Scaling up a project-based SQL course

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THE SYSTEM AND ITS OBJECTIVES

• SQL : 2\textsuperscript{nd} 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

<table>
<thead>
<tr>
<th>Objectifs</th>
<th>N</th>
<th>P</th>
<th>L</th>
<th>F</th>
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<tbody>
<tr>
<td>SQL – LDD (schema)</td>
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<td>2</td>
<td>12</td>
<td>14</td>
<td>15</td>
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<tr>
<td>SQL – LMD (queries)</td>
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<td>12</td>
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<tr>
<td>SQL – LMD (update)</td>
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<td>10</td>
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<tr>
<td>Programming SQL (PL/SQL)</td>
<td>4</td>
<td>15</td>
<td>7</td>
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<td>6</td>
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<tr>
<td>Tests and trial sets</td>
<td>3</td>
<td>10</td>
<td>11</td>
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- 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.


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.