

The evaluation of learning of chemistry in the faculty of Ben M'Sik: Dysfunction and axes for improvement

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Abstract:

At university as at other levels of education, evaluation is an integral part of the daily work of teachers. The objective of this article is to examine the evaluation practices of higher education trainings, in particular to the die SMC at the Faculty of Sciences Ben M'Sik, after ten years of LMD(Licence(BA),Master Degree, Doctorate) system adoption.

The methodology of this study is based on administering a questionnaire to a group of 23 teachers, representing 40% of the faculty of the Chemistry Department of the FSB who have responded to several items related to these four dimensions: Characteristics of the course, evaluation tools, evaluation practices and teacher / student communication.

A second questionnaire was administered to 20% of students studying SMC both S4 and S6 levels. It involved three dimensions: branch, teacher / student communication, and evaluation practices.

This study allowed us to detect a dysfunction in the evaluation of learning caused by certain practices that concern:

- The imbalance between the number of students and those of teachers and inadequate educational infrastructure quality does not promote the implementation of formative assessment, mainly oriented on the individual skills of learners.
- The absence of training in general education and technical evaluation of teachers affect negatively the quality of training.
- The assessment practices are not effective:
 - a) Lack of course objectives;
 - b) The absence of a framework of quizzes and exams;
 - c) Low Teacher / student communication;
 - d) The competences covered by the evaluation are especially understanding, memorization and application.
 - e) Absence of assessment of prerequisites;
 - f) Undiversified evaluation tools;
 - g) Insufficient Students' errors analysis.

Keywords: evaluation of learning, continuous controls, higher education, prerequisites, assessment tools.

I. Introduction

Several studies have been made in the practical assessment of learning at the university include, we (Blais et al., 1997) [1], (Grilles, 2011) [2], (Marc ROMAINVILLE, 2002)[3], (Bourema KONATE, Mme TRAORE Kadaouyé DAMBA et Kalilou SIDIBE 2007) [4] et (Said El Melhaoui, 2012) [5].

With the objective to analyze the practices of evaluation of learning in the Faculty of Science Ben M'sik, a investigation was carried out in spring 2013, it was sent to chemistry teachers and students of the SMC die both S4 and S6 levels in what was sent a questionnaire to teachers composed of four dimensions:

- Characteristics of the course;
- Evaluation tools;
- Evaluation practices;
- Teacher / student communication;

Another questionnaire consisting of three dimensions was submitted to the students:

- Branch;
- Teacher/ student communication;
- Evaluation practices.

II-Study methodology and characteristics of the survey sample

In the beginning, the study targeted the teachers of the Faculty of Sciences, Ben M'Sik. A survey questionnaire was administered to 23 teachers, a number which makes up 40% of the teaching chemistry at the FSB.

Next, a questionnaire was administered to 90 students. That number represents 20% of discipline SMC of the two levels S4 and S6.

III-Result analysis (attached the results recorded)

The research we conducted with teachers and students from the Faculty of Science Ben M'Sik allowed us to raise the following points:

1-Course objectives

From the interviews with the teachers, it was noted that most teachers confuse the content of the course with its objectives, which is clearly illustrated in the statement of tracks (example: Track: Matter-science Chemistry). There is a confusion between the objectives, information and course content, and also, from students' answers, about the communication of course objectives by their teachers (25.6% of students confirmed this).

This calls into question the teachers' answers about the:

- Definition of course objectives;
- Communication of these objectives to students;
- Evaluation of these objectives.

We need to define the objectives of each course, formalize them in the statement of each track, communicate them to all teachers and all students, and guide the evaluation of learning in these objectives.

2-Assessment tools

Assessment tools used in the Faculty of Science Ben M'sik are not diversified.

So it's necessary to diversify assessment tools:

- Integrate multiple choice, sentence completion, true / false, and short-answer questions to overcome the difficulties of the French language in the student and at the same time facilitate the correction of exams for the teachers (S1 to S6).
- Integrate presentations and oral examinations (50% of the final grade for the S5 and S6) to develop autonomy and communication in the student.
- Integrate problem situations and case studies (S5 and S6)
- To schedule more practical work and evaluate it practically (S1 to S6).
- Organize more outings, field courses and ask questions in real situations, depending on the nature of each subject.

3-The competences covered in the evaluation

At the Faculty of Science Ben M'Sik:

The competences covered in the evaluation of learning are especially: understanding, memory and application.

But the main objective of any educational system is to be based primarily on logic for the sake of training critical thinking and the stimulation of intelligence in order to integrate an information and communication society, and not just depend on storage and memorisation .

Therefore, it is proposed to change the testing system. The conventional tests should be replaced by objective ones that evaluate not only memorizing and understanding but also the ability to analyze, synthesize, solve real problems and make decisions (bloom's taxonomy), besides these skills should be defined for each subject.

4-Absence of a repository of quizzes and exams

The repository of quizzes and exams aims to:

- Unify vision among teachers of the same subject during the handling of exams and quizzes (several teachers of the same subject for a large number of students).
- Increase the credibility of exams.
- Cover and represent the entire curriculum for efficient drainage of the principle of equal opportunities.
- Find a basis for the evaluation of quizzes and exams.
- Unify reference for all participants in the process for founding exams on a contractual basis between all parties involved.

From the answers of teachers and students of the Faculty of Science Ben Sik, we can say that:

- The vision among teachers in the implementation of quizzes is not always unique.
- There is a poor coverage of the course.

- The evaluation of quizzes and exams' topics is fairly assessed, and even when there is an assessment, it is not effective in the absence of a basis to be compared.
- The average number of quizzes carried out by subject is one per semester, which is not in accordance with what is prescribed in the specifications. However, the " CNPN Project of the BA Cycle (Fundamental Studies BA and Professional BA) Amending CNPN taken by Order No. 1695-1604 of 24 September 2004" stipulates an elimination of continuous assessment in semesters S1 and S2 due to the high number of students, while there is an evolution in students' grades in quiz 1 (thermochemistry: 13.50% who had a score higher than 10 and 48.41% who had a score of 0) in quiz 2 (41.42% who had a score higher than 10 and 8.31% who had a score of 0).
- The quizzes' and exams' questions are not clearly formulated.
- The marking of the tests is often subjective.

A clear dissimilarity between the students' and teachers' answers is revealed, which is quite normal in the absence of a repository of quizzes and exams.

It is proposed to develop a repository of quizzes and exams, respect it and communicate it to all teachers and students.

This repository must contain for each subject under each semester:

- The number of quizzes.
- The objectives to be evaluated.
- The schedule of quizzes and exams.
- The percentage of each part of the course for each quiz and exam.
- The percentage of each level of difficulty.
- The method of average calculation.
- The skills targeted in a well-defined percentage.

Review the proposed elimination of continuous assessment for S1 and S2 as they proved important while being applied.

5-Teacher / student communication

At the Faculty of Science Ben M'Sik, there is a wide discrepancy between the answers of teachers and students about the communication of course objectives, prerequisites, evaluation criteria, method of calculation of the average and the schedule of quizzes and exams.

Indeed, the repository of quizzes and exams previously proposed must be communicated to all students, in addition to trying to stabilize the number of students for each teacher (courses, directed work, and practical work) to ensure good communication and proper monitoring of students.

6-Evaluation of prerequisites

Most chemistry teachers of the Faculty of Science Ben M'sik confirm that the prerequisites which the student must know before the beginning of each class are defined, but they are not well communicated to the students (85.4% of students say that), their assessment is low, and their intervention when they find a lack of a certain prerequisite is likewise low.

In the statement of tracks, the prerequisites are not well formalized. They are rarely defined as courses in general, and from the interview with teachers, we have noticed their ignorance of those of secondary school which creates rupture between high school and university.

By analyzing the national educational standards of the Hassan II Mohammedia University we found:

- Registration requirements in S5 and S6 depend on S1 and S2 semesters validation and at least two modules of S3 and S4;
 - For the fall semester, the student must be registered for the invalidated modules of semester S3 and complete his/her registration by the modules of semester S5.
 - For the spring session, the student must be registered for invalidated modules in semester S4 and complete his/her registration by semester S6 modules.
- To register for S3 and S4 modules:
 - For the fall semester, the student must re-register; for invalidated modules in semester S1 and complete the registration by modules of semester S3.
 - For the spring session, the student must re-register; for invalidated modules in semester S2, and complete the registration by semester S4 modules.

In general the student registers in 4 modules per session.

Therefore, the seasonal distribution of semesters: Fall Session (S1, S3, S5) and the Spring Session (S2, S4, S6) neglects the prerequisites that the student must have, which creates a problem in the student to follow some

modules (because s/he did not validate the module that contains the necessary prerequisites or even in some cases study it.).

We must define the prerequisites of each course, formalize them in the description of each track for each subject, communicate them to all teachers and students, assess them, intervene if there is need, and give a back-up semester ,especially for students of S1 and S2.

We also suggest duplicating semesters.

7-Formative Evaluation

Chemistry Teachers of the Faculty of Sciences Ben M'sik correct students' errors in directed work (even if this is not enough) better during the course, which is quite normal considering the high number of students in the course. However, this correction is rarely performed after quizzes, given that many students are aware of the usefulness of continuous assessment.

As a result, students do not receive feedback, views or advice, thereby continuous assessment loses its true value; hence, the need to establish a formative assessment system.

As for the analysis, synthesis, and interpretation of students' grades, teachers should give more attention to these aspects, and not just relegate them only to module and track staff.

From an interview with teachers, it seems that the decisions based on the interpretation of the results do not take into consideration the following points [6]:

Modification of the approach of the course, changing the adopted strategy, repetition of explanation and the organization of educational support sessions for the students who are lagging.

Analysis, synthesis, interpretation of students' grades and decision making according to the previously defined aspects, may be feasible and effective only if we stabilize the mass of students for each teacher (Course, directed work) in order to ensure proper monitoring.

Finally, we suggest a teacher training for all teachers so that a better collaboration can be met.

IV- Conclusion

The evaluation of learning of chemistry Faculty of Science Ben Sik has more weaknesses than strengths. This is the result which leads the study.

This failure is due to some parameters which are:

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ANNEX1

Table 1

	Always	Often	Sometimes	Rarely	Never
The objectives of the courses are defined	59,1%	31,8%	9,1%	0%	0%
The practical relevance of the topics is demonstrated	30,4%	17,4%	34,8%	13,0%	4,3%
The articulation of courses with other subjects or disciplines is evidenced	17,4%	30,4%	39,1%	4,3%	8,7%
The conduct of course session is planned	66,7%	23,8%	0%	4,8%	4,8%

Table 2

	Always	Often	Sometimes	Rarely	Never
Vision between the teachers of the subject during conduct of quizzes and exams is unique	17,4%	39,1%	13,0%	21,7%	8,7%
The evaluation covers the entire curriculum	30,4%	26,1%	17,4%	13,0%	13,0%
The control subjects and examinations are evaluated after each execution	19,0%	23,8%	38,1%	9,5%	9,5%
Evaluation is oriented along the course objectives	39,1%	34,8%	17,4%	8,7%	0%
After each quiz and exam: You analyse the student grades.	34,8%	43,5%	17,4%	0%	4,3%
After each quiz and exam: You make a synthesis and interpretation of the results achieved	27,3%	45,5%	9,1%	4,5%	13,6%
After each quiz and exam: You take a decision following these results	27,3%	27,3%	22,7%	4,5%	18,2%

Table 3

	Always	Often	Sometimes	Rarely	Never
The prerequisites that the student must have are defined	30,4%	65,2%	87,0%	13,0%	0%
You evaluate these prerequisites before starting each course	13,0%	8,7%	34,8%	13,0%	30,4%
You intervene when you discover a lack of a prerequisite	30,4%	39,1%	17,4%	8,7%	4,3%

Table 4

	Always	Often	Sometimes	Rarely	Never
The difficulties encountered by students are noted: During the course	20,0%	25%	25%	10%	20%
The difficulties encountered by students are noted: During directed work	39,1%	52,2%	4,3%	0%	4,3%
The difficulties encountered by students are noted : After each quiz	39,1%	39,1%	8,7%	4,3%	8,7%
The difficulties encountered by students are noted : After each exam	38,1%	28,6%	19,0%	0%	14,3%
The difficulties encountered by the students are analyzed	17,4%	21,7%	39,1%	8,7%	13,0%
You put corrective actions to overcome these problems in the students	13,6%	40,9%	31,8%	9,1%	4,5%
You put preventive actions to overcome these problems in the students	18,2%	50,0%	13,6%	9,1%	9,1%

Table 5

	Always	Often	Sometimes	Rarely	Never
Quizzes and exams evaluate: Knowledge	52,2%	30,4%	4,3%	8,7%	4,3%
Quizzes and exams evaluate: Understanding	60,9%	30,4%	4,3%	0%	4,3%
Quizzes and exams evaluate : Application	39,1%	30,4%	26,1%	0%	4,3%
Quizzes and exams evaluate: The capacity to analyze	21,7%	26,1%	43,5%	4,3%	4,3%
Quizzes and exams evaluate: The capacity for synthesis	13,0%	17,4%	52,2%	4,3%	13,0%
Quizzes and exams evaluate : The capacity of real-problem solving	13,0%	17,4%	34,8%	17,4%	17,4%
Quizzes and exams evaluate :Decision taking	4,3%	13,0%	43,5%	13,0%	26,1%

Table6

	Always	Often	Sometimes	Rarely	Never
Closed tools: MCQ (Multiple Choice Questions)	0%	9,1%	18,2%	22,7%	50,0%
Closed tools OQSA (open questions and short answers)	9,1%	18,2%	22,7%	13,6%	36,4%
Closed Tools: The type questions in sentence completion	59,1%	13,6%	13,6%	13,6%	59,1%
Open tools: Exercises	59,1%	36,4%	4,5%	0%	0%
Open tools: Situational Problem	9,1%	31,8%	27,3%	13,6%	18,20%
Open tools: Case Study	0%	30,4%	21,7%	17,4%	30,4%
An Oral Examination / Presentation	17,4%	26,1%	21,7%	4,31%	30,4%
A Practical Exam	13,0%	21,7%	17,4%	26,1%	21,7%

Table 7

	Always	Often	Sometimes	Rarely	Never
MCQ	0%	9,1%	18,2%	22,7%	50,0%
OQSA	9,1%	18,2%	22,7%	13,6%	36,4%
Questions In complete sentence	59,1%	13,6%	13,6%	13,6%	59,1%
Exercices	59,1%	36,4%	4,5%	0%	0%
Situational Problem	9,1%	31,8%	27,3%	13,6%	18,20%
Case Study	0%	30,4%	21,7%	17,4%	30,4%
Oral Examination / Presentation	17,4%	26,1%	21,7%	4,31%	30,4%
Practical Exam	13,0%	21,7%	17,4%	26,1%	21,7%

Table 8

	Always	Often	Sometimes	Rarely	Never
Students are informed with the evaluation criteria.	22,7%	40,9%	22,7%	4,5%	9,1%
Students are informed with the method of calculating the average.	40,9%	31,8%	22,7%	4,5%	0%
Quizzes and exams are conducted according to a set schedule.	47,8%	21,7%	17,4%	13,0%	0%
The schedule is communicated to students.	47,87%	21,7%	21,7%	4,3%	4,3%
The prerequisites are communicated to students	13,0%	26,1%	30,4%	8,7%	21,7%
The course objectives are communicated to students	39,1%	43,5%	0%	13,0%	4,3%

ANNEXE 2

Table9

	Always	Often	Sometimes	Rarely	Never
Your teachers communicate to you the objectives of the course	7,0%	11,6%	37,2%	27,9%	16,3%
You are informed with the schedule of quizzes and exams	3,4%	4,5%	9,0%	12,4%	70,8%
You are aware of the criteria for evaluating quizzes and exams?	2,2%	3,3%	28,9%	21,1%	44,4%
The teachers communicate to you the prerequisites that you need to know before the start of each course	6,7%	7,9%	57,3%	22,5%	5,6%
You are informed with the method of calculating the average	0%	4,4%	7,8%	12,2%	75,6%
Teachers notify you with other students' mistakes	4,4%	10,0%	42,2%	32,2%	11,1%

Table10

	Always	Often	Sometimes	Rarely	Never
Teachers assess the prerequisites before you begin each course.	2,2%	11,2%	29,2%	24,7%	32,6%
Teachers intervene when they find a lack of a certain prerequisite.	5,6%	4,4%	14,4%	31,1%	44,4%
Teachers correct students' errors: In the course	6,7%	12,4%	25,8%	30,3%	24,7%
Teachers correct students' errors: In directed work	19,1%	15,7%	41,6%	14,6%	9,0%
Teachers correct students' errors: After each quiz	3,4%	5,7%	11,5%	18,4%	60,9%
Are the exam questions clearly stated?	3,3%	16,7%	43,3%	30,0%	6,7%
Does the review cover all the chapters studied in the course?	11,1%	30,0%	34,4%	20,0%	4,4%

Table11

Items	Percent	
How many quizzes do you have in each subject?		
0	1,1	
1	51,1	
2	46,7	
3	1,1	
Is there consistency between the content studied and the quizzes' topics?		
Yes	21,3	
Rather yes	40,4	
Rather not	21,3	
No	16,9	
The distribution of quizzes for each subject in each semester is		
Good	12,4	
Average	65,2	
Bad	22,5	
How do you estimate this number of quizzes?		
High	11,5	
Good enough	55,2	
Low	33,3	
How does test-making seem to you ?		
Very objective	3,3	
Objective	16,7	
Subjective	34,4	
Very subjective	45,6	
The planned capacities evaluation		
Memory	41,1	
Understanding	35,6	
Application	11,1	
Analysis	8,9	
Synthesis	2,2	
Creation	1,1	
	True	False
According to you: Continuous assessment allows students to get caught up in time	42%	58%
According to you: Continuous assessment allows the student to reorient if necessary	26,1%	73,9%
According to you: Continuous assessment allows the teacher to improve his/her course	48,3%	51,7%