Improving online and blended Learning with Educational Data Analytics

Results of the final evaluation survey

ILEDA Project Result no.5

Project No. 2021-1-BG01-KA220-HED-000031121

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Internal project peer review process

Reviewed by	Role, Organisation	**Date**
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Table of Contents

In this document, we analyze the responses to the final evaluation survey questionnaire on the teaching methodologies implemented in the ILEDA Erasmus+ project. Piloting was implemented in 9 different courses in four participating Universities of the ILEDA project, out of which 4 courses conducted flipped classroom model and 5 courses implemented project-based learning teaching methodology. At the end of the piloting, students and teachers were asked to fill out the survey questionnaire on the volunteer basis. In total, 859 students attended the pilot courses, while 133 responses were collected. In this report, first we analyze 133 students’ responses to the evaluation survey: 52 students in the flipped-classroom methodology and 81 students in the project-based learning methodologies. Then, we analyze 11 teachers’ responses: 5 in the flipped-classroom methodology and 6 in the project-based learning methodologies. We report each dimension of each of the evaluation surveys one by one.

1 Students

1.1 Overall satisfaction

The first question deals with students’ overall satisfaction with the implementation of flipped classroom/project-based learning methodologies in their courses. Students who attended the flipped classroom courses (n = 52) were mostly highly satisfied (n = 15, 28.85%) or satisfied (n = 23, 44.23%). Students who attended the project-based learning courses (n = 81) were mostly satisfied (n = 28, 34.57%) or highly satisfied (n = 19, 23.46%). Therefore, students’ opinions on both methodologies were positive, with a somewhat better opinion on the flipped classroom methodology (Figure 1).

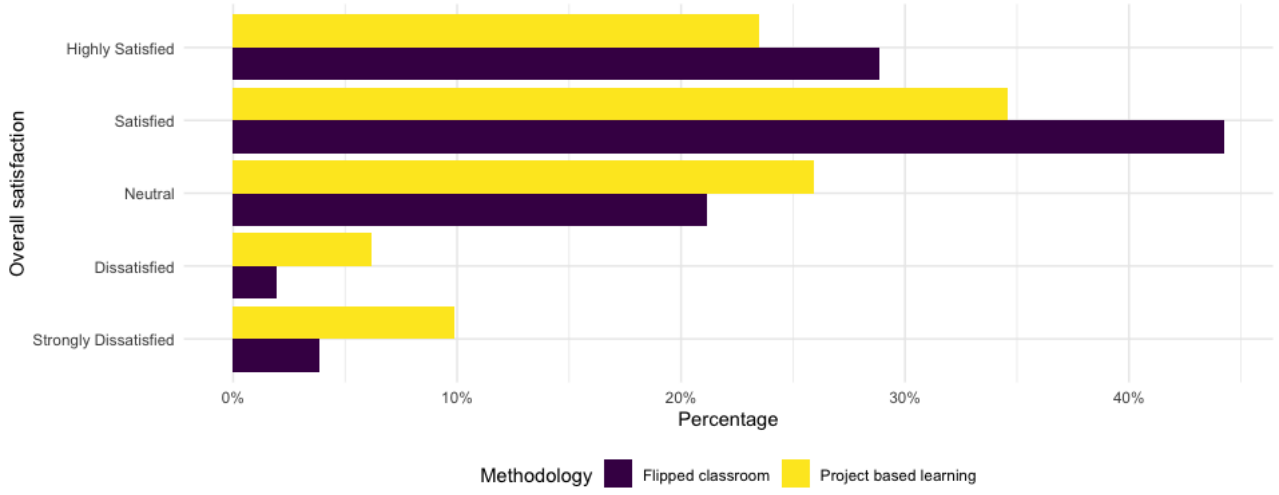

Figure 1. Overall student satisfaction with implemented teaching methodology

1.2 Promoting the learning experience

When asked how effective they felt the flipped classroom/project-based learning methodology was in promoting their learning experience, students had a diversity of opinions. Students who attended the flipped classroom courses highlighted its effectiveness and helpfulness. Some complained about the high workload at home. The students liked getting feedback on their weekly performance. Moreover, they pointed out that classroom time was better employed with practical exercises and discussions. Regarding project-based learning, students had generally very positive opinions on the methodology. They pointed out that it forces the students to work continuously and that it is suitable for acquiring practical skills.

1.3 Weekly activities

When inquired about how effective the weekly activities/project assignments were in enhancing their understanding of the course material, the flipped classroom students thought it was somewhat effective (n = 17, 32.69%), just effective (n = 13, 25.00%) or highly effective (n = 13, 25.00%), whereas the project-based learning students were slightly more polarized, with most students rating the assignments as highly effective (n = 27, 33.33%), followed by neither effective nor ineffective (n = 19, 23.46%) (Figure 2).

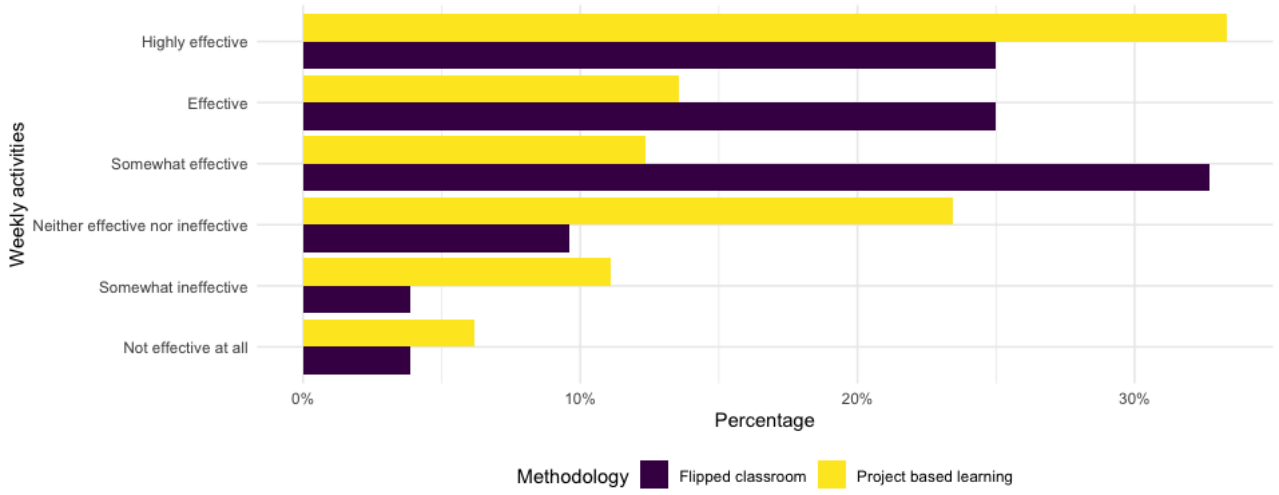

Figure 2. Students’ opinion about weekly activities

1.4 Specific examples

When asked about specific examples of in-class activities that they found engaging and helpful for their learning, students pointed out to a variety of resources such as weekly questionnaires, practical sessions in class, video lectures and lecture recordings, example (solved) exercises. They also highlighted the teachers’ attitude as a factor that helped keep their interest during class.

1.5 Critical thinking and problem-solving skills

Students were inquired about how well the methodologies used fostered their critical thinking and problem-solving skills. Students enrolled in flipped classroom courses mostly responded quite well (n = 24, 46.15%), followed by moderately well (n = 14, 26.92%). Students enrolled in the project-based learning courses responded equally moderately well (n = 22, 27.16%) and quite well (n = 22, 27.16%) (Figure 3).

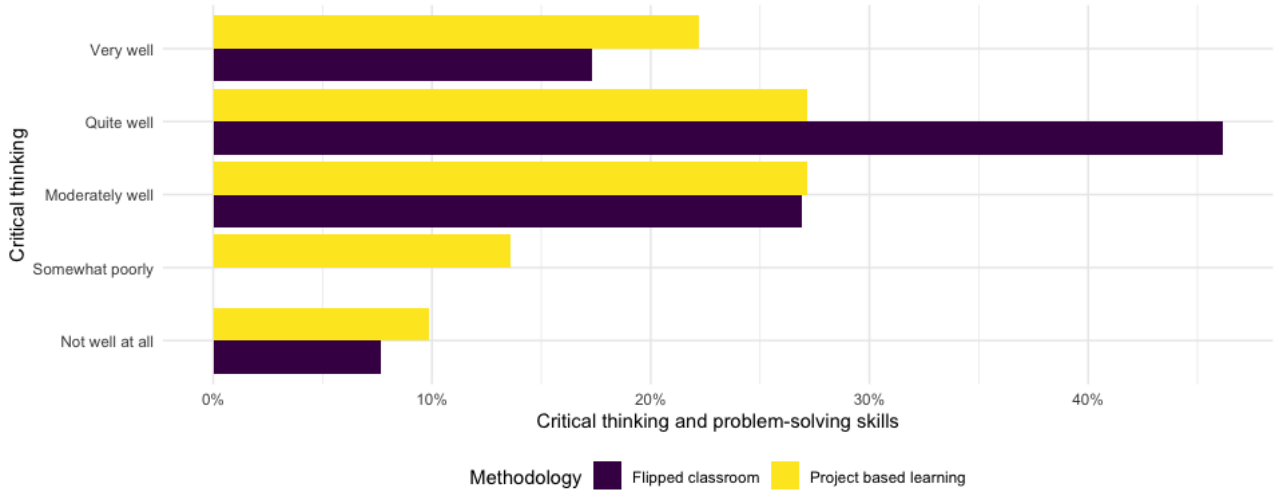

Figure 3. Students’ opinion on the development of their critical thinking skills

1.6 Participation

When asked about how the flipped classroom/project-based learning methodologies enhanced their motivation to participate in class activities and discussions, the students had quite diverse opinions. Most of the flipped classroom students replied that the methodology increased their motivation to participate moderately (n = 17, 32.69%). In the case of project-based, learning, most respondents claimed that it absolutely did (n = 20, 24.69%), although a high number of students said that it did not at all (n = 17, 20.99%) (Figure 4).

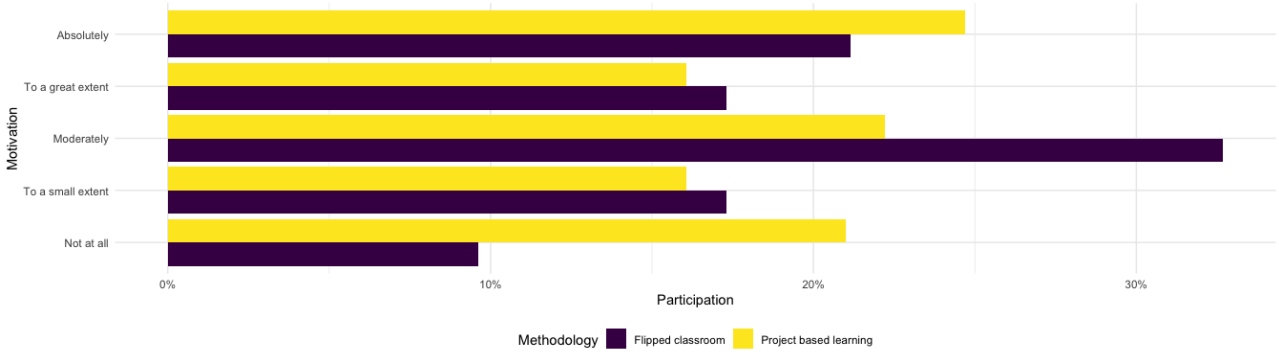

Figure 4. Student motivation level

1.7 Learning materials

Students were asked whether the learning materials provided (e.g., online resources, handouts, readings) were relevant and helpful in supporting their understanding of the topics covered. Most students agreed that the materials were highly (flipped classroom: n = 17, 32.69%; project-based learning: n = 30, 37.04%) or somewhat (flipped classroom; n = 25, 48.08%; project-based learning: n = 34, 41.98%) relevant and helpful (Figure 5).

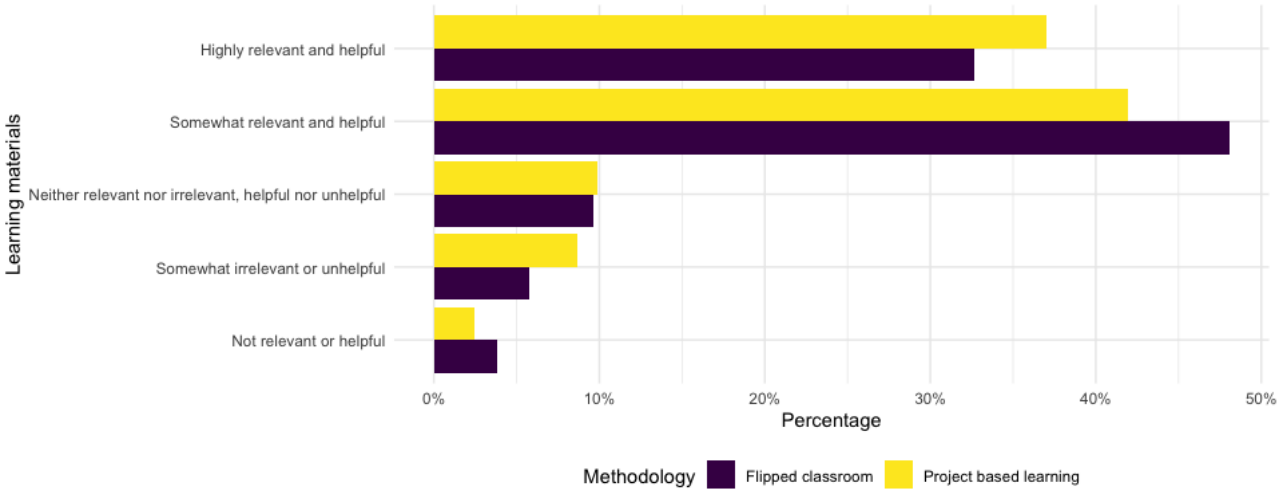

Figure 5. Effectiveness of learning materials

1.8 Collaboration

When asked about how well the implemented learning methodologies and activities encouraged students’ collaboration and interaction, students responses were mostly in the positive side of the spectrum (more than 65%) (Figure 6).

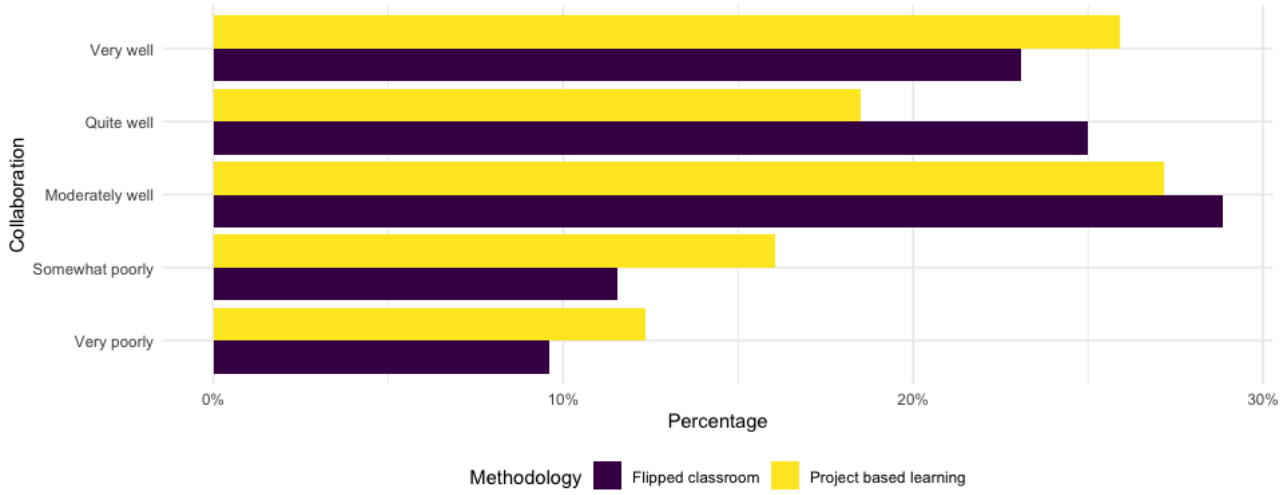

Figure 6. Level of students’ collaboration

1.9 Assessment

Regarding the assessment methods used (e.g., quizzes, projects, presentations), students mostly rated them as quite appropriate for evaluating their understanding of the course content (flipped classroom: n = 18, 34.62%; project-based learning: n = 29, 35.80%) (Figure 7).

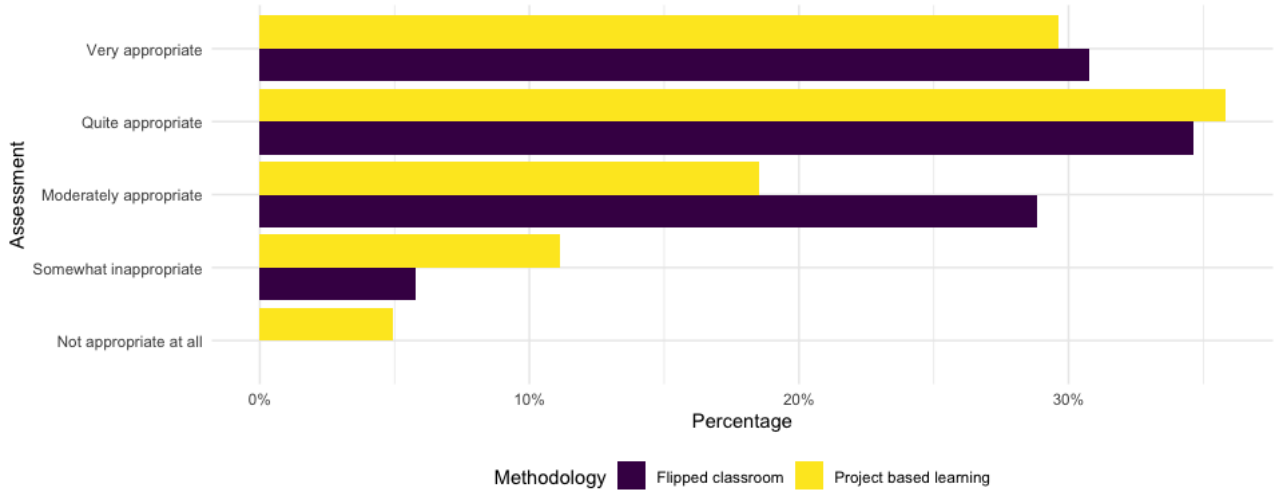

Figure 7. Effectiveness of course assessments

1.10 Confidence

When it comes to how confident students feel in applying the knowledge and skills gained through this course in real-life situations, most of the students were some

degree of confidence, especially, the students in the flipped classroom methodology (Figure 8).

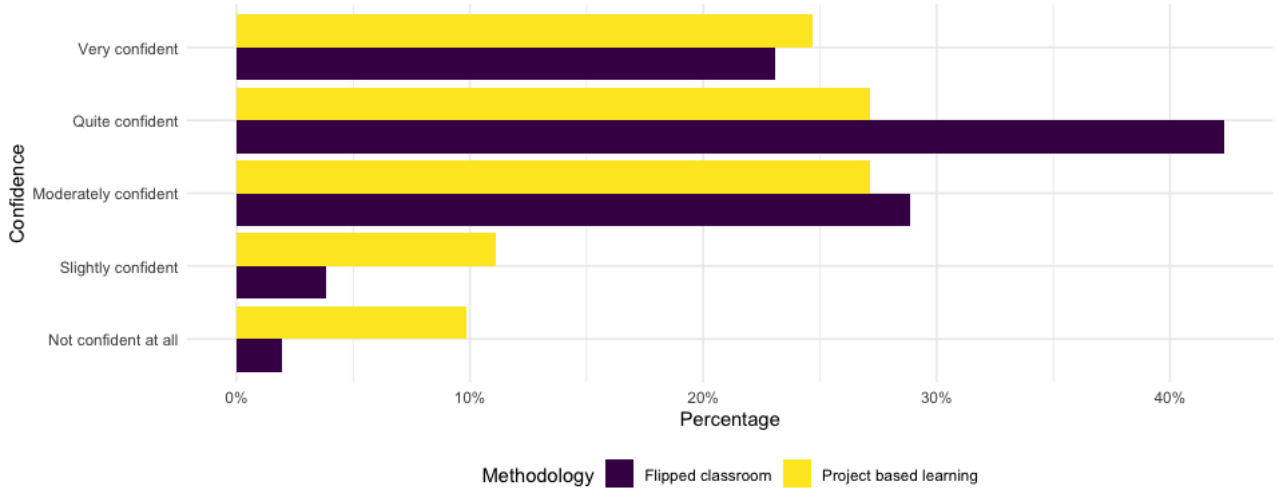

Figure 8. Achieved students’ confidence in applying gained knowledge and skills in real-life situations

1.11 Instructor’s role in learning

The instructor’s facilitation and guidance in supporting students’ learning during the implementation of these methodologies and activities was rated quite positively (mostly excellent and good) (Figure 9).

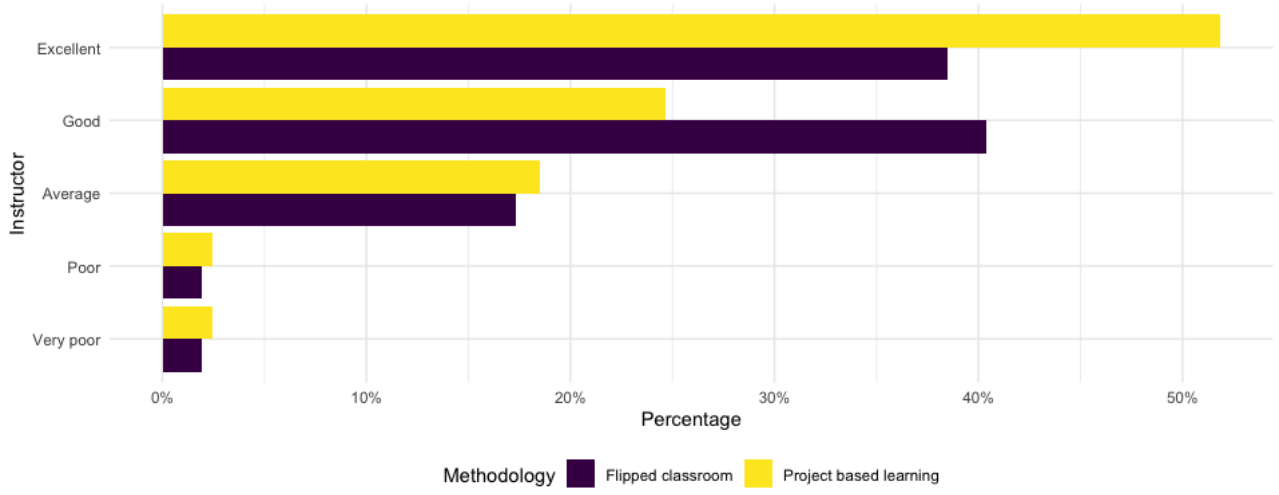

Figure 9. Perceived role of instructor’s help in learning

1.12 Recommend

When asked whether they would recommend the implementation of flipped classroom/project-based learning methodologies in other courses, most students

agreed, especially the flipped classroom methodology, although those who disagreed mostly did so strongly, highlighting that this methodology might not be for everyone (Figure 10).

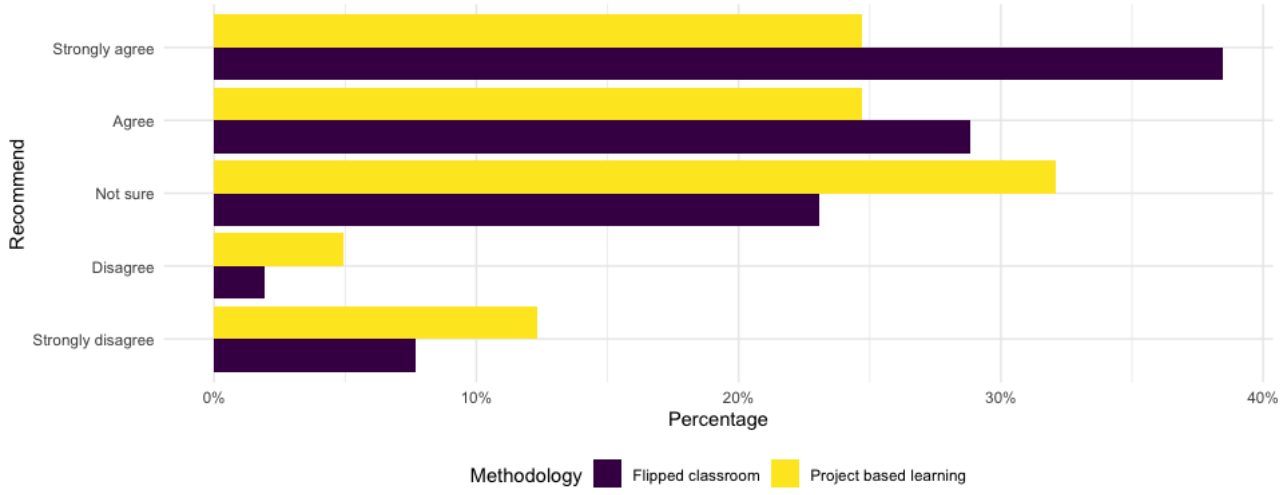

Figure 10. Students’ attitude towards the continuation of using classroom/project-based learning methodologies in other courses

1.13 Motivation before

Students were asked to state their motivation for learning before and after the course. Comparing the results, it can be seen that the flipped classroom methodology was more effective in increasing students’ motivation, although they started with lower levels than those of the project-based learning courses (Figure 11).

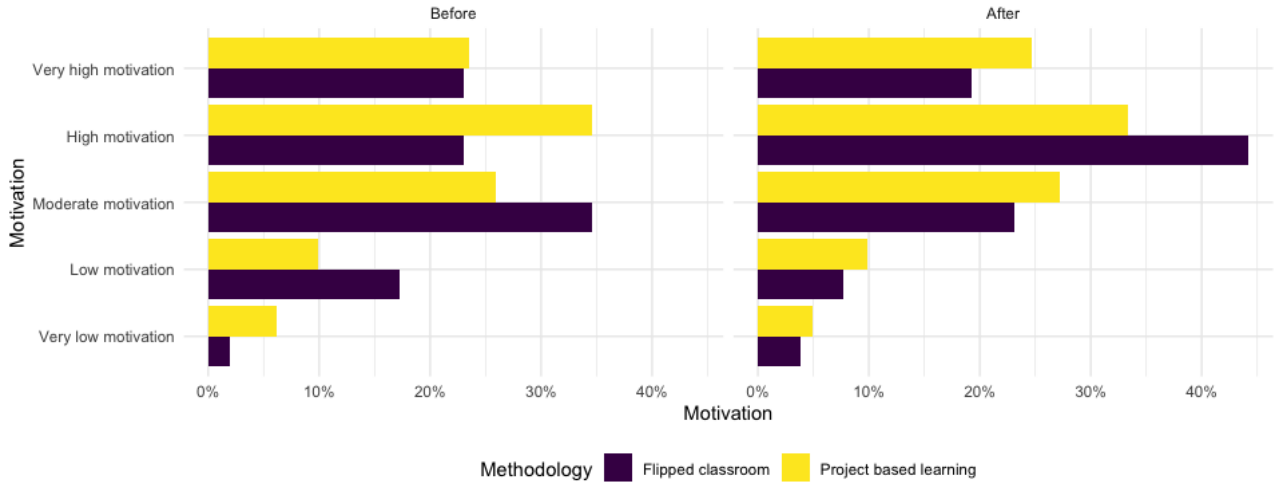

Figure 11. Level of students’ motivation before and after the pilot courses

1.14 Perspective

When asked about whether they thought that the course teacher gained a better perspective on their individual needs as a student, the project-based learning students had somewhat better perceptions, most likely because the project work required a closer communication between teacher and students in some of the institutions (Figure 12).

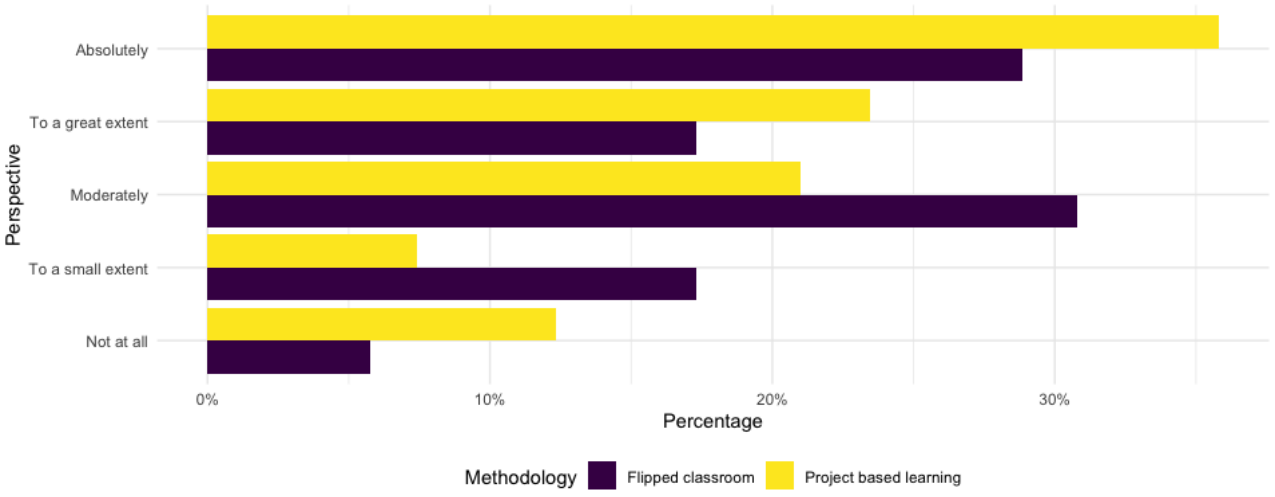

Figure 12. Perception of instructor’s familiarity of students needs

1.15 Strengths

Students pointed out to several strengths of the implemented methodologies. For the project-based learning, students’ mentioned the ability to gain practical knowledge, working with real-life technology, receiving feedback from the teacher, and having weekly deadlines and questionnaires. For flipped classroom, students mentioned the flexibility for accessing and studying the learning materials (especially the videos), and solving practical exercises and doubts in the classroom.

1.16 Challenges

Students highlighted some challenges of the methodologies. For project-based learning, students highlighted the difficulty of applying the knowledge acquired in practice, dealing with conflicts in the group projects, and having to resort to external resources to solve some of the technical difficulties of the project. For flipped classroom, students highlighted time management issues when estimating the duration of the activities and preparing the learning materials, and delayed feedback on the weekly assignments. Some students pointed out that it is challenging to follow the flipped classroom methodology if you are not already highly motivated to complete the course.

1.17 Suggestions

Students were asked for suggestions to improve the methodology. Project-based learning students asked for the learning materials to be uploaded with more time in advance, having more Q&A sessions, rewarding participation, mixing students of different levels in the same groups, and giving more early feedback on the project work. Flipped classroom students suggested having flexible deadlines with a penalty system to avoid procrastination, and providing weekly feedback.

2 Teachers

2.1 Confidence and preparation

In general, teachers felt very confident and prepared to use PBL and flipped classroom methods in their course (Figure 13).

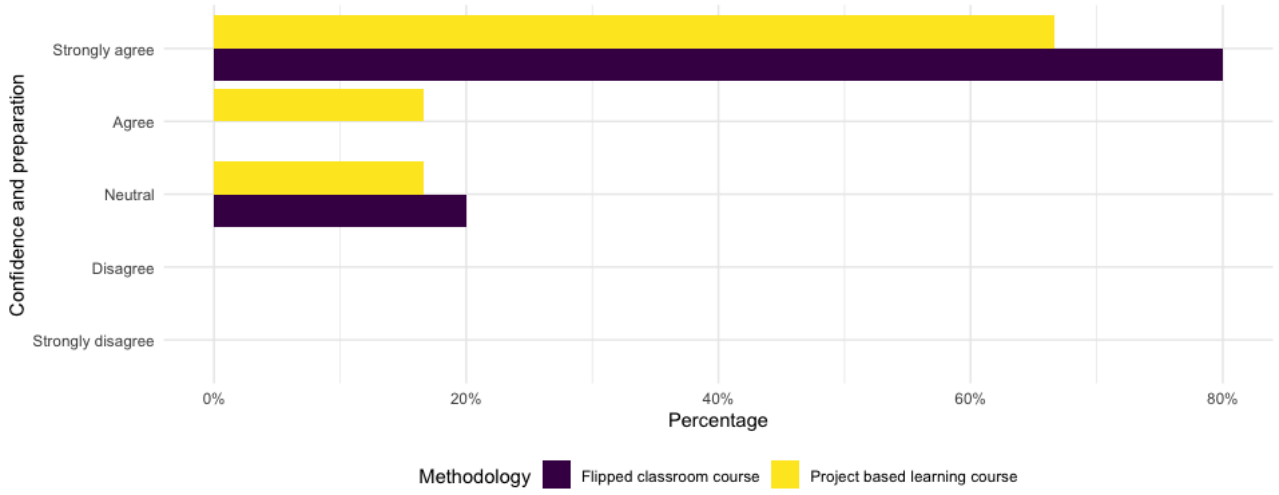

Figure 13. Teachers’ confidence and preparation to teach new methodologies

2.2 Ability to align learning objectives

Most teachers strongly agreed that they were able to align the learning objectives of their course with the ILEDA approach (Figure 14).

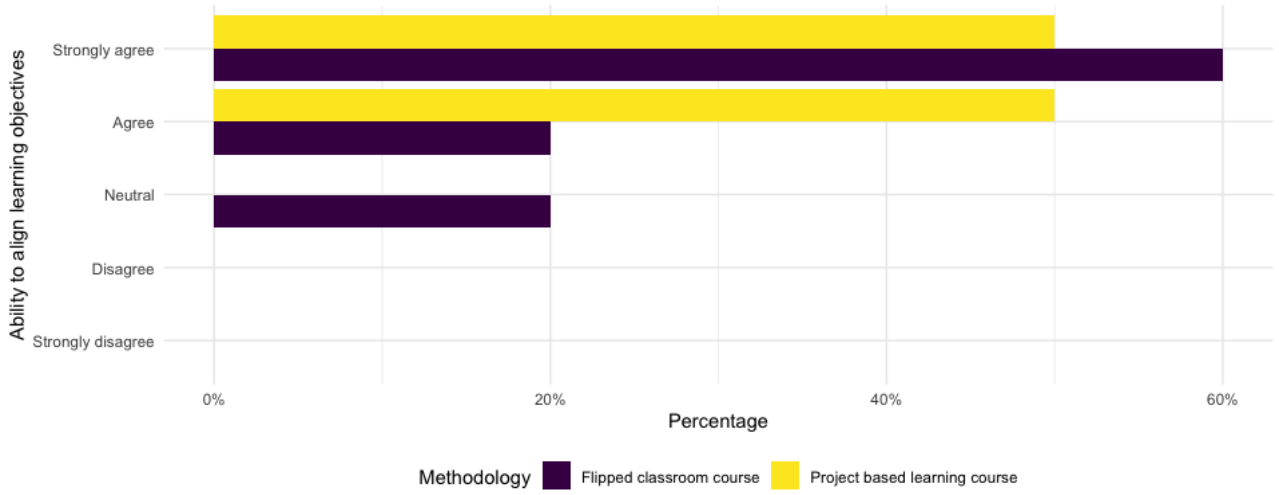

Figure 14. Teachers’ ability to align course learning objectives with the ILEDA teaching approach

2.3 Ability to align learning activities

Likewise, teachers agreed or strongly agreed that they were capable of aligning the learning activities of their course with the ILEDA approach (Figure 15).

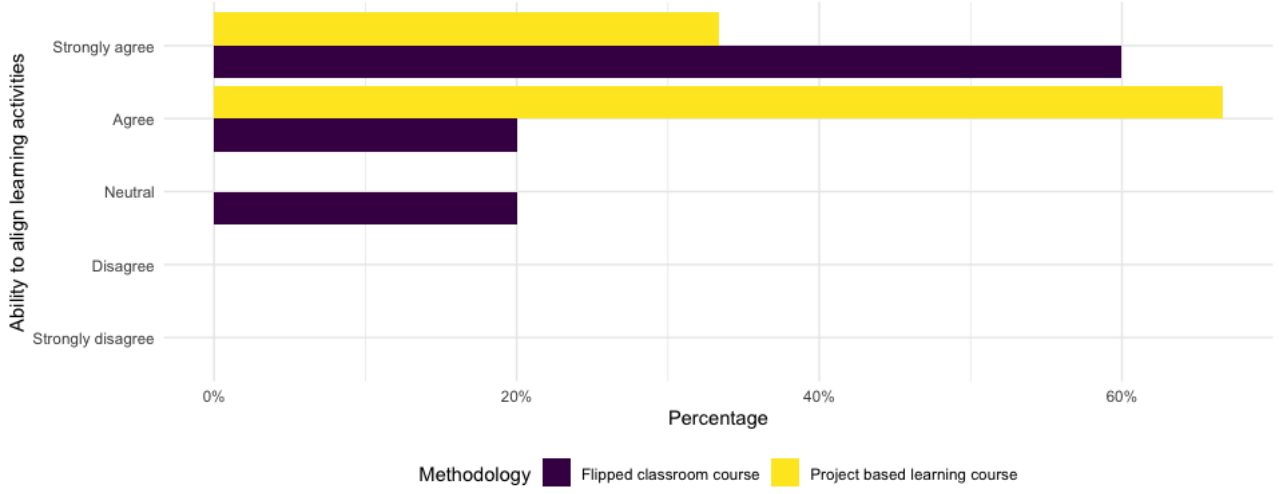

Figure 15. Teachers’ ability to align course learning activities with the ILEDA teaching approach

2.4 Ability to align course assessments

Course assessments were also possible to align with the ILEDA approach, with most teachers strongly agreeing on this matter (Figure 16).

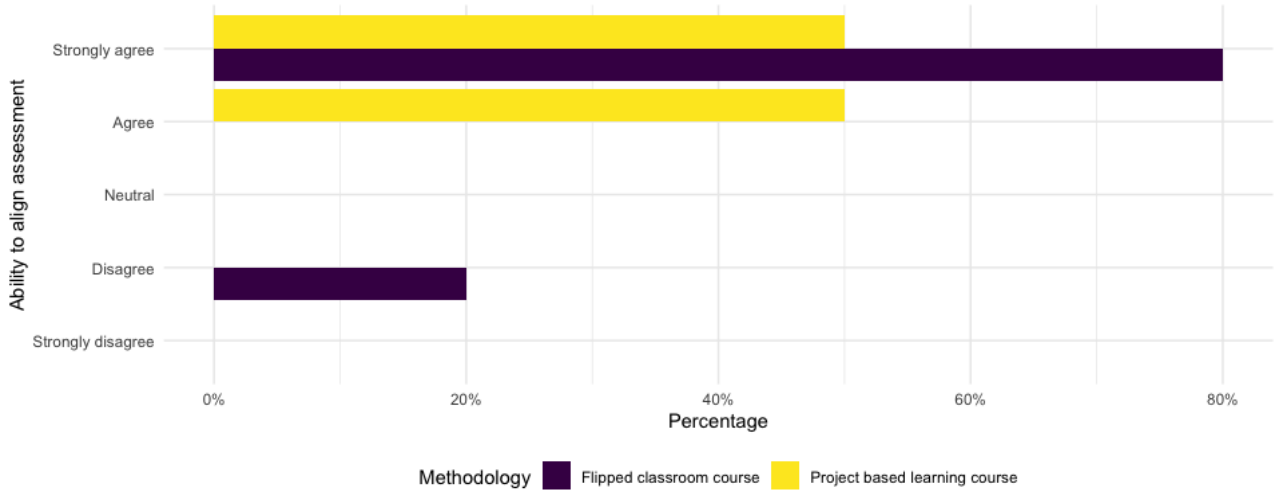

Figure 16.Ability to align course assessment with the ILEDA teaching approach

2.5 Engagement and motivation

Teachers mostly agreed that the ILEDA approach helped them engage and motivate students to learn. Teachers who implemented the project-based learning approach were more convinced than those who implemented flipped classroom (Figure 17). A possible reason is that students reported a perception of increased workload and teachers had a hard time to keep them motivated as the course progressed

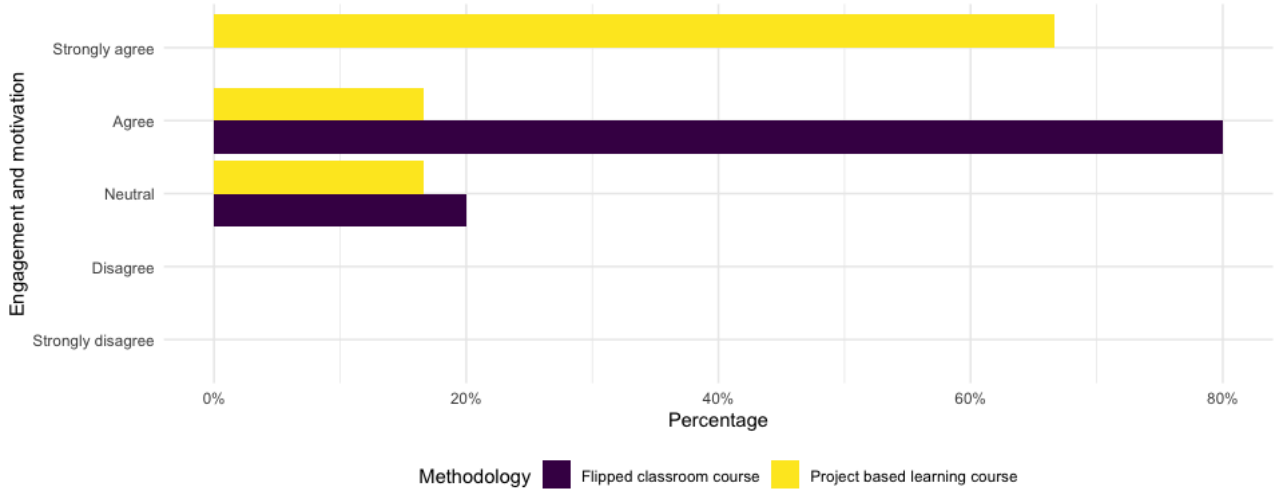

Figure 17. Teachers’ perception of students’ engagement and motivation to learn

2.6 Monitoring and evaluation

Teachers agreed or strongly agreed that the ILEDA approach helped them monitor and evaluate the progress of their students, especially in the flipped classroom approach (Figure 18).

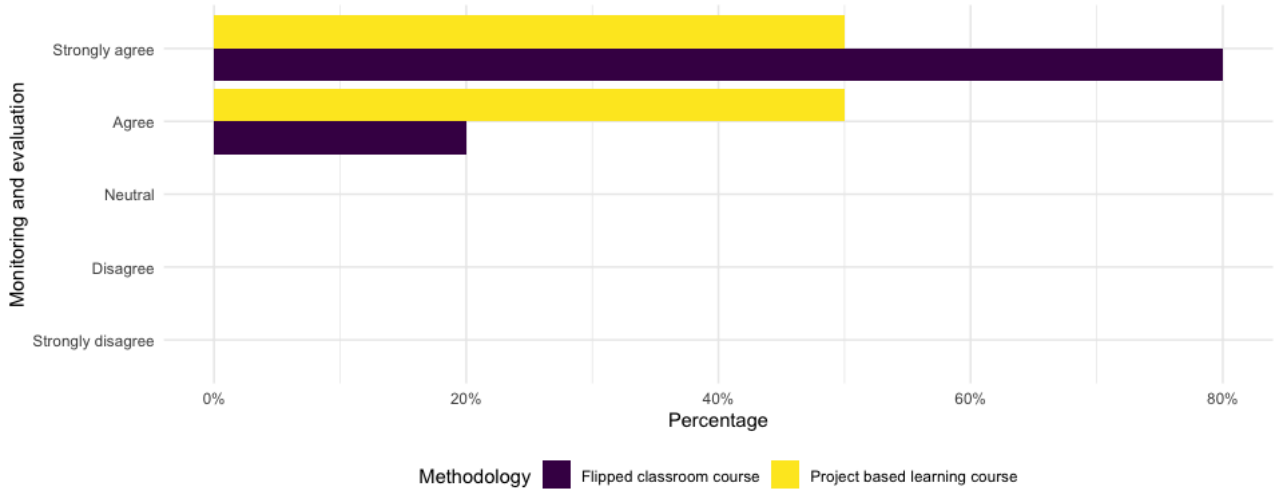

Figure 18. Teachers’ opinion of the influence of the ILEDA approach on student monitoring and evaluation of student progress

2.7 Communicating effectively

The ILEDA approach helped most teachers communicate effectively with other teachers who were also piloting the ILEDA approach in their courses, more so in the case of the project-based learning methodology (Figure 19).

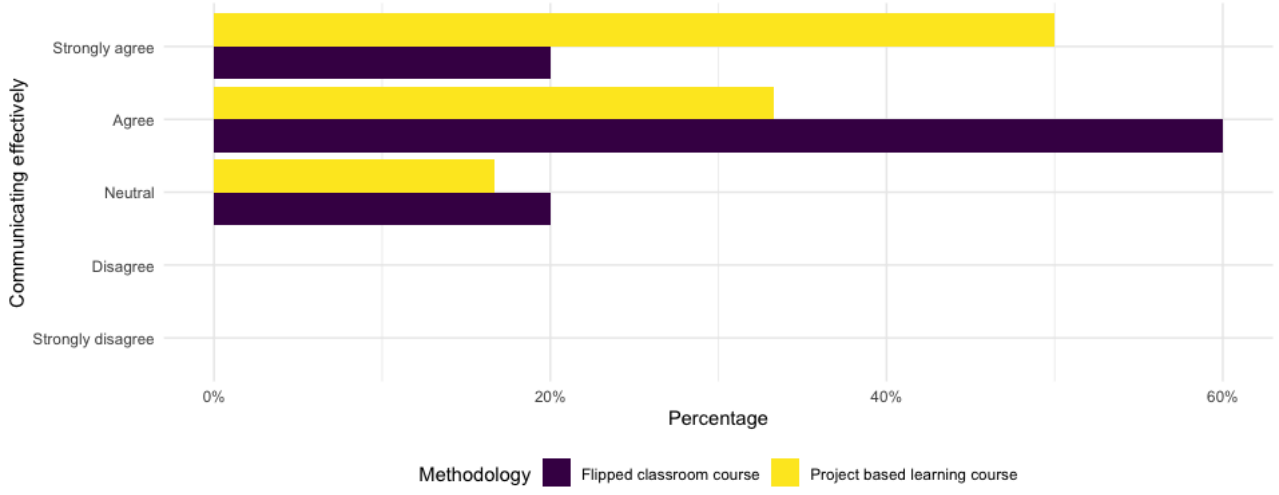

Figure 19. Effectiveness of the ILEDA approach on the communication between teachers

2.8 Time and effort

Teachers mostly did not perceive any change on the time and effort spent on preparing and designing the course using the ILEDA approach compared to previous courses. Some teachers in the project-based learning approach spend less time and effort using the ILEDA approach, but none of the flipped classroom teachers, probably due to the fact of having to record many videos (Figure 20).

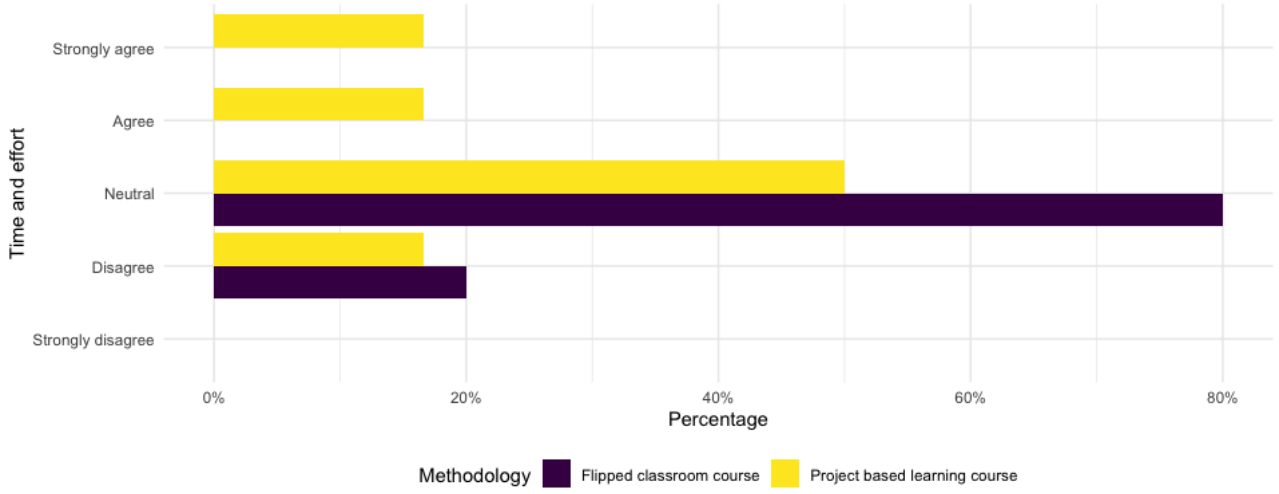

Figure 20. Teachers’ perception of the time and effort spent on preparing and designing the course using the ILEDA approach

2.9 Challenges in learning analytics

Teachers were very polarized when asked if they had challenges in regards to creating teaching materials to match learning analytics (LA) requirements from the ILEDA project. Teachers who followed the flipped classroom approach did not seem to face challenges, whereas teachers who followed project-based learning did. A possible cause is that monitoring project work and individual contribution of each team member is more challenging than the flipped classroom tasks (Figure 21).

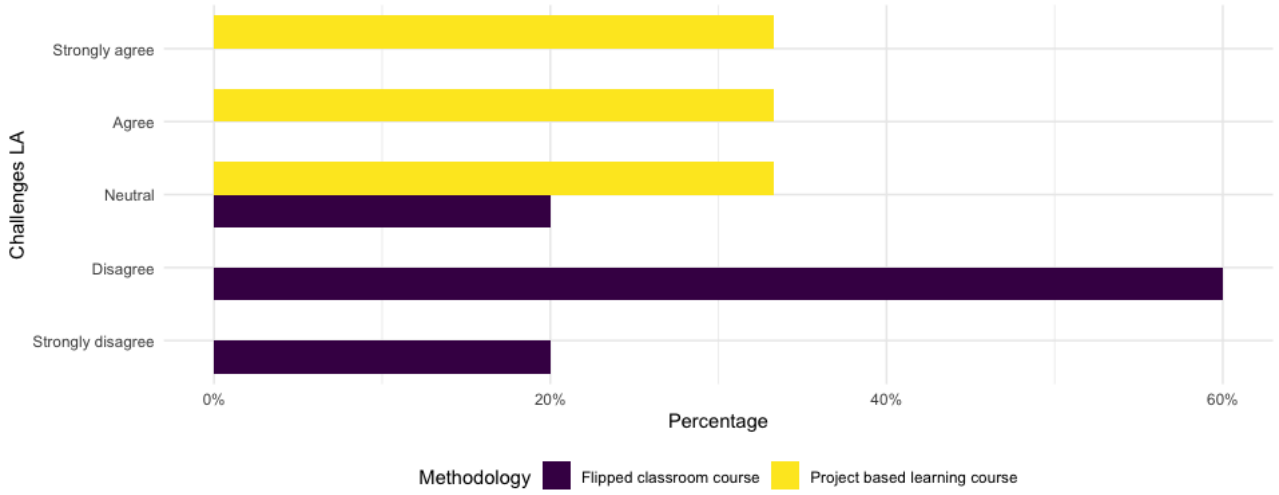

Figure 21. Challenges in creating teaching materials to match learning analytics requirements

2.10 Students’ acceptance

All teachers either agreed to some extent or were neutral regarding students’ acceptance of the methodologies proposed, with a slight advantage of project-based learning over flipped classroom (Figure 22).

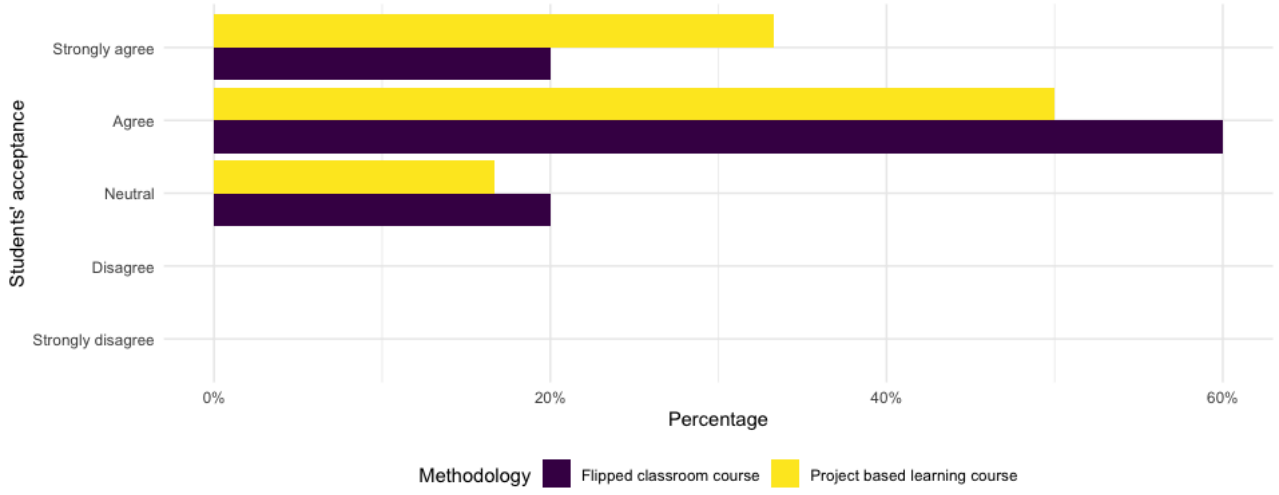

Figure 22. Teachers’ perception of students’ acceptance of applied teaching models

2.11 Future

When asked whether the teachers would use the same approach in future courses, most teachers in flipped classroom strongly agreed, while in project-based learning they strongly agreed and simply agreed equally (Figure 23).

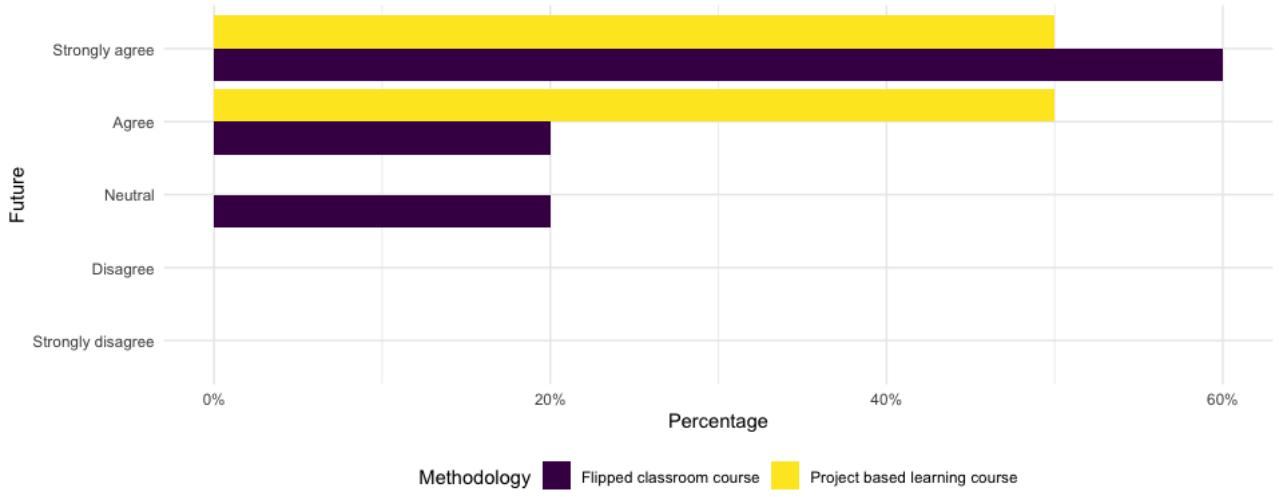

Figure 23. Teachers’ attitude towards continuing with using ILEDA approach in other courses

2.12 Overall experience

Overall teachers rated the experience as very positive. They mentioned the flexibility of flipped classroom for students who have a job, and the advantage of giving continuous feedback in the case of project-based learning.

2.13 Main challenges

When talking about the main challenges, the teachers mentioned that developing the learning materials (especially for the flipped classroom) from scratch was very time consuming but hope to be able to reuse the materials in the next iterations of the course. They also highlighted that some students were not mature enough to accept these methodologies that require a lot of independent work. One teacher mentioned the central role of AI technologies (e.g., ChatGPT), which makes assessment more challenging and learning less motivating for students.

2.14 Positive aspects

When it comes to positive aspects of the ILEDA approach, teachers highlighted less synchronous lecture-based teaching in favor of more individual work from students. The role of the leaning analytics monitoring of weekly activities was also highlighted as a way to follow students more closely and identify knowledge gaps, at the expense, of course, of more time from the teachers.

2.15 Improve/Adapt teaching strategies

Teachers disclosed how they are planning on improving or adapting their teaching strategies for the next semester based on their experience with piloting. One teacher pointed out enforcing that everyone has seen the weekly lectures before

attending the face-to-face lesson in flipped classroom. Another teacher suggested implementing project-based learning in more advanced courses. Making students’ role in planning and organizing their work more central was also highlighted, as an important part of self-regulated learning.

2.16 Lessons learned

There were several lessons learned from the piloting experience. For example, one lesson was that flipped classroom requires discipline to follow weekly so it might benefit from hard deadlines. Another lesson is that students liked mixing at home and in-class activities. An important remark was that students in the upper grades would benefit from this approach more. Students might be reluctant to adopt the methodology at the beginning but end up liking it in the end.

2.17 Areas for improvement

Some aspects for improvement were highlighted such as collecting data from more sources than Moodle, for example, Youtube, or satisfaction surveys. At the same time, teachers highlighted the need for more support in interpreting the analytics dashboards