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Scaling up a project-based SQL course

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Project-Based Learning Session

THE SYSTEM AND ITS OBJECTIVES

- SQL : 2nd year of CS Bachelor, 36 hours (3 ECTS).
- 5 objectives for learning the SQL language.
- Project-based : a library management software.
- Practical activities contribute to the project.
- All productions could have benefited from continuous evaluation.
- Competence scale :N Not acquired, P Partially acquired, L Largely acquired, F Fully acquired.
- Evaluation : Deliverables, Project-based written exam
- Analysis : self-assessment questionnaire, correlations

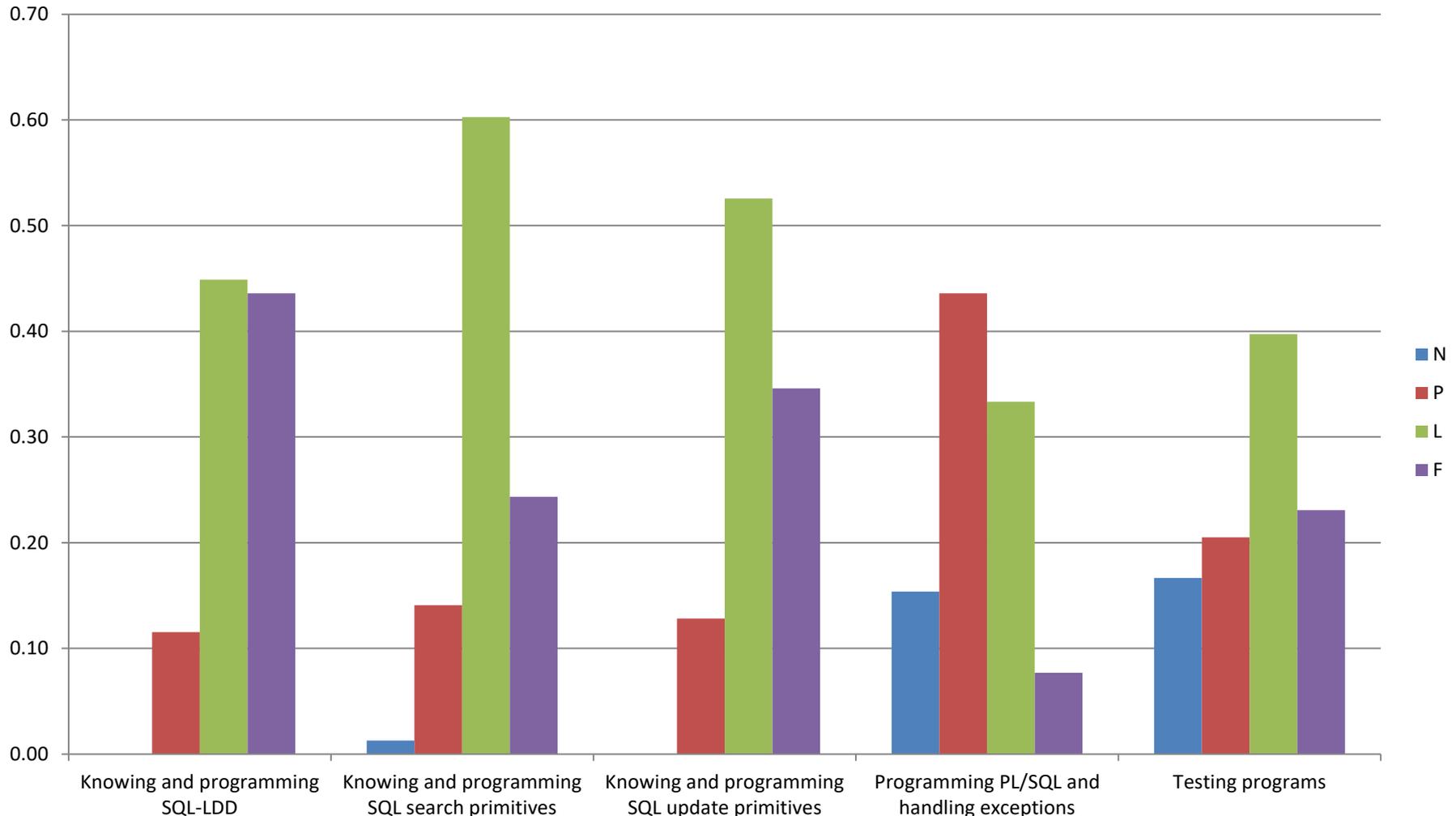
2015 Correlate auto-assessment and grades

| Objectifs | N | P | L | F | ! |
|--------------------------|---|----|----|----|----|
| SQL – LDD (schema) | - | 2 | 12 | 14 | 15 |
| SQL – LMD (queries) | - | 4 | 15 | 9 | 12 |
| SQL – LMD (update) | - | 8 | 10 | 10 | 17 |
| Programming SQL (PL/SQL) | 4 | 15 | 7 | 2 | 6 |
| Tests and trial sets | 3 | 10 | 11 | 4 | 6 |

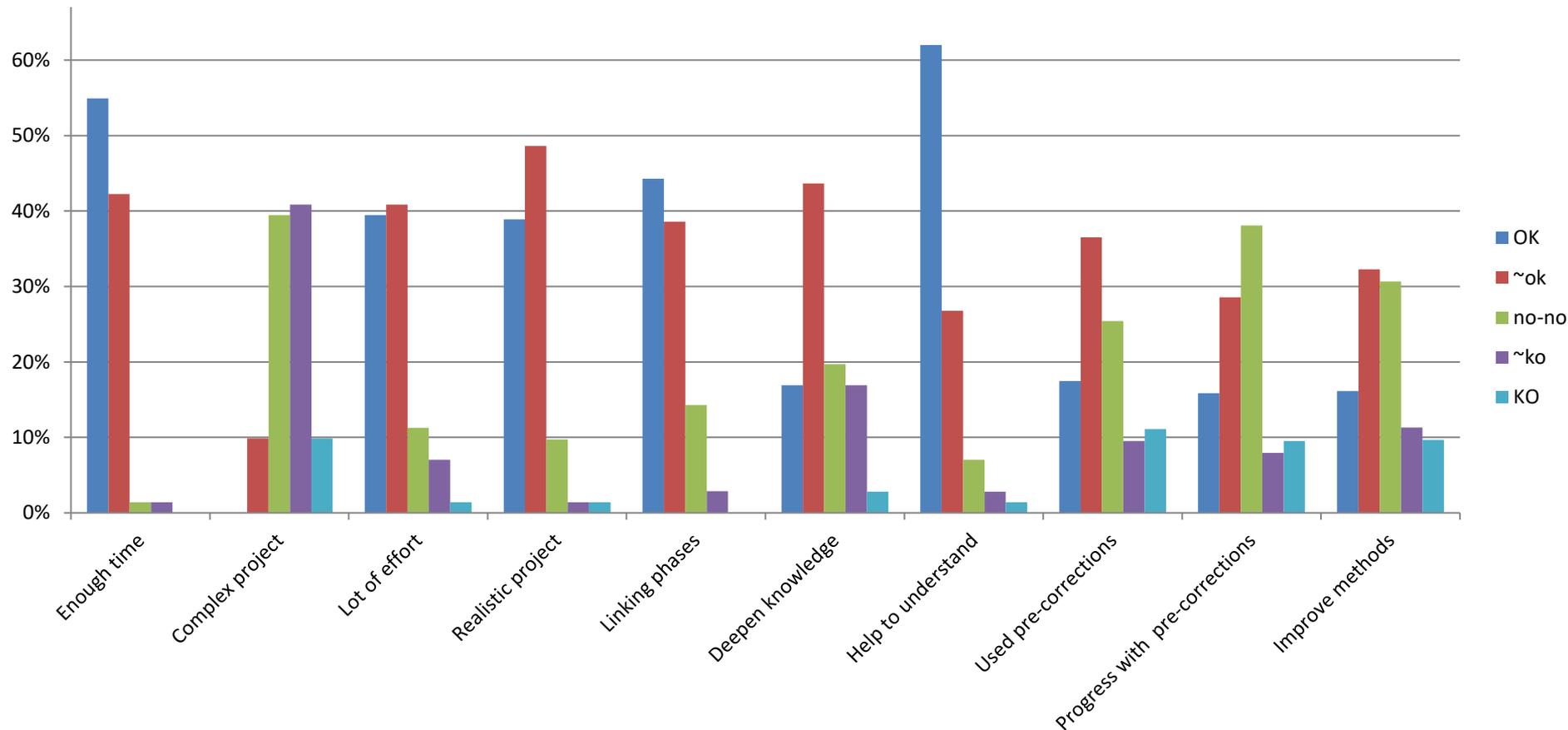
- Last column (!) matches between self-assessment and teacher's assessment
- 28 students /35 : skills booklet and questionnaire.
- Difficulty of self-assessment: / objectives or / SQL knowledge.
- Student frustration with the programming objective.
- Lack of time : the Test objective was misunderstood.
- Pre-corrections (author-reader cycle) worked for 3 objectives.

2019 competency auto-assessment

- Pre-conception : significant decrease in self-assessment of objectives
- According to students, it improved (less cognitive imbalance ?)



pedagogical environment characteristics

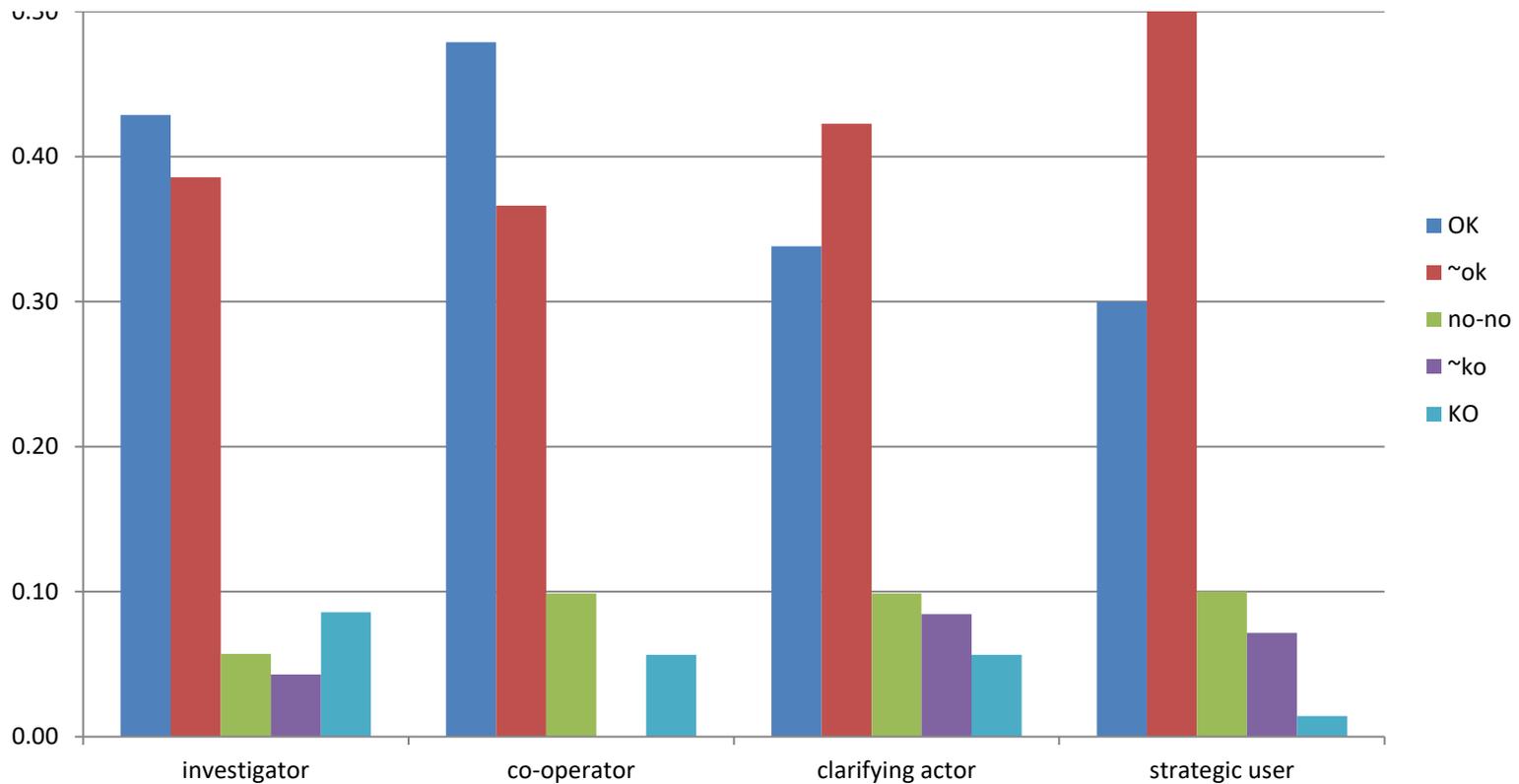


No significant difference between 2015 and 2020 for the first four characteristics.

A mini-project based on the course rather than a stand-alone project : SE (lifecycle ...) understanding is diminished but it helps students better understand the SQL course.

Very few students used pre-corrections, so the last three characteristics are strongly decreased. Assessment is therefore no longer integrated into learning.

Students' roles (Tardif, 1998)



investigator: I discussed with other students my questions about the project and/or I defended my solutions;

co-operator sometimes expert: I explained some project points to other students and/or I had myself explanations from others;

clarifying actor: I asked the teacher or other students in order to insure my good project understanding and to verify the adequacy of my proposals;

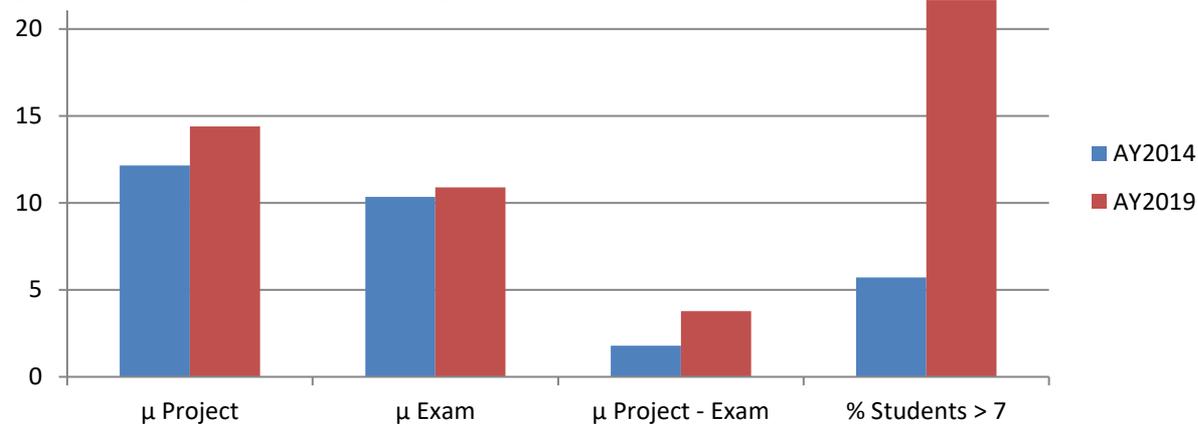
strategic users of available resources: I used the available resources and/or supplementary resources and I verified their relevance.

Students' roles (author's opinion)

- AY2019 students do not **investigate** much but decide quickly based on what others do.
- cooperative learning (1) students are interdependent
(2) they share a common goal.
The teacher do not have any control on **cooperation**.
- To question peers and teachers, both about peers' and their own understanding, but the **clarification** between students may take the form of conflict.
- Can we agree that students are **strategic users** when the most common strategy is trial and error ?

Correlation with summative evaluation

AY2014 and AY2019 grade averages, and significant differences.



Grading system : The French system uses grades ranking from 0 to 20 (10 required). Mapping of marks: N \rightarrow 0, P \rightarrow 6.66, L \rightarrow 13.33, and F \rightarrow 20.

Alert : 7 points are a significant difference between marks : 6% vs 22 %.

Analysis : In AY2014, the project was carried out individually with a few plagiarism. In AY2019, the project was carried out in pairs. In some pairs, a student, consciously or unconsciously, may not work hard enough.

Learning paradigm (consistency of learning and variation over time) **vs** **teaching paradigm** (consistency of time and variation in learning). With a rigid timetable, the logic of performance prevails over the logic of learning: in an unbalanced pair, the strongest student does most of work.

Conclusion

- In AY2014, the findings indicated that the system promoted knowledge construction, encouraged students to be active, autonomous, cooperative. Students asked for a structured course, lacked of time and complained about the technical platform.
- In AY2019, a teaching system with a “kind of” project : rudimentary lifecycle, no requirements analysis, optional design and primitive tests. However, students are overwhelmingly satisfied with the skills acquired, the teaching environment and the roles practiced.
- The learning paradigm has been much disruptive for students. The classical teaching method let them perform their "student job" well-established over the years, hence an enhanced self-satisfaction.
- Conscious and unconscious plagiarism is a problem.