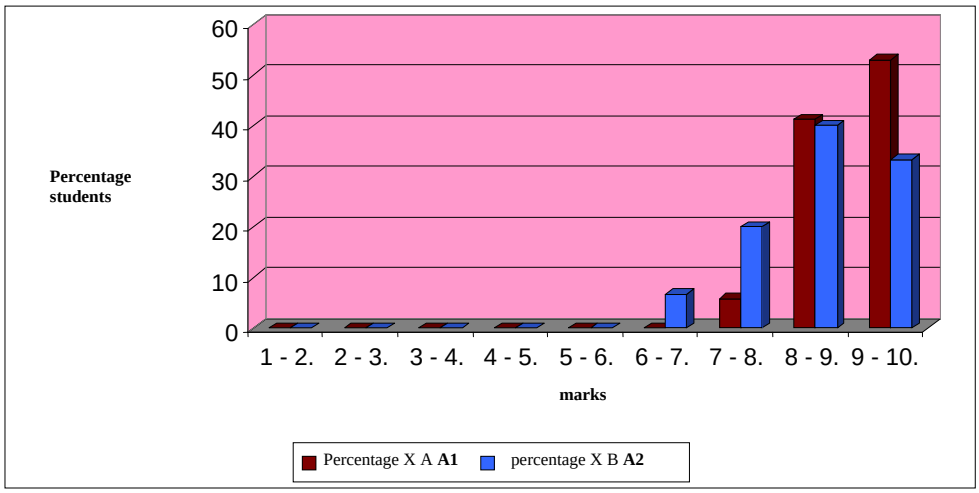

Figure 3. Histogram for the final test, group level A

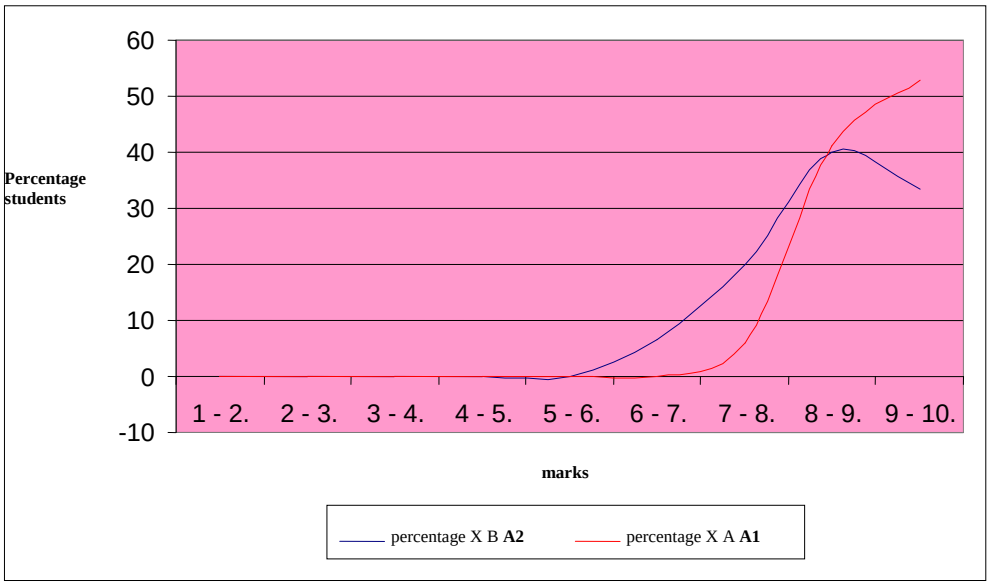

Figure 4. Gauss Curve comparative scoring for the group level A (A_1 and A_2) –Final test

From the analysis of the histogram, it can be observed that the percentage is higher for X-A, between 9-10 (52,94%) and for X-B the percentage between 8-9 (40%).

The Gauss Curves have a suddenly ingrase. The tenth A (the class X-A) has a general mean higher than class X-B.

The progress thet has been registered is:

- 8,17 – 9,47 for X-A
- 7,93 – 9.00 for X-B

X-A has registred a progress of 1,3% and X-B 1,07%.

Table 4.

The results of final test group level B

Notation interval	Number of students X A B_1	Percentage (%)	Number of students X B B_2	Percentage (%)
1 - 2	0	0	0	0
2 – 3	0	0	0	0
3 – 4	0	0	0	0
4 – 5	0	0	1	7,69
5 – 6	1	10	1	7,69
6 – 7	1	10	2	15,38
7 – 8	3	30	3	23,08
8 – 9	3	30	4	30,77

9 - 10	2	20	2	15,38
Total	10	100	13	100
General mean	**8,40**		**8,07**	

After the final test, both classes had the general mean over 8, more exactly X-A – 8,40, and X-B – 8,07, wich shows the acumulation of knowledge and progress.

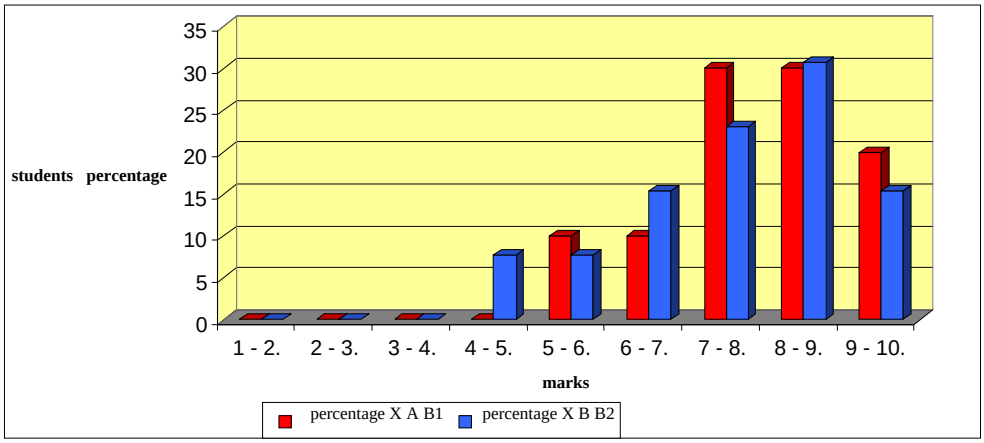

Figure 5. Histogram of notation for the final test, group level B ***(B_1 şi B_2)***

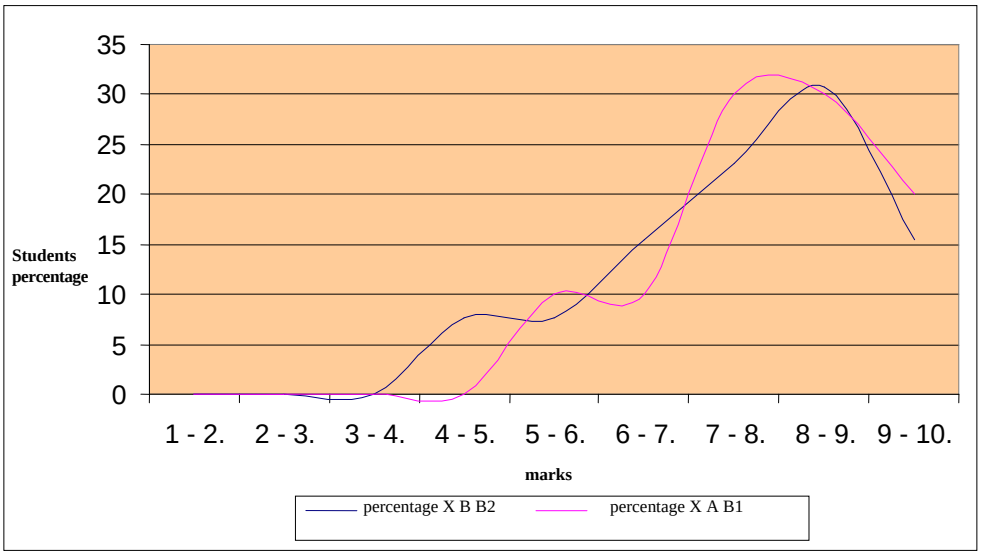

Figure 6. GaussCurve comparative scoring for group level B (B_1 şi B_2)-Final test

From the analysis of the histogram, both classes ge a maximum at the notation level between 8-9. The Gauss Curves have a slowly increase class X-A has a general mean higher than X-B.The both classes progress at A level is:

- 7,70 – 8,40 for X-A
- 7,46 – 8,07 for X-B

The class X-A has registered a progress of 0,7% and X-B 0,61%.

4. CONCLUSIONS

As a result of this didactic experiment it was found:

In teaching activity, the teacher has to have some specific competences, a correct scientific knowledge, a critic analysis of the scientific facts, he has to motivate and stimulate the students, to make them to enjoy chemistry, to project the didactic scheme of each unit in conformity with the students' needs, and to practice the diagnosis summative and formative evaluation, to learn the students to work in teams or groups.

The continuous evaluation is extremely important and useful. This evaluation can be done if the teacher uses many theories and various instruments of evaluation. The **hypothesis** of the didactic experiment has been confirming: the level of the two experimental classes has been improved by continuous evaluation.The Evaluation is a complex process which measures the results of teaching, the resources' eficacity, and the activities used in teaching having as goals the improvement of teaching. So, the teacher can use a different teaching, in conformity with the students' abilities. During teaching of a unit (lesson, or groups of lesson, themes and chapters), this evaluation is useful for the student who can notice his own progress (autoevaluation) and it is also good for teachers who care see if their objectives were achieved. The continuous evaluation focused on the objectives which have a major role both for teachers and students.

Using a modern didactic requires an increased interdisciplinarity with Physic and Biology. The methods used in this experiment were very useful in both theoretical and practical knowledge of the students, but also the raising the knowledge of the classes level taken in the study.

Lately the volume and quality of information increased, becoming even acute the problem of teacher-student interaction.

Using the heuristic strategy and continuous evaluation in order to use a creative didactic would require the need of "ventilation" of school curricula from curriculum area in Mathematics and Natural sciences for ensuring the desire to be his own training agent.

The school curriculum is extremely loaded, and both teachers and students have to do a gnat effort in teaching, respectively learning it with negative effects on their capacity to assimilate knowledge. The amounts of hours assigned to the "Chemistry" should be increased according to the classes profile.

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