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Importance of the Diagnostic Test in the Supervision of Future Physical Science Teachers

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Summary

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Introduction

- **Teacher training** is always a problematic subject in projects to reform education systems.

- The major importance of this issue is manifested by a tendency to provoke debates at the international level on the links between **teacher qualifications** and **results of school systems.**

Introduction

- According to the new engineering of teacher training in Morocco relating to the law establishing Regional Centers for Education and Training (CRMEF), teacher trainers **train**, **support** and **supervise** future teachers throughout their professional training.

- The latter, based on the **competency-based approach**, implies a better coherence of the modules and ensures the professionalization of teaching practices.

Introduction

- Our problem is part of a **strategy to improve the performance** of the results of the training of future teachers of physical sciences at the CRMEF of Casablanca-Settat, Morocco.

- To respond to our problematic, we have thought about an innovative pedagogical strategy based on **diagnostic evaluation**.

What is diagnostic assessment?

- It is an evaluation linked to a **starting situation** in a learning program. It aims to make a diagnosis of this situation in order to make decisions on the teaching and learning operation to come.

- It is a key operation of the **competency-based approach**. It is practiced at the beginning of a school year, at the beginning of a learning unit or at the beginning of a session.

Objectives of a Diagnostic Assessment :

- It helps to identify students with **difficulties** and the nature of these difficulties;
- It provides leads to organize the **continuation** of learning;
- It gives the student a sense of **responsibility** and allows him/her to get involved in his/her training;
- It proposes avenues for **remediation**.

Problematic

Research Question :

- What are the achievements in general?
- Which students are "at risk" and why?
- What is the nature of student error?
- What content could be problematic based on the information collected?
- Are there barriers to motivation?
- Are there common misrepresentations?
- How can the results of the diagnostic test be used to correct student deficiencies in order to minimize the percentage of false answers?

Problematic

- This research proposes a detailed statistical study of a diagnostic test (consisting of all the elements of the chemistry modules), validated three times along the years 2017, 2018 and 2019, carried out among the new professors recruited during the years 2017, 2018 and 2019.

Methodology

- This research is based on the observation of diagnostic test results on a sample of **55 future teachers.**
- The diagnostic test is written in the form of a multiple-choice questionnaire (**MCQ**).
- It consists of **26 items** divided into **7 themes** of **Chemistry**.
- We calculated the overall averages of the success score for each module of our diagnostic test.

Methodology

We have calculated :

- PQRG: overall percentage of successful questions.
- PQFG: overall percentage of false questions.
- PQNRG: overall percentage of questions not passed.

The results of the Multiple Choice Questionnaire are processed in an Excel database, which allowed us to make highly significant graphical representations of the variables studied.

We then proceeded to the pedagogical analysis of each item.

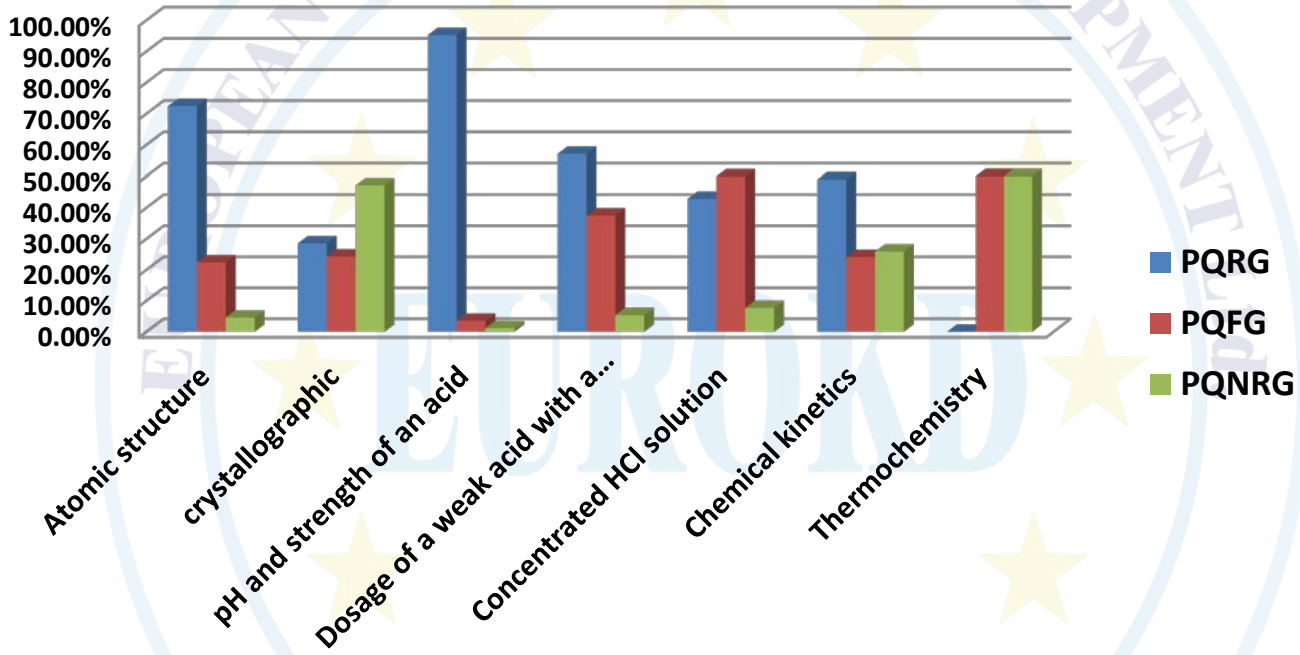
Methodology

The modules taken into account are :

- Structure of the atom.
- Crystallography.
- pH and strength of an acid.
- Dosage of a weak acid with a strong base.
- Concentrated HCl solution.
- Chemical kinetics.
- Thermochemistry

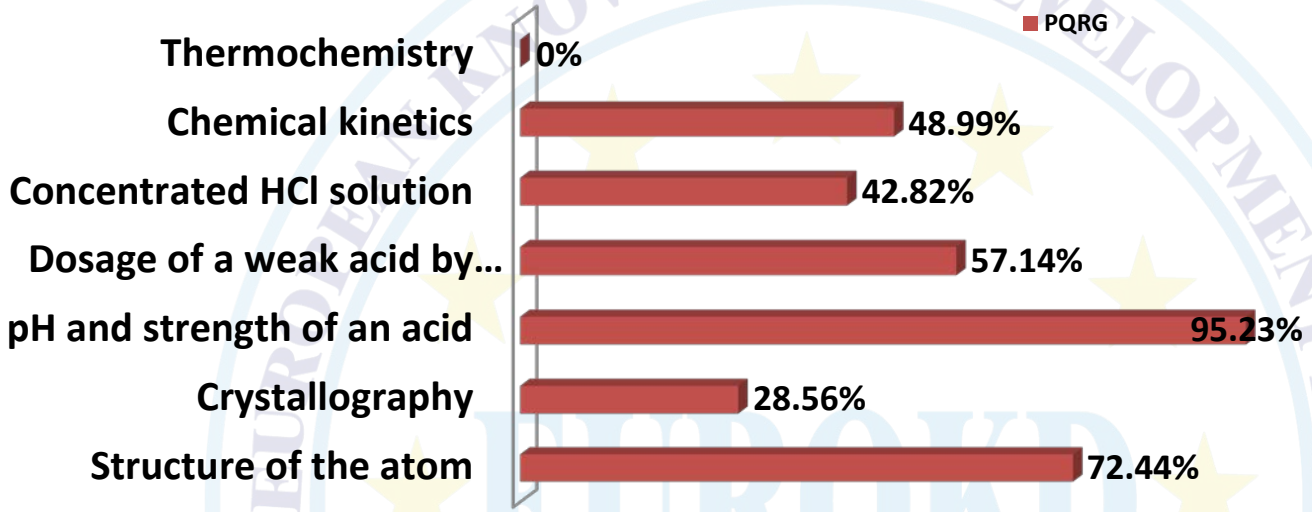
Results and discussions

Level of mastery of each subject



we find that there is a difference in the mastery of each subject, which was represented by the percentage of questions answered.

Comparison of overall success score averages :

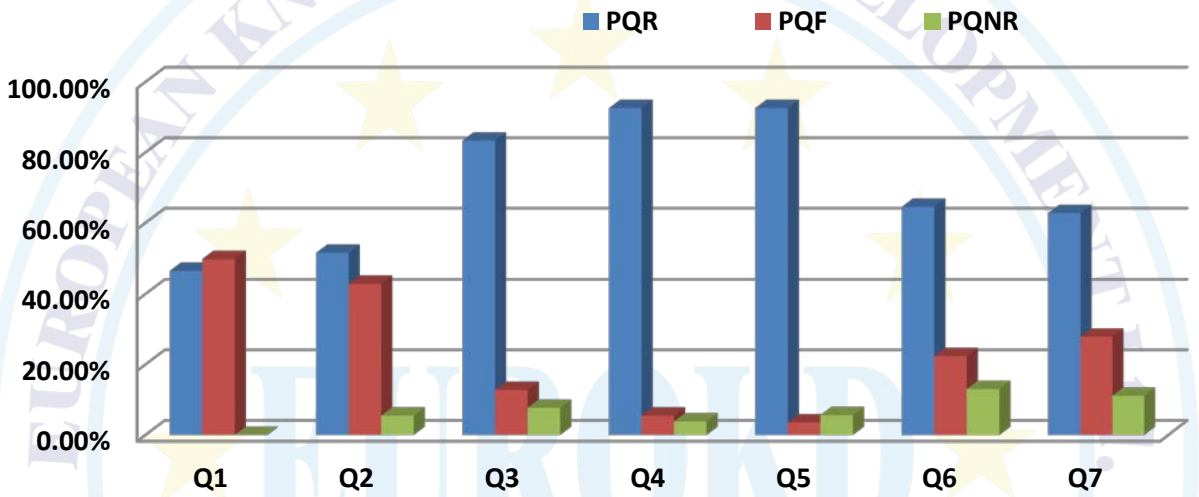


- The module "pH and strength of an acid" is the module most mastered by the students because it represents the largest percentage of correct answers.

- For the modules "thermochemistry, crystallography..." the students have difficulties and deficiencies that must be corrected.

Results and discussions

Theme1:Structure of the atom



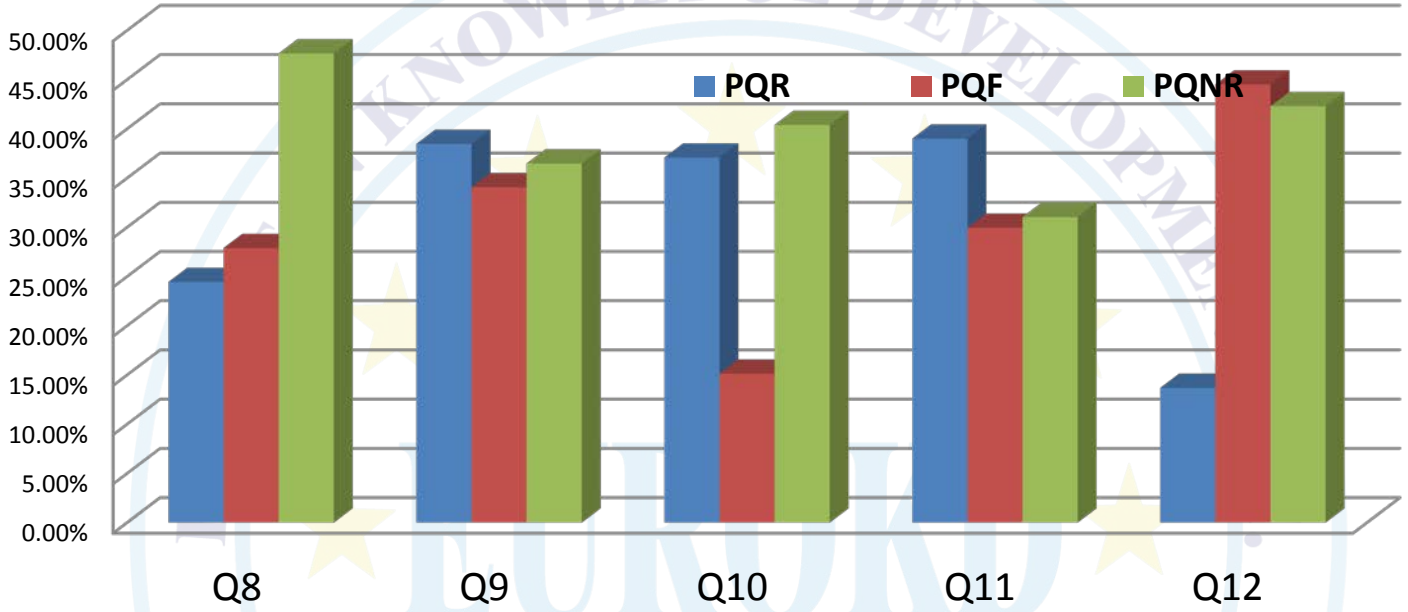
PQR: Percentage of successful questions

PQF: Percentage of false questions

PQNR: percentage of questions not answered.

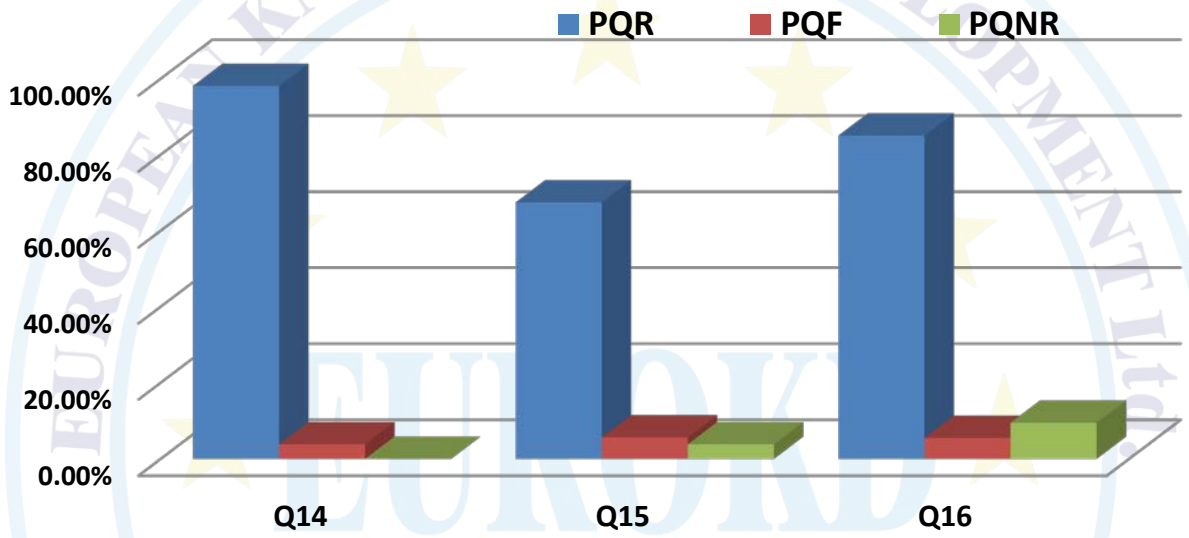
We note that the average PQR is 72%, which means that students have sufficient skills for the subject structure theme.

Theme2: Crystallography



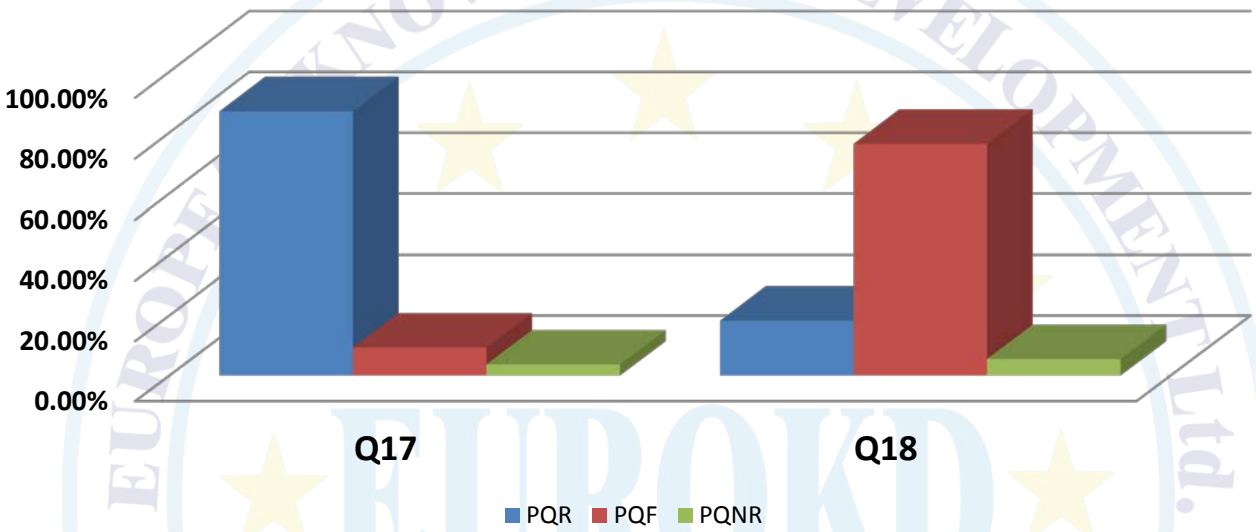
We find that the average PQF and PQNR is 70%, which means that the majority of students do not have sufficient skills to handle the crystallography portion of the course.

Theme 3: pH and stength of an acid



We notice that the average of correct answers is very high compared to the others. So the students have sufficient skills for this part of chemistry.

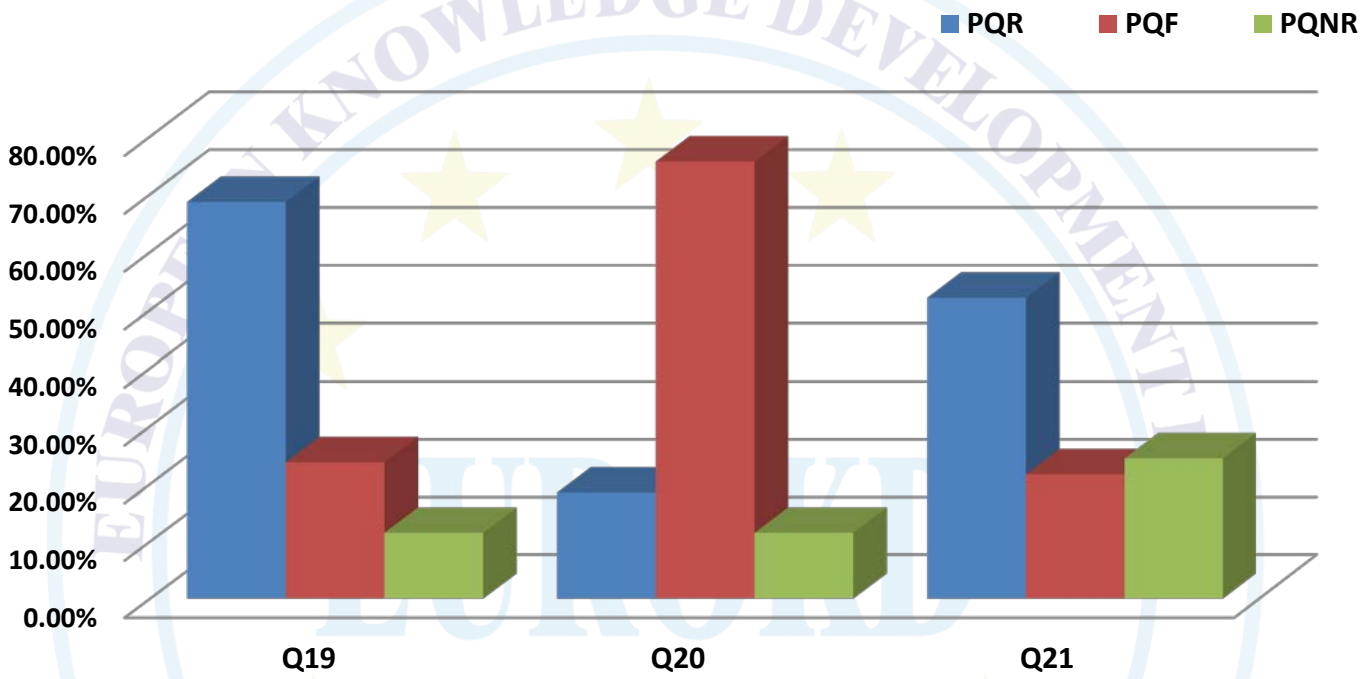
Theme 4: Dosing a weak acid with a strong base



In calculating the overall percentage of successful PQRG questions (57.17%), we note that slightly more than half of future teachers have correct answers compared to the others.

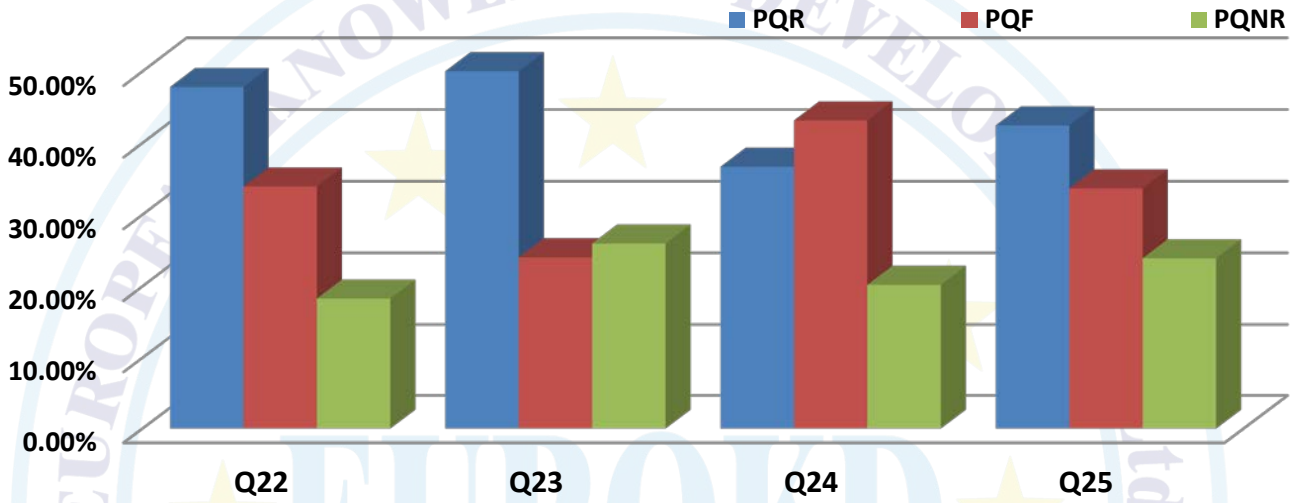
It can, therefore, be concluded that they do not have sufficient skills for this part of chemistry.

Theme 5: Concentrated HCl solution



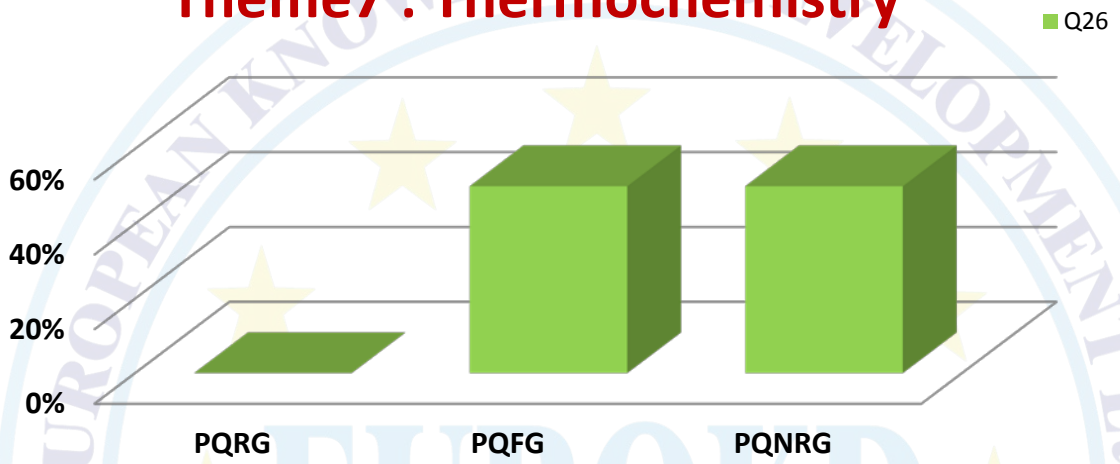
Calculating the overall percentage of successful questions (42.85%), we notice that less than half of the future teachers have correct answers. Therefore they do not have sufficient skills to handle the module of the concentrated HCl solution.

Theme 6: Chemical kinetics



Only half of the future teachers are able to determine the order of a chemical reaction from some data on the initial concentration of reagents. We conclude that future teachers do not have sufficient skills to deal with the topic of chemical kinetics.

Theme7 : Thermochemistry



We note that no future teacher had the right answer to this question (0%), so they are unable to deal with this part which concerns thermochemistry in general.

Conclusion

- The analysis of the results obtained by The calculation of global averages of the success score for each theme of our diagnostic test showed that the theme "pH and strength of an acid" was better than "The structure of the atom" and the latter was less difficult than "Dosing a weak acid with a strong base" on the one hand.

- On the other hand, the large percentages of false answers corresponded to the topics "thermochemistry", "crystallography", "chemical kinetics" and "concentrated HCl solution", respectively.

Conclusion

- The results of the diagnostic test allowed us to classify the future teachers in groups of three or four, according to their knowledge of chemistry and the preparation of an adequate training device via the test results obtained.

- This test also allowed us to identify the causes that may hinder learning.

Perspective

We will compare these results with those obtained for new contract teachers who have already taught and who will do the short-term training.