

Student-Centered Instructional Approaches to Engage Students in Higher Education

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June SRICHINDA

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Résumé

Dans un contexte marqué par la promotion de l'apprentissage actif, l'enseignement supérieur connaît une transition des cours magistraux vers des approches centrées sur l'étudiant. Dans ce contexte de changements, les étudiants ne souhaitent plus adopter une posture passive et expriment le besoin de cours plus engageants. Cette thèse s'intéresse à trois approches pédagogiques centrées sur l'étudiant (l'apprentissage par l'enquête, l'apprentissage collaboratif et l'apprentissage par le jeu) en lien avec la conception tridimensionnelle de l'engagement en classe (émotionnel, comportemental et cognitif). Un dispositif de recherche en méthodes mixtes a été mis en place afin de comprendre la dynamique d'une perspective à trois points de vue : les étudiants (431), les enseignants (9) et un observateur non participant. La méthode de triangulation met en lumière des résultats concordants et permet une compréhension approfondie de cet engagement au regard des différentes pratiques pédagogiques proposées. Cette thèse met également en évidence l'importance de l'étayage enseignant pour guider les étudiants vers un engagement interactif le long du continuum pédagogique et favoriser leur développement en tant qu'apprenants. Les recherches futures devraient intégrer davantage d'outils de mesure de l'engagement des étudiants dans l'enseignement supérieur.

Abstract

Since there is a push in education for more active learning, there has been a shift from lecture-based learning to student-centered learning in higher education. Within all these changes, students no longer want to sit passively; They want more engaging courses. This thesis focuses on three student-centered instructional approaches (inquiry-based, collaborative-based and game-based) in relation to the three-dimensional construct of engagement (emotional, behavioral and cognitive) in the classroom. A mixed-methods design was used to understand the dynamics of the three-point perspective: students, teachers, a non-participant observer. The participants included 431 university students, nine teachers and one observer. The triangulation method provides convergent results and a deeper understanding of how students were engaged in student-centered instructional approaches. This thesis also highlights the importance of teacher scaffolding in guiding students toward interactive engagement along the pedagogical continuum and fostering their development as agentic learners. Future research should incorporate more measuring tools to engage students in higher education.

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“The greatest sign of success for a teacher is to be able to say, ‘The children are now working as if I did not exist.’” (Montessori, 1949, p. 279).

Introduction

Introduction

1. General Background and Context

Since education has been rapidly changing over the past decades, many teachers who left university several years ago now face the challenge of adapting their teaching practices to what is often described as a “new generation of learners.” Traditional lecture-based approaches are increasingly questioned, and there is a growing need for teaching methods that are more adaptable to today’s students. These students are more comfortable with multitasking, technology, and being attentive when they are actively involved in the learning process (Afonso et al., 2018). For this reason, involving students more directly in the teaching and learning process has become a key concern for higher education teachers when designing their courses. Meeting the needs of students through student-centered approaches is often considered innovative in higher education.

Innovation in instructional approaches in higher education has been a growing trend. Teachers adapting their teaching methods to fit their students can be seen more and more today, although this evolution has generally been slow (Gonzalez et al., 2021). Psychologists and pedagogues such as Piaget, Papert, Dewey, Freinet, and Freire, often associated with constructivist and open education movements, have emphasized the need for educators to rethink education, imagine new learning environments, and integrate new tools, media, and technologies to support learning (Ackermann, 2001). These perspectives have influenced contemporary reflections on teaching and learning in higher education and highlight the importance of educational research in understanding how students learn.

As instructional approaches evolve, attention has increasingly turned toward student engagement. Considering approaches to teaching have made their way into higher education, the next step is to examine how these approaches affect student engagement. Engaging students in learning helps make them more accountable and supports the development of lifelong skills and organizational capacities that are important for their future (Lund Dean & Wright, 2017). Despite the growing number of studies in educational research, there remains a need to better understand how changes in teaching and learning in higher education influence student learning (Tan & Chen, 2020).

There is existing research that discusses broad instructional models such as the “flipped classroom” or “project-based learning.” However, fewer studies focus on what specifically happens within these approaches. What specific activities are teachers using, and how do these activities influence student engagement during the learning process? This highlights the need to examine student-centered instructional approaches at a more detailed level, by focusing on concrete teaching practices and their relationship to student engagement.

This research is also rooted in a personal and professional journey within the field of education. My interest in teaching and learning began when I was a student, where having a

present and engaging teacher made classes more enjoyable and meaningful, and where I felt that I was truly learning. This experience inspired me to pursue teaching, which led me to complete a master's degree in education (Teaching and Learning). I then worked as a high school teacher for seven years in Chicago, where I continued to explore different teaching and learning approaches in my own classroom. After moving to France, I taught at the high school level for one year before being offered a position at a university. Teaching at the university level allowed me to become part of a community of teachers interested in exploring and experimenting with student-centered instructional approaches, which ultimately led me to pursue a PhD. These experiences shaped the direction of this research and raised important questions about how teaching practices influence student engagement in higher education.

Within this context, the Université Catholique de Lille provides a relevant setting for this research. As a growing university that is strongly involved in innovative teaching practices, it offers the opportunity to examine how student-centered approaches are implemented by teachers in practice and how students experience engagement within these learning environments.

2. Research Problem and Rationale

Student-centered instructional approaches are increasingly being used in higher education as an alternative to traditional lecture-based instruction. However, even though these approaches are often described as innovative, there is still limited evidence showing how they function in practice and how they influence student engagement. In higher education, many teachers are encouraged to redesign their courses and adopt student-centered practices, yet they often receive little feedback on whether these approaches are effective in engaging students during the learning process.

In France, student-centered instructional approaches are being implemented in higher education institutions as part of a broader push toward pedagogical innovation. Despite this growing interest, there is a lack of empirical research examining how these instructional approaches affect student engagement at the university level. While there are student-centered instructional approaches being used in higher education in France, there is not a large body of research that documents their effectiveness in terms of student engagement.

Existing educational research often focuses on broad instructional models such as the flipped classroom or project-based learning. Although these models are well documented, they do not always provide insight into the specific teaching practices and activities used within courses. As a result, it remains unclear which concrete student-centered practices contribute to engaging students and in what ways they influence engagement during classroom activities.

This lack of detailed understanding represents an important gap in literature. There is a need to examine student-centered instructional approaches at a more micro level by focusing on what teachers actually do in the classroom and how these practices relate to student engagement. By addressing this gap, research can provide valuable feedback to teachers and

contribute to a better understanding of how student-centered approaches operate in higher education contexts.

3. Purpose of the Study and Research Question

The purpose of this study is to examine student-centered instructional approaches and their influence on student engagement in higher education. As teaching practices continue to evolve, there is a growing need to better understand how these approaches affect students' learning experiences. This study responds to this need by focusing on student engagement as a key element of the teaching and learning process.

Student-centered instructional approaches will be examined based on the learning activities provided to the students and the ways in which these activities encourage participation, involvement, and investment in learning. By focusing on student engagement, this study seeks to contribute to existing research by providing a clearer understanding of how student-centered approaches operate within higher education classrooms.

This research is situated in a higher education context, where there is an increasing emphasis on innovative teaching practices. By examining student-centered instructional approaches within this context, the study aims to provide insight into how teachers adapt their pedagogy and how students respond to these changes in terms of engagement.

Based on these objectives, the main research question guiding this study is:

“How can student-centered approaches to instruction have an impact on student engagement in higher education?”

To further explore this question, the study also considers the following sub-questions:

- Are students engaged in student-centered instructional approaches in higher education?
- In what ways do different student-centered instructional approaches engage students?
- How do teachers perceive student engagement when implementing student-centered approaches?
- What role does the teacher play in supporting student engagement in the classroom?

4. Significance of the Study

Currently in higher education, there has been a growing shift from lecture-based teaching environments to more student-centered instructional approaches, based on the positive relationship between these approaches and academic success (Severiens et al., 2014; Lea et al., 2003). The student-centered approach is grounded in constructivist theory, where students are actively involved in their own learning process. To fully understand the potential of these approaches, it is necessary to examine how they influence student engagement in higher education.

Student engagement refers to being actively involved in the learning process while acquiring skills, knowledge, and personal growth. By focusing on student engagement, this study contributes to ongoing discussions about the effectiveness of student-centered

instructional approaches in higher education. Understanding how these approaches engage students can provide valuable insight for educators who are interested in redesigning their courses to better meet students' needs.

The significance of this study lies in its ability to provide teachers with insight into how their student-centered teaching methods are affecting student engagement, especially when they don't yet have feedback. By examining these approaches within a higher education context, the findings can guide teachers in making informed choices and continuously reflect on how they teach.

In addition, this study contributes to the broader field of educational research by strengthening the understanding of student engagement in higher education contexts. As teaching methods continue to evolve, research that examines the relationship between instructional approaches and student engagement remains essential for informing future pedagogical innovation.

5. Organization of the Study

This thesis is organized into 14 chapters.

Chapter 1 outlines the theoretical framework. It reviews the literature on student-centered instructional approaches (inquiry-based, collaborative-based and game-based), the ICAP Framework and the three dimensions of student engagement (emotional, behavioral and cognitive).

Chapter 2 introduces the empirical study and its methodological design. It outlines the research context, research questions, mixed-methods approach, and data collection instruments. This chapter also presents the three-point perspective (student, teacher, and observer) as the central analytical framework guiding the study.

Chapters 3 to 13 details the empirical results, structured around the nine case studies. Chapters 3 to 11 examine each case studies from the perspective of the teachers and observer, with one chapter dedicated to one case study. Chapter 12 revisits the same nine case studies but from the students' perspective on engagement. Chapter 13, presents a published case study that analyzes student engagement in two biology courses using the three-point perspective, and is essential because it provides published data of what a full 3-point triangulation looks like in practice.

Chapter 14, brings the thesis together through a conclusive discussion. It synthesizes findings across all chapters, situates the results within existing literature, reflects on methodological contributions, and outlines implications for practice, theory, and future research.

Chapter 1

Literature Review

Literature Review

The purpose of this study is to answer the research question: “How can student-centered approaches to instruction have an impact on student engagement in higher education?” This chapter focuses on two key areas: student-centered approaches to teaching and learning, and student engagement. It provides a review of the theoretical foundations, historical context, and relevant literature to understand how these approaches operate in higher-education settings.

Building on this foundation, the chapter examines three student-centered approaches, inquiry-based learning, collaborative learning, and game-based learning, as examples of instructional approaches that reflect student-centered principles in higher education.

1. Theoretical Foundations of Student-Centered Learning

Student-centered learning is a model that has students taking charge of their education, shifting the focus from the teacher to the student. This model encourages critical thinking, independence, and learning experiences that are catered to the needs, interests, and learning styles of the students (McCombs & Whisler, 1997). Although student-centered learning is often discussed as a contemporary pedagogical approach, its foundations can be traced back to the New Education Movement, which emerged in the late nineteenth and early twentieth centuries (Dewey, 1916; Labaree, 2005). This movement represents the shift from traditional teacher-led instruction to a student centered one based on a student’s lived experience. The curriculum is constructed based on the experience of the students rather than the subject itself. John Dewey was an influential figure during this movement. He argued that education should have experience, interaction and reflection instead of the passive transmission of knowledge in lecture-based learning (Dewey, 1938). Dewey posited that learning is a social process where students construct understanding through interactive activities in problem-solving situations. Through these ideas, the groundwork for student-centered approaches became more apparent in schools and universities (Biesta, 2013).

Although Dewey established the philosophical and pedagogical foundations that are centered on student interaction, there are other educators that have the same progressive movements in education, where they focus on student autonomy and participation. One example is Maria Montessori. She promoted self-directed learning in an environment that was structured to help independence (Montessori, 1967). She demonstrated that students would gain independence if given the key elements (environment, practical life activities, self-correcting materials, mixed-age participants, and freedom with responsibility). Another contributor to this movement was Célestin Freinet (1960/1993), who encouraged students to work in a cooperative way. This idea of cooperative learning suggests that students who work together toward a common goal are better able to construct knowledge, develop social responsibility, and support one another’s learning. William Kilpatrick developed the project method, which emphasized purposeful, student-driven activities to promote deeper

understanding (Kilpatrick, 1951). Together, these educators established the idea that learning should be active, participatory, and connected to lived experience.

Student-centered learning is strongly connected to constructivist learning theory, which suggests that learners actively construct knowledge through interaction with their environment rather than simply receiving information from a teacher (Fosnot, 2013). Constructivism, however, encompasses both individual and social traditions, which differ in how they conceptualize the process of knowledge construction. Piaget provided an important psychological foundation by explaining how learners build understanding through cognitive development and interaction with new experiences (Piaget, 1970). His work primarily emphasized individual cognitive processes and the internal restructuring of mental schemas. According to Piaget, children learn by actively engaging with new experiences and social interactions, instead of simple repetition or memorization. While Piaget focused primarily on individual knowledge construction, other theorists, most notably Lev Vygotsky, articulated a complementary but distinct perspective known as social constructivism, which emphasizes the role of social interaction and cultural context in the learning process. Lev Vygotsky emphasized the importance of social interaction in learning and introduced the concept of the Zone of Proximal Development (ZPD), which describes how learners can achieve deeper understanding with guidance from teachers or peers (Vygotsky, 1978). This perspective highlights the importance of dialogue, collaboration, and scaffolding in the learning process (Wertsch, 1985). Vygotsky's theory also suggests that the student-centered learning approach is not just about independence but about social interdependence (Johnson & Johnson, 2009), where students rely on one another to bridge the gaps in their understanding.

Building on these ideas, Jerome Bruner further developed constructivist theory through concepts such as discovery learning and scaffolding, emphasizing structured support that enables students to construct knowledge progressively (Bruner, 1961; Bruner, 1996). These contributions helped shape what is now commonly referred to as social constructivism, where learning is understood as a process of shared meaning-making through interaction (Palincsar, 1998). These theoretical perspectives are particularly relevant in higher education, where students are expected to take greater responsibility for their learning and to engage in collaboration, inquiry, and reflection (Rogoff, 1990; Mercer & Littleton, 2007; Hmelo-Silver et al., 2007).

In the context of this study, social constructivism serves as the primary theoretical lens for understanding student-centered learning. From this perspective, learning is conceptualized as a socially mediated process in which knowledge is co-constructed through dialogue, shared activity, and interaction within specific cultural and institutional contexts. Student-centered approaches are therefore not viewed merely as instructional techniques, but as pedagogical enactments of socially situated meaning-making processes. This orientation is particularly relevant in a mixed-methods investigation that examines both observable classroom interactions and students' subjective experiences of engagement, as it allows learning to be understood as simultaneously cognitive, social, and contextual.

Grounded in these theoretical underpinnings, and particularly in the principles of social constructivism, the following sections examine three specific student-centered pedagogical frameworks: inquiry-based learning, collaborative learning, and game-based learning. While there are numerous theoretical lineages of student-centered learning, this thesis focuses on these three pedagogical approaches because they were purposively selected as the primary instructional modalities identified during the preliminary observation of the nine higher education courses. By focusing on these three pillars, this literature review provides a targeted theoretical grounding that aligns the existing literature with the specific pedagogical realities observed in the field. Each of these approaches reflects different ways of learning and is shaped through social interaction: inquiry-based learning emphasizes guided exploration and scaffolding, collaborative learning focuses on peer interaction and shared knowledge construction, and game-based learning situates learning within structured, rule-governed social activity.

1.1 Inquiry-based Approach to Learning

Inquiry-based learning (IBL) is a student-centered approach in which students are actively involved in asking questions, exploring topics, and building their own understanding, rather than passively receiving information from the teacher (Linn et al., 2004; Wood, 2003). In higher education, IBL is typically structured where students formulate questions, investigate problems, analyze information, and construct evidence-based explanations. The understanding of inquiry is deeply rooted in the work of John Dewey, who viewed learning as an active process of investigation, where knowledge emerges through experience, reflection, and problem solving rather than receiving it passively (Dewey, 1938). Similarly, Lev Vygotsky (1978) believed that learning is a social act that is built through interaction, dialogue and guided participation, particularly done within the zone of proximal development. Through these lens, the approach “is defined as the development of a research plan, the creation of assumptions by investigating the information in line with the development plan, the critical experience of the assumptions created using the constructivist models, and the willingness of the individuals to engage in peer discussions while dealing with problems” (Teke & Çalışıcı, 2025, p.520; Linn et al., 2004). From a social constructivist perspective, IBL exemplifies how knowledge is co-constructed through guided exploration, dialogue, and interaction with peers and instructors, rather than being transmitted from teacher to student.

The IBL approach can be defined by its approach to actively engage students. When students are going through the learning process, they are actively engaged by asking questions to understand the subject, by undertaking research to respond to these questions, and are organizing their findings in a structured way (Wood, 2003). The pedagogical design of IBL facilitates the development of analytical and critical thinking skills by requiring students to evaluate evidence and predict outcomes (DiPasquale et al., 2003). In addition, “The IBL approach can be defined as a learning approach making students active throughout their learning lives, enhancing their scientific process using skills, and improving their critical-thinking skills through discussions and activities” (Duran & Dökme, 2016, p. 1443).

Compared to traditional teacher-centered approaches, where the teacher delivers information and students primarily receive it, IBL positions students as active participants in their learning. In IBL courses, students are positioned not as a recipient of knowledge, but as an active participant who construct understanding through questioning, exploration and collaboration. Teachers serve as guides or facilitators, supporting students as they investigate questions, solve problems, and follow the stages of scientific inquiry (Duran & Dökme, 2016). The teacher's role shifts toward facilitation, providing structure and scaffolding that support students as they engage in progressively more complex forms of inquiry. Through guided questioning, peer discussion, and continuous refinement of ideas, students negotiate meaning collectively, reflecting Vygotsky's emphasis on social interaction as central to cognitive development (Vygotsky, 1978). This aligns with social constructivist principles, as teachers scaffold learning to help students construct meaning collaboratively and progressively. An important feature of IBL is its focus on purpose-driven learning: students learn by solving problems, and understanding emerges through active engagement with the content.

Table 1 compares traditional teacher-centered teaching with inquiry-based teaching by, highlighting key differences in the teachers and students' roles, learning environment, teaching methods, communication, creativity, motivation, purpose and evaluation. This comparison helps illustrate how inquiry-based teaching shifts responsibly to students and emphasizes active problem-solving, exploration, and understanding (Duran & Dökme, 2016). In a teacher-centered instructional approach, the teacher is described as a person who gives information and presents the information to the students who are there to receive the information given. Whereas in inquiry-based teaching, the teacher is there to guide and be a counselor to the students, who solves problems and follows scientific stages. An important part of the inquiry-based teaching is the purpose, where the students learn by solving problems and understanding how to learn.

Table 1. Comparison of traditional teacher-centered teaching with inquiry-based teaching Source: Duran & Dökme, 2016, p.2890.

	Traditional teacher-centered teaching	Inquiry-based teaching
Teacher	Provides information, presents principles, concepts and generalizations.	Guide, counselor and leader.
Student	Passive receiver of information.	Person who solves problems by following scientific stages.
Area of interest	Related to teaching of phenomena, skills and concepts. Focuses on what to teach.	Related to selection of the method suitable for solving the problem. Focuses on what and how to teach.
Learning environment	Class, teacher and standard classroom tools, fixed class hour.	Learning is a creative process that is independent of any specific person, time and place.
Method-Technique	Lecturing, reciting, repeating and dictating.	Problem solving, project, experiment.
Communication	Competition-based communication.	Cooperation-based communication.
Creativity	Performance of activities expected from children as modeled by the teacher is important.	Children have opportunities to try original ways of accomplishing behaviors and skills expected of them.
Expectation - motivation	All children are expected to be successful in the subject studied. Perfection is promoted.	Children's attempts to solve problems through their own ways are supported. Every type of effort is supported.
Purpose	Something must be learned as it must be learned.	Students learn by solving problems. The purpose of learning is understanding.
Measurement-evaluation	One-dimensional, product-oriented evaluation through standard tests.	Multi-dimensional, process-oriented evaluation through performance tests, portfolio etc.

An influential framework for inquiry-based teaching and learning is called the 5E model from Bybee et al. (2006). In table 2, this model focuses on the 5E phases: engage, explore, explain, elaborate and evaluate. The model provides teachers with an instructional way to show the students how to understand knowledge. The first E, engage, asks for the learner to bring forth the information that they attained prior to the school activity. The teacher will bring forth what the students know prior and what they are learning in the present. The second E, explore, is a way to show the learner how to explore what they know and how they can gain new information. The third E, explain, focuses on explanation. In this phase, students need to be able to explain their comprehension of certain topics and ideas. The teacher also uses this phase to explain to the students that will guide them for deeper understanding. The fourth E, elaborate, is a phase where teachers give activities to challenge students by giving them more conceptual understanding of topics, where they can elaborate on what they know and the new experiences that they encounter in class. The last E, evaluate, is when the students are able to evaluate what they learnt and assess what was given to them during the course. From a social constructivist viewpoint, the 5E model operationalizes the collaborative and interactive dimensions of learning, ensuring that knowledge emerges through guided social participation.

Table 2. Description of the phases of the 5E model (from Bybee et al., 2006, p. 2)

Phase	Description
Engage	The teacher or a curriculum task accesses the learners' prior knowledge and helps them become engaged in a new concept through the use of short activities that promote curiosity and elicit prior knowledge. The activity should make connections between past and present learning experiences, expose prior conceptions, and organize students' thinking toward the learning outcomes of current activities.
Explore	Exploration experiences provide students with a common base of activities within which current concepts (i.e. alternative conceptions), processes, and skills are identified and conceptual change is facilitated. Learners may complete lab activities that help them use prior knowledge to generate new ideas, explore questions and possibilities, and design and conduct a preliminary investigation.
Explain	The explanation phase focuses students' attention on a particular aspect of their engagement and exploration experiences and provides opportunities to demonstrate their conceptual understanding, process skills, or behaviors. This phase also provides opportunities for teachers to directly introduce a concept, process, or skill. Learners explain their understanding of the concept. An explanation from the teacher or the curriculum may guide them toward a deeper understanding, which is a critical part of this phase.
Elaborate	Teachers challenge and extend students' conceptual understanding and skills. Through new experiences, the students develop deeper and broader understanding, more information, and adequate skills. Students apply their understanding of the concept by conducting additional activities.
Evaluate	The evaluation phase encourages students to assess their understanding and abilities and provides opportunities for teachers to evaluate student progress toward achieving the educational objectives.

Although the inquiry-based approach is used widely, the literature also highlights several challenges and uncertainties related to implementation. These uncertainties typically stem from the high demands it places on both students and teachers, which, if not properly managed, can lead to minimal learning gains (Kirschner et al., 2006). In particular, when there is not enough teacher scaffolding or when students have limited prior knowledge, the learning process can lead to cognitive overload or activities that become unstructured rather than reflecting true inquiry (Hmelo-Silver et al., 2007). In addition, inquiry-based learning can be time-consuming and may create practical challenges for students in terms of pacing their investigations and covering required content within the available instructional time (Krajcik et al., 1998; Wolf & Fraser, 2008). To make sure that students are on the right path to learning, students need to be aware of what is expected of them at each phase of the process, the teacher's ability to guide and structure learning effectively.

Contemporary research further supports these theoretical roots by showing that inquiry-based approaches promote deep learning and conceptual understanding by engaging students in authentic investigation and reflective discourse (Hmelo-Silver et al., 2007; Justice et al., 2007). For example, Hmelo-Silver et al. (2007) emphasize that well-structured inquiry tasks can facilitate collaborative sense-making and metacognitive growth, while Justice et al., (2007) argue that IBL fosters both disciplinary thinking and reflective practice in higher education. In addition, recent meta-analyses point to the importance of instructor scaffolding and contextual support to ensure inquiry activities result in meaningful conceptual development rather than superficial activity (Eberbach & Crowley, 2009; Alfieri et al., 2011). Inquiry tasks often involve collaborative exploration and shared interpretation of findings, reinforcing Dewey's view that education should mirror authentic processes of investigation (Dewey, 1938). By emphasizing questioning, problem-solving, and joint knowledge construction, IBL creates conditions that promote not only conceptual understanding but also deeper cognitive engagement and sustained intellectual curiosity, thereby linking inquiry

processes directly to the multidimensional nature of student engagement discussed in the following section.

1.2 Collaborative Approaches to Learning

Collaborative learning is a student-centered approach that emphasizes peer interaction and the shared construction of knowledge, where students work together in small groups to achieve common goals through discussion and mutual engagement (Bruffee, 1999). Empirical research identifies cognitive and socio-affective benefits and advantages of using collaborative approaches in the classroom. On the contrary, logistical and interpersonal challenges are frequently cited in the literature (Roberts, 2004). There are also noted problems and challenges using the collaborative approach, such as, resistance to group work, lack of group work skills, no contribution to the work, not a proper group selection, inequality of student's abilities (Roberts & McInerney, 2007). A substantial body of literature consistently reports positive outcomes regarding the use of collaborative approaches in the classroom (Hattie, 2008; Johnson & Johnson, 2009; Kyndt et al., 2013).

Collaborative learning is known as an “high-impact practice that enhances student learning” (Dick et al., 2022, p. 189). The concept of having students exchange ideas and experiences to understand a subject matter is what this approach promotes. Key components to collaborative approaches are to have teachers decide the groups beforehand, prepare activities that promote discussion and critical thinking, and set the environment so that the students are in a social environment ready for learning, have clear end goals so that the students understand the assignment and their roles. All these components are imperative when it comes to learning. The structured grouping allows students to interact with their peers that have diverse backgrounds, so they can foster negotiation, perspective-taking, and co-construction of knowledge. The first component was to have the teacher decide the members of each work group before the task. Allowing the teacher to decide the groups is an advantage because the teacher forces students to work with other students who might not have the same background as themselves. The second component asks the teacher to prepare activities or tasks that promote discussion. When there is a high level of discussion, students think critically because they are given different points of view of the group members. They can be challenged by what their group members are saying, or they can add to what they agree on. The third component is about the social environment. When there are collaborative tasks, students need to have the right environment to be able to work, discuss, feel safe and comfortable. The last component is based on what the teacher decides for the students. The teacher must prepare clear end goals. When students are given clear information and instruction, they can produce and finish tasks.

Collaborative learning is grounded in social constructivist theory and in the early work of scholars such as Vygotsky, who emphasized that learning occurs through social interaction. These ideas were later expanded by educators influenced by Piaget, who highlighted the importance of peer discussion and negotiation in supporting cognitive development (Bruffee, 1999; Dillenbourg, 1999). The theoretical foundations of collaborative learning therefore position peer interaction and shared responsibility as central mechanisms in the construction

of knowledge. Bruffee (1999) describes collaborative learning as a socially constructed process in which learners engage in dialogue and negotiate meaning together. Similarly, Dillenbourg (1999, 2002) emphasizes that collaborative activities require joint responsibility, where students work collectively to advance their understanding through interaction and shared problem-solving. Research on group cognition (Stahl, 2006) further demonstrates how cognitive processes can emerge from group discourse itself, while studies on collaborative regulation (Kirschner et al., 2011) highlight the importance of reflecting on group processes and maintaining shared accountability. Taken together, these perspectives position collaborative learning as a student-centered approach in which learning develops through social negotiation, mutual responsibility, and collective sense-making. While some of these elements may also be present in inquiry-based learning, they are emphasized here as the defining characteristics of collaborative learning.

In practice, collaborative learning often involves structured group discussions, joint problem-solving, peer review, and reflective activities, where students share responsibility for achieving learning goals. Teachers facilitate these interactions by providing scaffolding, prompting reflection, and supporting dialogue, rather than delivering content directly. Research has shown that collaborative learning can enhance critical thinking, problem-solving, metacognitive skills, motivation, and engagement (Laal & Ghodsi, 2012; Vangrieken et al., 2017; Strijbos et al., 2010). These benefits arise from the social negotiation of meaning, joint responsibility, and shared reflection, which encourage students to articulate ideas, justify reasoning, and integrate multiple perspectives. Different variations of collaborative learning, including structured approaches, peer tutoring, and computer-supported collaborative learning (CSCL), illustrate how the approach can be adapted to diverse higher education contexts (Stahl, 2006; Kirschner et al., 2011).

Despite these benefits, collaborative learning also presents challenges. Social dynamics can lead to unequal participation, dominance by more vocal students, or social loafing (Roberts & McInerney, 2007; Strijbos et al., 2010). Cognitive risks include reinforcement of misconceptions if peer scaffolding is inaccurate or focus on task completion rather than deep understanding (Dillenbourg, 2002; Kirschner et al., 2011). Logistical and structural challenges require careful planning, teacher facilitation, and well-designed assessments to support effective collaboration (Laal & Ghodsi, 2012; Vangrieken et al., 2017). Furthermore, measuring individual learning outcomes in collaborative settings can be challenging, as students' contributions are interconnected and not always easy to separate (Strijbos et al., 2010).

By clearly defining these mechanisms, this section positions collaborative learning not only as an instructional approach, but also as a framework for explaining how students co-construct knowledge, regulate their learning, and develop cognitive and socio-emotional competencies in group contexts.

1.3 Game-based Approaches to Learning

The game-based approach to learning has been encouraging teachers to change their courses so that they can have students learn through games. Gaming has a history of providing fun and interaction to those who play the game, so it was only a matter of time that gaming appeared in classrooms. Gaming doesn't only have a fun aspect; it also is known to provide knowledge and gain skills depending on the game. Game-based approaches were implemented by teachers to boost student participation and engagement (Detweiler, 2022). Game-based learning uses actual games as a learning experience and is getting attention for what it could bring to the educational world (Hashim et al., 2019). It helps students work together, share ideas, get involved, and collaborate in groups. Instead of just practicing skills on their own, you learn by playing adapted games, where questions are used to make you think and talk with others (Light & Mooney, 2014). Strategic games make the brain more active, and gaming gives a lively way to motivate learners to build skills and connect emotionally with learning and concepts. Through play, games create flow, which drives motivation and ultimately enhances learning (Bizzocchi and Paras, 2005). In higher education institutes, game-based learning is important for capturing students' interest, enhance learning outcomes and improving the overall educational experience (Akour et al., 2020).

Although there are advantages and benefits of using the game-based approach, there are also some disadvantages and challenges that need to be stated. Poorly designed games or those misaligned with learning objectives may reduce engagement and limit learning outcomes, while overly rigid rules can stifle creativity or intrinsic motivation. Games can also be challenging if the game itself is strict and is rule-based. Students could feel confined and feel like school and not a game. The approach can require significant preparation, resources, and technological support, and differences in learner characteristics, such as prior knowledge, gaming experience, and individual learning preferences, may influence how effectively students engage (Hashim et al., 2019; Detweiler, 2022).

Research indicates that game-based learning can enhance students' motivation and satisfaction, while providing authentic opportunities to apply knowledge and practice skills in socially interactive contexts (Sahin, 2017; Bostan & Turan, 2023). By fostering collaboration, problem-solving, and active participation, games support deeper cognitive engagement, emotional commitment, and joint responsibility, particularly in domains such as language learning where communicative practice is essential (Chapman, 2012; Reinhardt & Sykes, 2014; Sundqvist & Wikström, 2015). Effectiveness is maximized when game activities are aligned with learning objectives and learners' needs (Doğan & Koç, 2017).

Through this method, students construct and adapt their understanding as they engage with the problems. Collaboration between students, the teacher, and the game is a key element of this approach. Students are actively involved in applying knowledge, testing strategies, and reflecting on outcomes while collaborating with peers, which allows them to scaffold each other's understanding. This joint responsibility and social interaction are

central to the approach, as they support problem-solving, communicative competence, and strategic skills within the learning context.

By explicitly articulating these mechanisms, this section situates game-based learning not only as a pedagogical approach but also as a framework for understanding how students actively engage, collaborate, and co-construct knowledge through structured play, complementing the principles discussed for inquiry-based and collaborative learning. Through its structured social interaction, purposeful engagement, and opportunities for communicative practice, GBL exemplifies how student-centered approaches can operationalize social constructivist principles, emphasizing shared meaning-making, dialogue, collaboration, and the development of authentic skills such as speaking and communication.

Ultimately, these three pillars; inquiry-based, collaboration-based, and games-based learning are not merely disparate instructional techniques. Within a social constructivist framework, they represent specific pedagogical enactments that facilitate the co-construction of knowledge through dialogue and shared problem-solving, moving the focus from individual discovery to collective sense-making. By utilizing these approaches, the focus of the classroom shifts from individual discovery to collective sense-making, where meaning is negotiated through social interaction.

While the theoretical lineages of inquiry-based, collaborative, and game-based learning provide a framework for *how* instruction should be designed, the success of these designs depends on the student's response to them. In this sense, student-centered approaches are intended to act as catalysts for student engagement. To understand this relationship, the following section examines the multifaceted nature of engagement, transitioning from traditional three-dimensional models to contemporary frameworks that categorize the cognitive quality of student activity.

2. Research in Student Engagement

Following the discussion of student-centered instructional approaches, it is important to examine student engagement, as engagement is often considered a key mechanism through which these approaches influence learning. Student-centered approaches aim to actively involve students in the learning process, and student engagement helps explain how and why such involvement can support learning outcomes in higher education.

Student engagement (SE) has been defined and studied for over 30 years (Mosher & MacGowan, 1985). However, despite this long history, student engagement remains a complex and multifaceted concept. There have been different definitions and different dimensions of student engagement. For example, Dixson (2015) defines student engagement as the learner's effort when acquiring knowledge and building their critical thinking skills. Appleton et al., (2006) stated that SE is "energy in action" (p. 428). These different perspectives highlight the dynamic nature of student engagement and raise important questions about how it should be understood and studied (Eccles & Wang, 2012).

From a social constructivist perspective, engagement is co-constructed through interaction with peers, instructors, and the learning environment (Vygotsky, 1978; Palincsar, 1998). This means that students are not just passively receiving knowledge, they are actively building understanding through dialogue, collaboration, and shared problem-solving.

Because of these multiple definitions, student engagement is often described in literature as difficult to define consistently, with researchers focusing on different indicators and dimensions. Despite this variation, studies have shown that students who are engaged in the classroom are more likely to achieve better academic outcomes, including higher grades and stronger performance on standardized exams (Fredricks et al., 2004).

Engagement in the classroom is often centered on what students are actively doing during learning activities. Classroom engagement describes the degree to which students actively participate in and contribute to learning activities (Reeve et al., 2004; Skinner et al., 2009; Wang et al., 2014). Skinner and Pitzer (2012) also agreed that engagement can be seen as the action side of motivation. They identified three main reasons why engagement is important: first, engagement is necessary for students to learn, as they must be constructively involved in activities; second, students' school experiences play an important role in shaping their future; and third, engagement contributes to the development of academic skills and competencies. Together, these reasons suggest that student engagement plays a central role in supporting meaningful learning experiences.

In this sense, student engagement can be viewed as one of the most immediate pathways to learning (Bronfenbrenner & Morris, 1998). Students who are engaged are also less likely to drop out of school (Marks, 2000). Because of its strong link to academic achievement and persistence, student engagement has become a central focus in educational research and practice.

Since student engagement has been shown to have more links to academic success and provides a pathway to learning across different measures, exploring the different instruments that help understand this phenomenon is beneficial. One way to explore two of the three dimensions of engagement is by using an instrument called the ICAP framework (Chi & Wylie, 2014). Using this framework helps fill the gap in research between instructional approaches and cognitive engagement (Pintrich et al., 2000). The ICAP framework also helps connect behavioral and cognitive engagement (Wiggins et al., 2017). In line with Chi and Wylie's ICAP framework, the student-centeredness is treated as a continuum of engagement rather than a fixed instructional state.

2.1 The ICAP Framework as a Theory of Cognitive Engagement

While the three-dimensional model provides a useful way to categorize engagement (emotional, behavioral and cognitive), other frameworks focus more specifically on the quality of students' engagement during learning activities. An influential framework, known as the ICAP, can be presented as a cognitive-engagement-oriented framework of learning processes, since it links observable forms of engagement to underlying cognitive mechanisms

and differential learning outcomes (Chi, 2009; Chi & Wylie, 2014). The ICAP framework classifies learning activities into four modes of engagement: Passive, Active, Constructive, and Interactive. These modes are organized hierarchically, suggesting that deeper forms of engagement are more likely to promote meaningful learning from Passive to Interactive.

Passive engagement refers to situations in which students receive information without overt action, such as listening to a lecture without note-taking or interaction. Active engagement involves observable actions such as highlighting text, copying notes, or repeating information. Although active engagement requires physical involvement, it does not necessarily guarantee deep understanding (Chi, 2009). Constructive engagement occurs when students generate new outputs that go beyond the given information, such as explaining ideas in their own words, asking questions, or making connections between concepts. Interactive engagement represents the highest level in the ICAP framework and occurs when learners engage in dialog with their peers or teacher and they build on each other's ideas, challenge reasoning, and co-construct understanding (Chi & Wylie, 2014; Vygotsky, 1978).

Students who are engaged in inquiry-based learning (IBL) and collaborative problem-solving are theoretically expected to reach the constructive and interactive levels of the ICAP framework. In Inquiry-based learning, students come up with explanations and formulate questions, test hypothesis and construct knowledge through exploration, which aligns with constructive engagement because students actively produce output that go beyond the give information (Hmelo-Silver et al., 2007; Chi & Wylie, 2014). When there are peer discussions and shared reasoning, engagement may shift to the interactive mode, where understanding is co-constructed because of dialog and mutual ideas that are elaborated. (Chi & Wylie, 2014; Vygotsky, 1978).

Collaborative-based learning is structured around peer interaction and joint responsibility, requiring students to explain ideas, negotiate meaning, and respond to alternative perspectives. These processes reflect interactive engagement in ICAP, as learning emerges through dialog and exchange with their peers rather than individual activity (Dillenbourg, 1999; Bruffee, 1999; Chi & Wylie, 2014). Research on group cognition further supports the idea that shared reasoning and collective problem-solving promote deeper conceptual understanding (Stahl, 2006). In this sense, collaborative learning operationalizes the interactive mode of ICAP by positioning knowledge construction as a socially mediated and collectively regulated process.

Game-based learning, particularly when it involves strategic decision-making, problem-solving, and reflection, also aligns with constructive and interactive engagement. Well-designed educational games require students to apply knowledge, evaluate consequences, adapt strategies, and often collaborate with peers, processes associated with deeper cognitive processing and conceptual change (Gee, 2003; Plass et al., 2015; Chi & Wylie, 2014). When gaming includes discussion, students often debate strategies, co-create solutions, or explain rationale to peers, and because of that engagement may reach the interactive level through shared reasoning and co-construction of solutions. Through constant feedback, strategic adaptation, and social interaction, game-based learning can therefore move students beyond

active participation toward the constructive mode and interactive mode into making meaning in what they are doing.

The ICAP framework aligns with student-centered approaches because it recognizes that not all participation leads to the same level of learning. Activities that promote constructive and interactive engagement are more likely to result in deeper cognitive processing and conceptual change (Menekse et al., 2013). In this way, ICAP builds on the three-dimensional model of engagement (emotional, behavioral and cognitive) by highlighting that not all active learning is equal, that some activities require much more mental effort than others. By incorporating ICAP, student engagement can be understood not only in terms of emotional, behavioral, and cognitive dimensions, but also in terms of the depth and quality of students' learning processes. Taken together, these perspectives suggest that student-centered approaches do not simply increase participation; rather, when implemented in alignment with their theoretical principles, they foster constructive and interactive forms of engagement. Positioning ICAP as a cognitive theory of learning processes strengthens the conceptual coherence between inquiry-based learning, collaborative learning, game-based learning, and student engagement, highlighting that the depth of engagement is not merely an observable activity but also that it is central to learning.

2.2 Three-Dimensional Construct of Engagement

Student engagement is known to have different dimensions and models. Before discussing these dimensions, it is important to note the historical development of engagement models. Since the 1980's, multiple models have emerged, such as the Participation-identification model by Finn (1989). This model served as a framework to explain student engagement in schools and to illustrate links between learning outcomes and dropout prevention. Another framework connected to student engagement was Connell and Wellborn's engagement and disaffection model (1991). The central concept of this model is that both engagement and disaffection represent patterns of behavior reflecting how students participate in and respond to learning activities.

Based on these different models, key components emerged that contribute to the understanding of student engagement dimensions. The engagement and disaffection model describes three dimensions: behavioral, emotional, and disaffection. Behavioral engagement refers to students' effort, persistence, attention, and participation in activities. Emotional engagement focuses on students' feelings of interest and enjoyment in learning. Disaffection, the opposite of engagement, refers to students being bored, withdrawn, or showing a lack of interest and effort.

Another influential framework is the three-dimensional model by Fredricks et al., (2004), which is widely cited in literature due to its clarity and comprehensiveness. The three dimensions are emotional (or affective), behavioral, and cognitive engagement. Emotional engagement refers to students' feelings toward their school, teachers, peers, and learning (Skinner et al., 1993). Behavioral engagement describes students' participation in academic, social, and extracurricular activities. Cognitive engagement focuses on students' investment

in learning, including effort to understand, willingness to engage, and use of strategies to accomplish tasks.

In alignment with social constructivism, these dimensions are interconnected. For example, cognitive engagement is often strengthened through collaborative discourse and problem-solving, which were observed in several of the nine courses where students explained ideas to peers, debated solutions, and co-constructed understanding in small groups or during game-based simulations.

Although these dimensions are distinct, they are closely related and often influence each other. Understanding these interconnections helps to capture the complexity of student engagement and how different aspects of engagement interact in educational contexts.

Affective/Emotional

Emotional engagement is important for maintaining students' interest, as it occurs throughout the learning process (Ben-Eliyahu et al., 2018). Emotions can influence student motivation and learning, which in turn impacts engagement and performance (Pekrun & Linnenbrink-Garcia, 2012). Students experience a range of emotions, which can be shaped by individual factors and contextual conditions (Kuang et al., 2019). Understanding these emotions requires careful consideration of students' perspectives and experiences. Emotional learning engagement (ELE) can have significant and complex effects on academic performance because it provides a psychological basis for learning. It can also influence both behavioral and cognitive engagement, which affects achievement (Geertshuis, 2019).

There are different types of positive emotions that students experience in the classroom. Positive emotions can be hope, pride, interest, enjoyment, motivation, etc. When students experience enjoyment in learning activities, they tend to demonstrate sustained interest and intrinsic motivation, which has been linked to higher levels of persistence and academic achievement (Pekrun et al., 2002). Additionally, the feeling of hope is associated with optimistic beliefs when it comes to future achievements, that same feeling also supports students in persisting through challenges, and also gives students the ability to contribute more if there is continued engagement and effort (Snyder et al., 2002). The emotion of pride that students experienced after a successful task completion also enhances confidence, which leads to motivating students to engage in further academic tasks (Pekrun, 2006).

Negative emotions also have been linked to lower academic achievement (Hernández et al., 2016). When students experience anxiety during learning activities, they may disengage from participation or avoid discussion, which can reduce both engagement and performance (Pekrun et al., 2017). Likewise, boredom, which arises when learning tasks are monotonous or lack challenge, has been associated with lower engagement and attention, thereby hindering deep learning (Goetz et al., 2014). Similarly, when students feel anger or frustration due to unclear instructions or peer conflict, their motivation to participate often decreases, leading to withdrawal from learning activities and reduced engagement (Pekrun & Perry, 2014).

Emotional engagement is most commonly measured using self-reports, such as questionnaires or surveys, which allow students to reflect on their own feelings and

experiences (Pekrun, 2006; Fredricks et al., 2004). These methods are practical and can capture a wide range of emotions, but they rely on students' self-awareness and honesty, and can be affected by students' desire to respond in a socially acceptable way or by difficulties accurately remembering their experiences. (Appleton et al., 2008; Schunk et al., 2014). Appleton et al., (2008) created the Student Engagement Instrument (SEI), which has questions about enjoyment, interest, boredom, anxiety, and pride. In addition to self-reports, emotional engagement can also be assessed through observation of body language, facial expressions, and vocal tone, which provides more direct and dynamic insights but can be time-consuming and subject to observer interpretation (Linnenbrink & Pintrich, 2003; Appleton et al., 2008).

Behavioral Engagement

Behavioral engagement is an observable behavior and action that reflects whether students are on-task, paying attention, concentrating, and being compliant (Skinner, 2016). Connell and Wellborn (1990) stated that behavioral engagement is important in achieving positive achievements, where students participate in social, academic and extracurricular activities. Active participation can be directly related to positive student attitudes when it comes to learning and deep thinking (Skinner et al., 2009). Whereas students who have low behavioral engagement are found to have disaffection and higher dropout risk (Finn, 1989). Some examples of low behavioral engagement are students that are absent to class, withdrawn from the learning activity or showing off-task behavior, such as doing things other than the activity itself.

If a student is seen as active and participating in class or in a school setting, then the observer would deem that the student is behaviorally engaged. Fredricks, Blumenfeld and Paris (2004) gave some examples of what is observed as behaviorally engaged: participation, effort, persistence, asking questions, contributing to class discussion. This shows that the students are "active" and "doing" the work of learning. Some other researchers have defined behavioral engagement as students' positive conduct, which includes involvement in learning and academic tasks (showing effort, concentration, and attention) and participation in school-related activities such as sports, clubs, and other extracurriculars (Fredricks et al., 2004, p. 62).

When students demonstrate high behavioral engagement by consistently participating in class discussions, collaborating with peers, and following instructional tasks attentively, research shows they are more likely to develop positive academic habits and achieve better performance outcomes (Kuh, 2009). Conversely, low behavioral engagement, such as frequent absence, off-task behavior, or withdrawal from group activities, has been linked to poorer academic performance and increased risk of disengagement or dropout (Finn & Zimmer, 2012).

Some of the forms of measuring behavioral engagement are through observations, checklists, self-reports and teacher rating that show participation, persistence, effort and attention (Fredricks et al., 2004). The most common method of measuring behavioral engagement is self-reports and teacher rating, where the students use a Likert-scale survey to

report their level of effort or the teachers rate the students on participation (Skinner et al., 2009). The use of this type of method is efficient for large scale samples but not so much for small scale samples. Self-reports can also have a social desirability bias since some students don't want to be honest because that looks bad on their part as a student (Appleton et al., 2008). Another form of measuring is by observing students during the classroom lessons. To capture engagement during the 'action', there are often checklists used to help record students' behavior (Fredricks et al., 2004). This provides a real view of the students in their setting but can be labor-intensive and students could change their behavior because of the presence of the observer (Linnenbrink & Pintrich, 2003).

Cognitive Engagement

Cognitive engagement has been defined as the mental effort and use of strategies that help students understand complex concepts, master skills, and achieve deep learning. Students who are cognitively engaged show investment in thinking, planning, and regulating their learning (Fredricks et al., 2004). Fredricks et al. (2004) conducted a meta-analysis of different definitions of cognitive engagement and found a split in the literature. One perspective focuses on students' psychological investment, meaning they stay concentrated and focused even when distractions are present. The other focuses on cognition and strategic learning, where students put in the effort needed to meet or exceed the requirements (Corno, 1993).

Cognitive engagement is important because it supports students' ability to process information deeply and regulate their learning. The key components include deep learning and self-regulated learning. Greene (2015) argues that cognitive engagement acts as the mediator that links the task itself to the students' academic achievement. Students engaged in deep learning process information at a deeper level, which improves understanding and retention. Self-regulated learning involves students being motivated to set educational goals, monitor their understanding, and apply learning strategies effectively.

When students engage in cognitive strategies such as planning, monitoring, and evaluating their own learning, they are more likely to develop deep conceptual understanding and academic competence (Zimmerman, 2008). Students are not just completing tasks, they are using specific strategies to ensure long-term understanding. Some key points that are effective for students are elaboration and organization, metacognition and persistence. When students connect new information with prior knowledge and organized it using mental frameworks, they have better attention and can apply that knowledge to new contexts (Greene, 2015). Another positive point when a student is cognitively engaged is that they are able to think about thinking, which means that when a student is stuck on a task, they are able to use strategies that were taught to guide them to finishing (Fredricks et al., 2004). Students are also cognitively engaged when they are persistent during difficult activities. The students have a willingness to use as much effort to comprehend complex ideas (Rotgans & Schmidt, 2011). On the contrary, when students engage in surface-level strategies such as rote memorization or task completion without reflection, their learning tends to be shallow and less durable (Entwistle & Peterson, 2004). Research indicates that tasks requiring higher-

order thinking, such as complex problem-solving or analysis, promote cognitive engagement more effectively than procedural or routine tasks (Newmann, 1992; Greene, 2015).

Cognitive engagement can be measured using self-report questionnaires, learning analytics/task performance (analyzing assignments, essays, or problem-solving tasks), and think-aloud protocols (students verbalize their thought process while performing a task). Unlike behavioral engagement, which is observable, cognitive engagement is internal and requires careful assessment to capture mental effort and strategy use (Pintrich et al., 2000).

In conclusion, the literature on student engagement highlights the importance of understanding its emotional, behavioral, and cognitive dimensions, each offering unique insights into how students interact with learning. Emotional engagement emphasizes the role of affect and motivation, behavioral engagement captures observable participation and effort, and cognitive engagement focuses on strategic learning and self-regulation. Grounded in social constructivism, this study conceptualizes engagement as a socially mediated process in which knowledge is co-constructed through dialogue, collaboration, and shared problem-solving. While these studies provide a strong theoretical foundation, gaps remain in understanding how these dimensions interact in higher education and how instructional practices can actively foster engagement.

Similarly, research on student-centered approaches has demonstrated potential benefits for learning, but empirical evidence on their direct impact on all dimensions of engagement is still limited. By integrating the ICAP framework as a theory of cognitive engagement, this study further distinguishes between passive, active, constructive, and interactive forms of engagement, emphasizing that not all participation leads to the same depth of learning. In particular, constructive and interactive engagement closely align with the principles of inquiry-based, collaborative, and game-based learning, as well as with the social constructivist emphasis on co-construction of knowledge.

Given these gaps, the current study seeks to answer the research question: “How can student-centered approaches to instruction have an impact on student engagement in higher education?” By examining the relationship between student-centered approaches and the three dimensions of engagement, while also considering the depth and quality of cognitive engagement as conceptualized by ICAP, this study aims to contribute both theoretically and methodologically to the understanding of engagement in higher education contexts.

Building on this theoretical framework, the following chapter shifts from conceptual considerations to empirical investigation. The next part introduces the empirical study conducted at the Université Catholique de Lille and presents the methodological choices that guide the research. It outlines the research questions, describes the data collection procedures, and explains the triangular approach (students, teachers, and observer) used to analyze student-centered teaching practices across different instructional contexts. This transition allows this study to examine how the theoretical principles discussed in Chapter 1 are implemented, experienced, and interpreted within university classrooms.

Chapter 2

Methodology of Empirical Studies

Methodology of Empirical Studies

This chapter explains how the study was designed and conducted in order to understand student engagement in student-centered university courses. Because engagement is complex and cannot be fully understood through a single method, this research uses a mixed methods design that brings together quantitative and qualitative data collected across multiple courses and academic years.

Following the mixed methods principles outlined by Schoonenboom and Johnson (2017), the study was intentionally designed to combine different types of data, collected at different moments, and viewed from different perspectives. Student engagement is examined through three complementary points of view: students' self-reported experiences, observed classroom behaviors, and teachers' pedagogical intentions. Bringing these perspectives together allows for a more complete and meaningful understanding of how student-centered instructional approaches function in real classroom settings.

The methodology presented in this chapter reflects both the longitudinal nature of the research and the evolution of the study over time. The nine courses included in this research are not treated as isolated cases, but as part of a coherent empirical project focused on inquiry-based, collaborative-based, and game-based learning approaches. The sections that follow describe the research design, participants, data collection procedures, and analytical strategies used to integrate findings across methods and perspectives.

1. Research Design

This study sought to explore what student-centered instructional approaches teachers at the Université Catholique de Lille were using in their classes. To identify those teachers, the process began by reaching out to teachers across different faculties to find anyone teaching in an "innovative" way, meaning teachers who were not using a lecture-based approach. Approximately 30 emails were sent to teachers at the university, of whom about 25 agreed to allow classroom observations of their instructional approaches.

To gain a better understanding of what each teacher was doing, numerous interviews and observations were conducted. After this process, a clear pattern emerged: nine courses stood out as having the characteristics of a student-centered learning environment. Those nine courses were not chosen based on their grade level or department, but solely because students were taking on an active role in their own learning process.

The data collection was conducted over three school years: 2016-2017, 2017-2018 and 2023-2024. The questionnaire was given to 431 participants that were in 9 different courses in university. The two instruments were on one sheet of paper (one side had the CEI and the other side had the open-ended and demographic questions). It was administered during the last 15 minutes at the end of each course to ensure that the students were able to fully grasp the instructional approach and to reflect on how that transcended during the course. It was

distributed to all the students in the course and was instructed that it will be used as data for a PhD study. There were five demographic questions that asked: gender, age, year in university, what school or faculty they belong to, and what was their major. All the participants agreed to being observed and were informed that all of the information gathered would remain anonymous.

During the first wave of collection during the school year 2016-2017, there were 133 participants that took the CEI questionnaire and answered the open-ended questions. The second wave during the school year 2017-2018, there were 274 participants that completed the CEI questionnaire and open-ended questions. The last wave was during 2023-2024 with 24 participants from one course, Cellular Biology. Some of the data that was collected came from the same teacher for both school years, using the same instructional approach, but the participants were different.

2. Participants

The participants consisted of a total of 431 students from the Université Catholique de Lille in the north of France, as well as a small number of students from an affiliated engineering school, and nine teachers. The selection of the students was solely based on them being students of the teachers chosen by the researcher.

The 431 students were enrolled in three faculties (Science and Humanities, Law and Management, and Economics and Sciences) and participated in nine university courses. These courses included Molecular Biology, Cellular Biology, Research Training in Psychology, Communication and Society, Psychology (Approach to Organizational Change; Organization Diagnostics: Prevention and Health), Law, Insolvency and Bankruptcy Business Law, and Spanish. The distribution of participants across the nine courses and academic years is presented in Table 3.

The grade level of the students ranged from the first year of university to the second year of the Master's program, including first-year ($n = 109$), third-year ($n = 214$), and Master's level students (first year, $n = 75$; second year, $n = 33$). Data were collected across several academic years (2015–2016, 2016–2017, 2017–2018, and 2023–2024), depending on the course.

Gender information was collected for most, but not all, cohorts. Overall, the sample consisted of 136 males, 285 females, and 10 students who did not disclose their gender. In some cohorts, demographic data such as age and gender were not available because questionnaires were not administered or photographic data were not collected. When demographic information was available, the average age of the students ranged from 18 to 23 years old, depending on the course and cohort.

While cohort size and available demographic data varied across studies, all participants were observed within their regular classroom settings and as part of their required coursework.

Table 3. Number of participants in 9 university courses from 2016-2017, 2017-2018 and 2023-2024.

University Course	2016-2017	2017-2018	2023-2024
Molecular Biology	31	27	
Cellular Biology	12	19	24
Research Training in Psychology	24	51	
Communication and Society	59	42	
Psychology-Approach to organizational change (group & organizations)	-	8	
Law	-	24	
Psychology- Organization diagnostics: prevention and health	-	3	
Insolvency and Bankruptcy Business Law	-	22	
Spanish	-	85	
Total	126	281	24
OVERALL TOTAL	431		

3. A Summary of the Nine Case Studies

There were nine courses that were observed for this thesis. The following tables provide a descriptive overview of each of the nine university courses. For each course, the following elements are presented: course name and subject area, a description of what the course involves, the academic years in which it was observed, the pedagogical approach used by the teacher, an introduction to the context before entering the studies, and the assessment methods and tools used to measure student learning and engagement.

The nine courses are organized by instructional approach: Inquiry-based (Case Studies 1–4), Collaborative-based (Case Studies 5–8), and Game-based (Case Study 9). All courses were conducted at the Université Catholique de Lille in the north of France.

3.1 Inquiry-Based Approaches

Inquiry-based learning positions students as active learners who construct knowledge through questioning, investigation, and problem-solving, while the teacher acts as a guide rather than a content transmitter. The four courses in this section each implement inquiry-based principles in different disciplinary contexts.

Student-Centered Instructional Approaches to Engage Students in Higher Education

Case Study 1	Cellular Biology
Subject / Discipline	Biology (Faculty of Management, Economics and Sciences)
University Level	Bachelor's degree (3rd year undergraduate)
Years Observed	2016–2017, 2017–2018, and 2023–2024 (three cohorts)
Class Size	Approx. 12–24 students per cohort (observed sessions); up to 55 CEI respondents total across all years
What Is This Course?	Cellular Biology is a 3rd-year undergraduate course with a total of 18 contact hours, divided into three equal parts of 6 hours each. The three parts are: (1) laboratory sessions, where students experiment on plant and animal cells; (2) group work sessions, where students prepare interactive presentations and a reading handout; and (3) presentation sessions, where each group presents their work to the class. Students work in pairs or small groups (2–3 students) and are assigned a specific biological topic to research and present. The goal is to create an interactive student-led presentation, designed as if they are teaching the subject to their peers. Each group also prepares a two-page written summary document for the final exam.
Pedagogical Approach	Interactive student-led presentations is an inquiry-based approach in which students investigate a topic, construct understanding, and present it as if they were the teacher. The core feature is interactivity: each presentation must include an element of audience participation (Q&A session, open questions, quizzes, prompts for discussion). This evolved from a standard presentation format. After observing that passive listening reduced engagement, the teachers redesigned the course so that both presenters and audience members are active at all times.
Context Before Entering the Study (Interview)	The teacher had been using traditional lecture-based methods and found that students were passive and disengaged. Around 2013, she began rethinking her approach. By 2016, with her co-teacher, she adopted the interactive student-led presentation format. Semi-structured interviews were conducted with one teacher before each observation year (January 2017, January 2018, and February 2024). The teacher's goal was for students to understand the material deeply enough to explain it to others, fostering peer learning and critical thinking.
Assessments & Methods of Student Learning	• Laboratory sessions: 20% of the final grade — based on performance during experiments • Group work and presentation preparation (incl. written reading material): 60% of the final grade • Written final exam: 20% of the final grade — based on the content produced during all parts of the course Observations used: BERI (quantitative behavioral counts) for early sessions; Ethnographic method (qualitative timeline analysis) for presentation sessions. ICAP Framework applied analytically to interpret cognitive engagement.

Case Study 2	Molecular Biology
Subject / Discipline	Biology (Faculty of Management, Economics and Sciences)
University Level	Bachelor's degree (3rd-year undergraduate); two student groups: Faculty students (Fac) and engineering school students (AGRO)
Years Observed	2015–2016, 2016–2017, and 2017–2018 (three cohorts, different observation intensities per year)
Class Size	Approx. 20–47 students per session; 58 CEI respondents total across two school years
What Is This Course?	Molecular Biology is a 2nd-semester undergraduate course with 24 total classroom hours, divided into 12 sessions of 2 hours each. Before the course begins, the teacher meets the students to explain the structure, objectives, and expectations, an important orientation session not counted in the 24 hours. The course is built around three distinct activities: (1) Chapter creation: students work in groups to write a chapter on a teacher-assigned topic; (2) Rotating tables: students move between groups to add, question, or revise content written by others; and (3) Exam creation: students collaboratively write exam questions, which the teacher then attempts to answer as if he were the student.
Pedagogical Approach	Classroom Reversal (Classe Renversée) is a variation of the flipped classroom where students fully take on the role of the teacher. They create course content (chapters), teach each other through rotating table discussions, and even design the exam. The teacher assumes the role of a learner, evaluating whether student-produced content is adequate. This is an inquiry-based approach: students must investigate their topics, question existing answers, and construct knowledge collaboratively. The teacher uses an open-door policy, encouraging students to take initiative and even take breaks as needed. After each session, the teacher collects written feedback (one positive and one negative comment per student).
Context Before Entering the Study	The teacher developed the 'classe renversée' model as a personal innovation, building on the known principles of the flipped classroom but pushing them further by having students actually create the course material. He had been implementing and refining this approach over several years before this study. The teacher was interviewed before the first observations. He believed strongly in student ownership of learning and evaluated his approach continuously through structured student feedback after each session.
Assessments & Methods of Student Learning	- Midterm (30%): Includes both an individual grade and a team grade; the team grade is adjusted by peer evaluation (a rubric where students assess their own and each other's contributions) - Final exam (70%): Based on the chapters produced, rotating table activities, and especially the exam questions created by students Observations used: Ethnographic method (timeline analysis) in 2015–2016 and 2017–2018; BERI (quantitative counts) during the 2016–2017 school year. ICAP Framework used analytically.

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Case Study 3	Research Training in Psychology
Subject / Discipline	Psychology (Faculty of Sciences and Humanities)
University Level	Masters – 1 st years
Years Observed	2015–2016, 2016–2017, and 2017–2018
Class Size	Approx. 22–51 students per session; 75 CEI respondents total across two school years
What Is This Course?	Research Training in Psychology is a course that introduces students to the methods and practices of psychological research. Students learn how to identify research topics, review the literature, design a study, and present their work. It is fundamentally a practice-based course where students are expected to produce real research-like outputs. The course is structured around interactive student-led presentations, where students take the role of the teacher and present their research topic or findings to the class, including an interactive component to involve the audience.
Pedagogical Approach	Interactive student-led presentations is an inquiry-based approach similar to Cellular Biology. Students investigate a psychology research topic and present it as if they are the instructor. They are required to include interactive elements such as discussions, debates, Q&A sessions, games, or interactive quizzes. This approach encourages critical thinking, peer learning, and the application of research methods in practice.
Context Before Entering the Study	The teacher transitioned from a more traditional lecture format to this student-centered approach in order to make research training more engaging and practical. She was interviewed before the observation period began (January 2016). The course is observed across three academic years, capturing different cohorts of students and the evolution of the teaching approach over time.
Assessments & Methods of Student Learning	• Student-led Presentations (30%): Students are assessed on the quality of their presentation, the depth of their research, and the effectiveness of the interactive element • Student Posters (30%): Students created a poster to introduce their presentation topics. • Final exam (40%): Based on the information present during the presentations Observations used: Ethnographic method (timeline analysis) and BERI; ICAP framework applied analytically. CEI questionnaire and open-ended questions administered to students.

Case Study 4	Psychology — Approach to Organizational Change (Group & Organizations)
Subject / Discipline	Psychology (Faculty of Sciences and Humanities)
University Level	Master's 2nd year
Years Observed	2016–2017 and 2017–2018
Class Size	6–9 students per session; 8 CEI respondents (2017–2018 data only)
What Is This Course?	This is a seminar-based Master's-level course focused on the psychology of organizations, change management, and group dynamics. Students apply psychological frameworks to analyze real-world organizational situations. The very small class size creates an intimate learning environment where every student is expected to contribute actively. Topics covered include organizational change, prevention, and health in the workplace.
Pedagogical Approach	Student-led presentations based on real-life professional situations, combined with structured debates. The approach involves three components: • Presentation: students present their assigned topic using a real-life professional case • Debate/Discussion: students debate the content presented based on the information shared • Written file: the presenting student synthesizes the information into a professional-style written document This is an inquiry-based approach as students are expected to investigate organizational contexts, apply theoretical knowledge, and defend their analyses.
Context Before Entering the Study	The teacher had developed this approach to make psychology more grounded in real professional experience. He was interviewed at the start of the study (January 2017). Given the Master's level and small cohort, the sessions function almost as professional seminars with a strong expectation of student preparation and engagement.
Assessments & Methods of Student Learning	• Written report that is based on the students research, course content learnt, exercises done in class, and discussions. Observations used: BERI and Ethnographic method; ICAP framework applied. CEI administered with 8 students (limited sample).

3.2 Collaborative-Based Approaches

Collaborative-based learning emphasizes peer interaction, shared responsibility, and the co-construction of knowledge. In these courses, students work together in groups to complete tasks, discuss ideas, and make collective decisions, while the teacher acts primarily as a facilitator.

Case Study 5	Communication and Society
Subject / Discipline	Communication Studies
University Level	Bachelor's degree (3rd year undergraduate)
Years Observed	2016–2017 and 2017–2018
Class Size	Approx. 40–65 students per session; 101 CEI respondents — the largest sample in the study
What Is This Course?	Communication and Society is a large course exploring the relationship between communication practices and society. It is one of the biggest courses in the study. Topics include the role of media, digital communication, social influence, and how communication shapes social structures. The 2017–2018 cohort was split into two classrooms for certain sessions, so the observer remained in one room for the entirety of each observed session.
Pedagogical Approach	Collaborative writing assignments is when students are grouped together to write a collective essay on topics provided by the teacher. This is the primary collaborative activity. The teacher also incorporates group discussion and debate around the written content. This approach focuses on peer interaction, joint writing, and shared intellectual effort. Students must negotiate ideas, reconcile differences, and produce a coherent group product.
Context Before Entering the Study	The teacher moved away from standard lecture-based instruction to give students more agency in constructing their understanding of communication theory. She was interviewed in January 2017 before observations began. The large class size makes collaborative work more challenging to manage, but the teacher deliberately structured the groups and activities to encourage meaningful interaction even at scale.
Assessments & Methods of Student Learning	• Presentation – Midterm exam • Collaborative writing paper – Final exam Observations used: BERI and Ethnographic method across multiple sessions; ICAP applied. CEI and open-ended questions administered to 101 students

Case Study 6	Psychology — Organization Diagnostics: Prevention and Health
Subject / Discipline	Psychology
University Level	Master's 2 nd year
Years Observed	2016–2017 and 2017–2018
Class Size	3–9 students per session; only 3 CEI respondents
What Is This Course?	This is a highly specialized Master's course focused on organizational diagnostics, health at work, and prevention strategies. The very small class size means that each student has a high level of individual responsibility and all are expected to contribute in every session. Students apply psychological frameworks to analyze workplace health issues, develop diagnostics tools, and propose preventive interventions.
Pedagogical Approach	Student presentations with integrated debate through role play is when one student prepares a presentation with supporting examples (a topic that they have researched), then leads the class into a discussion. This creates structured collaborative argumentation. This approach develops professional communication skills, analytical thinking, and the ability to manage group discussion. The role-play element ensures all participants are engaged with a specific function within the debate.
Context Before Entering the Study	The same teacher teaches both the organizational change course (Study 4) and this course, but with different pedagogical designs. This course is even more seminar-like. The teacher was interviewed in January 2017. Given the extremely small class size, the qualitative and observational data from this course carry more weight than the very limited CEI data.
Assessments & Methods of Student Learning	Written report (per group) summarizing the topic, scientific contributions, contributions from the discussions and critical analysis Observations used: Ethnographic method (timeline analysis) and BERI (2017–2018 only); ICAP applied. CEI administered with only 3 students.

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Case Study 7	Matrimonial Law
Subject / Discipline	Law (Faculty of Law)
University Level	Master's 1 st year
Years Observed	2017–2018 (one school year only)
Class Size	24–62 students per session; 24 CEI respondents (2017–2018)
What Is This Course?	This is a Law course in which students learn to apply legal frameworks to real-world case studies. In a traditional law course, students would listen to lectures about statutes and case law; here, the teacher uses collaborative activities to make this more active. The course is observed only during 2017–2018, making it one of the more recently integrated case studies in the research.
Pedagogical Approach	Group task exercises with collaborative problem-solving tools. Two main tools are used: • Groupwork exercises/Mind-mapping: students use visual brainstorming to organize legal concepts and structure their analysis of case studies • Solving case studies: students are given legal case scenarios and must identify the applicable law and relevant arguments This is a collaborative approach: students work in groups to develop and apply their legal knowledge, rather than passively receiving it. The teacher designs tasks that require group reasoning and consensus.
Context Before Entering the Study	The teacher sought to move away from traditional legal pedagogy (lecture + memorization) toward active application of the law. She was interviewed in January 2017 before the observations in 2017–2018. The use of groupwork exercises was specifically introduced to help students visually structure complex legal information, which students often find difficult to retain in abstract form.
Assessments & Methods of Student Learning	• Individual written assessments applying legal knowledge Observations used: BERI (three sessions across 2017–2018); ICAP framework applied. CEI and open-ended questions administered (n=24).

Case Study 8	Insolvency and Bankruptcy Business Law
Subject / Discipline	Law (Faculty of Law)
University Level	Master's 2 nd year
Years Observed	2015–2016 and 2017–2018
Class Size	23–30 students per session; 22 CEI respondents (2017–2018)
What Is This Course?	Insolvency and Bankruptcy Business Law is a specialized business law course covering the legal procedures involved when companies face financial difficulties. Students study the relevant legal frameworks and learn how to apply them to real or simulated business scenarios. The course was observed over two non-consecutive academic years (2015–2016 and 2017–2018), providing a longitudinal perspective on how the approach evolved.
Pedagogical Approach	Collaborative case-study solving with mind-mapping. Similar to Study 7, this course uses group work to analyze and solve legal case studies. Students use mind maps as a visual thinking tool to organize their approach to each case before writing their analysis. The teacher facilitates discussion and gives students structured tasks to complete collaboratively before sharing their reasoning with the class. The emphasis is on applying law in practice, not memorizing theory.
Context Before Entering the Study	The teacher was interviewed in January 2016, before observations began. She had redesigned her course to make the application of insolvency law more accessible and engaging for students, many of whom found the subject complex and dry in a traditional lecture format. The mind-mapping tool was chosen because it helps students visually represent the relationships between legal rules, exceptions, and case facts.
Assessments & Methods of Student Learning	Individual written exam on insolvency and bankruptcy law Observations used: Ethnographic method (timeline analysis) in both observed years; ICAP framework applied. CEI and open-ended questions administered (n=22).

3.3 Game-Based Approach

Game-based learning integrates structured games or game-like elements into the learning process. Students apply course content through playful, rule-based activities that encourage participation, competition or cooperation, and immediate feedback. This section includes one case study.

Case Study 9	Spanish (Language Course)
Subject / Discipline	Spanish (Faculty of Management, Economics and Sciences)
University Level	Bachelor's level (1st year undergraduate)
Years Observed	2017–2018 (one school year; two semesters)
Class Size	Semester 1: 17 students; Semester 2: 13 students. Total CEI: 85 respondents
What Is This Course?	Spanish is a 1st-year language course designed to develop oral communication skills in Spanish. Unlike other courses in the study which are subject-matter disciplines, this course focuses on communicative competence, the ability to understand and speak Spanish in real interactions. The course runs across two semesters of 2017–2018. It is the only game-based course in the study and also has the largest number of CEI responses (n=85), making its quantitative data particularly robust.
Pedagogical Approach	Board games as the primary learning tool where the teacher uses board games specially designed or selected to require students to communicate exclusively in Spanish. The rules of the games and all interaction must take place in Spanish, making oral communication both the medium and the objective. This is a game-based approach: learning happens through structured play. Students must apply their vocabulary and grammar spontaneously within the game context. Cooperation and interaction are built into the game mechanics themselves.
Context Before Entering the Study	The teacher was interviewed in January 2017 before the start of observations. She had moved away from grammar-translation methods and communicative but traditional classroom activities toward game-based interaction because she found that students spoke more freely and confidently in a game context than in formal exercises. The game format reduces anxiety around speaking a foreign language in front of peers and creates natural opportunities for spontaneous communication, a key goal in language acquisition.
Assessments & Methods of Student Learning	• Written exam (30%) • Oral communication assessments (21%): evaluated on fluency, comprehension, and spontaneous use of Spanish • Participation during the course (14%) • Homework (35%) Observations used: Ethnographic method (timeline analysis across multiple sessions in both semesters) and BERI; ICAP framework applied. CEI administered with 85 students — the largest CEI sample in the study.

4. Data Collection

Data were collected across multiple school years (2015–2016, 2016–2017, 2017–2018, and 2023–2024), depending on the course. Not all types of data were collected in every school year or for every course.

Across the studies, three main types of data were collected: classroom observations, teacher interviews, and analytical frameworks applied to the observational data. In addition, data from the CEI and three open-ended questions were collected over three school years (2016–2017, 2017–2018, and 2023–2024) from nine university courses.

Classroom observations were conducted using either the Behavioral Engagement Related to Instruction (BERI) instrument, the ethnographic method, or both, depending on the study design and availability of instruments during the data collection period.

The BERI was used in several courses and school years, typically during one or more class sessions, to assess students' behavioral engagement at different moments of the course (e.g., group work, presentations, or regular lectures). In some courses, the BERI was administered once, while in others, it was used multiple times to capture engagement at different points during the semester.

The ethnographic methodology was used in multiple studies and school years and consisted of taking detailed observational notes of student engagement, disengagement, and teaching actions during class sessions. In studies using this method, observations were conducted across several sessions and later analyzed using a timeline approach to examine patterns of engagement over time.

Semi-structured interviews with teachers were conducted for selected courses and cohorts, typically before or during the academic year in which the observations took place. These interviews were used to better understand the teacher's perspective on the course design, instructional choices, and perceived student outcomes.

Finally, the ICAP Framework (Interactive, Constructive, Active, Passive) was applied as an analytical tool across studies to interpret the observational data collected through the BERI and/or ethnographic methods. This framework was used to provide insight into students' cognitive engagement based on their observed behaviors during class sessions.

4.1 Students' Perspective: Qualitative and Quantitative Measures

The student perspective captures learners' subjective experiences of engagement that are not directly observable in classroom settings.

Data were collected using the Classroom Engagement Inventory (CEI) and three open-ended questions, administered during the final 15 minutes of the course to allow students to reflect on the instructional approach as a whole.

The CEI is a 24-item Likert-scale questionnaire measuring emotional, behavioral, and cognitive engagement. This instrument provides the quantitative breadth of the study by offering a standardized measure of engagement across all nine courses.

To complement this, students responded to three open-ended questions (see annex 1) focusing on:

1. What they most appreciated about the instructional approach,
2. What they least appreciated,
3. Suggestions for improvement.

These qualitative responses provide depth and contextualization, allowing students to explain their engagement experiences in their own words.

A questionnaire known as the Classroom Engagement Inventory (CEI), developed and validated by Wang et al. (2014) in the article *“Measuring Engagement in Fourth to Twelfth Grade Classrooms: The Classroom Engagement Inventory,”* was selected to measure student engagement based on the instructional approach. This instrument was originally developed to assess student engagement in classroom contexts and has since been used in educational research.

This questionnaire was chosen for this study because it is current and has the appropriate dimensions of engagement (emotional, behavioral and cognitive). One of the main challenges in selecting an instrument for this study was identifying a questionnaire that explicitly considers instructional approaches and classroom activities in relation to student engagement. The CEI met these criteria, as it focuses on instructional practices in the classroom, including the three dimensions of engagement with a strong emphasis on cognitive engagement, is applicable across different disciplines, and has been validated using a five-factor confirmatory factor analysis (CFA) model. For these reasons, the CEI was considered appropriate for the purposes of this study.

The Classroom Engagement Inventory (CEI) measures items based on student engagement such as disengagement, emotional, behavioral (compliance and effortful class participation) and cognitive engagement (Wang, Bergin & Bergin, 2014; Fredricks et al., 2004). The list of the questions presented in the CEI are listed in table 4.

Table 4. The Classroom Engagement Inventory questions

Emotional Engagement
I feel interested
I feel proud
I feel excited
I feel amused (smile, laugh, have fun)
I feel happy
Behavioral Engagement - Compliance
I listen very carefully
I pay attention to the things I am supposed to remember
I complete my assignments

Behavioral Engagement - effortful class participation
I get really involved in class activities
I form new questions in my mind as I join in class discussions
I do not want to stop working at the end of class
I actively participate in class discussions
I work with other students and we learn from each other
Cognitive Engagement
I go back over things I don't understand
If I make a mistake, I try to figure out where I went wrong
I ask myself some questions as I go along to make sure the work makes sense to me
I think deeply when I take quizzes in this class
I search for information from different places and think about how to put it together
If I'm not sure about things, I check my book or use other materials like charts
I try to figure out the hard parts on my own
I judge the quality of my ideas or work during class activities
Disengagement
I am "zoned out," not really thinking or doing class work
I let my mind wander
I just pretend like I'm working

The original language of the CEI is in English and for it to be used in French, it needed to be translated. The questionnaire was translated from English into French by using the forward-back translation process (Mimura & Griffiths, 2003), which was often quoted when using a translation process (Meadows et al., 1996). The Forward-back translation process has 4 phases. The first phase is to have the original language translated into the target language. In this study, two bilingual people were chosen (1 French native speaker and 1 English native speaker), who don't know each other. After the first phase was complete, the second phase was to have two other people translate the targeted language back into the original language, French into English. Two other bilingual people were chosen (1 French native speaker and 1 English native speaker). The idea is to have the translated version and the original version as similar as possible. If the two versions are not exactly the same, the third phase is to have a meeting with all four people, those who translated in phase one and phase two, along with some university professors. In the meeting, as a group, they must agree on the best translation from the original text to the target language text and see any discrepancies. In fourth phase, with the newly translated text, two new people translated the agreed text back into English. After that translation, if necessary, which it was in this particular study, everyone involved would have to decide what the appropriate translation from English to French would be. Table 5 is the translated version of the CEI questions in table 4.

Table 5. Translated version of The Classroom Engagement Inventory (CEI)

Emotional Engagement
Je suis intéressé(e)
Je suis fier(e) de moi
Je suis enthousiaste
Je suis heureux/se
Je m'amuse (sourires, rires...)
Behavioral Engagement - Compliance
J'écoute très attentivement
Je suis attentif/ve aux choses que je dois mémoriser
Je fais mes devoirs
Behavioral Engagement - Effortful class participation
Je m'implique beaucoup dans les activités du cours
Les activités du cours me font réfléchir
Le cours passe trop vite
Je participe activement aux discussions du groupe
Je travaille avec d'autres étudiants et nous apprenons les uns des autres
Cognitive Engagement
Je reviens sur les points que je n'ai pas compris
Si je fais une erreur, j'essaie de comprendre pourquoi
Je me pose des questions tout au long du travail pour être sûr qu'il soit cohérent pour moi
Je me concentre beaucoup pendant les tests en classe
Je recherche différentes sources d'informations et je réfléchis à la manière des les organiser
Si je ne suis pas sûr de certains points, je vérifie dans mon livre ou d'autres ressources
J'essayer de trouver par moi-même des solutions aux tâches difficiles
J'évalue la qualité de mes idées ou de mon travail pendant les activités
Disengagement
Je 'décroche' car je ne me sens pas impliqué dans mon travail
Je laisse mon esprit vagabonder
Je fais semblant de travailler

When the translation was completed, the questionnaire was given to the students by the observer. Doing this allowed the students to answer the questionnaire without any bias on what the students think the teacher would like to see. It took about 10 minutes maximum to administer. All the students in the course filled out the 5-point Likert scale (always, almost, sometimes, almost never, never) questionnaire and no participant refused to fill it in. Table 6 shows the total factors of the five dimensions of engagement from the original CEI.

Table 6. The 5 dimensions of engagement and the total of all factors (Alpha Cronbach) based on the original CEI of Wang, Bergin and Bergin (2014)

	Wang et al., 2014
Emotional engagement	.90
Behavioral engagement - Compliance	.82
Behavioral engagement – Effort class participation	.82
Cognitive engagement	.88
Disengagement	.82

4.2 Observer's Perspective: Systematic Observation and Analytical Frameworks

From the observer's standpoint, the research question aimed to explore student engagement and the teacher's role during lessons. Across all studies, the observer acted as a non-participant observer and employed one or more observation methods to document student and teacher behaviors during class sessions.

Two main observation methods were used. The first was the Behavioral Engagement Related to Instruction (BERI) framework, which was implemented in several courses and academic years to assess students' behavioral engagement during lessons. The second method was the ethnographic approach, in which the observer recorded detailed notes of student engagement, disengagement, and teacher actions throughout the class sessions. In studies using ethnographic observations, the data were analyzed using a timeline approach to capture patterns of engagement and disengagement across different segments of the lessons.

In some courses, only one observation method was employed (either BERI or ethnographic observation), while in others, both methods were used across different cohorts or academic years. The choice of observation method depended on the course context and the period of data collection.

Following data collection, the ICAP Framework (Interactive, Constructive, Active, Passive) was used as an analytical tool to interpret the behavioral engagement recorded through the BERI instrument and/or ethnographic observations. The ICAP framework provided a deeper understanding of students' cognitive engagement by linking observed behaviors to levels of engagement during the lessons.

4.2.1 Behavioral Engagement Related to Instruction (BERI)

The Behavioral Engagement Related to Instruction (BERI) framework was used in several studies to examine students' behavioral engagement and disengagement during class sessions. The BERI focuses on counting the number of students who are engaged or disengaged at specific moments in the lesson and provides quantitative data based on observable behaviors.

The BERI observations were guided by the behavioral indicators outlined by Lane and Harris (2015), which describe in-class behaviors that indicate student engagement or disengagement (see Introduction to the Studies section for more details). As the BERI does not allow time for detailed note-taking, the observer relied on numerical counts to assess student engagement during the observed sessions.

Across the studies, the BERI was typically used once or a small number of times, depending on the course and school year. In some cases, it was applied during group work sessions, lectures, or game-based activities to capture levels of student engagement at specific points during the course. In other courses, the BERI was used multiple times to observe engagement at different moments in the semester.

While the BERI was initially considered a useful observation tool, the observer later realized that it did not provide sufficient contextual information to fully understand what was occurring in the classroom. As a result, in several studies, the BERI was either complemented by or replaced with the ethnographic method, which allowed for more detailed observations of student and teacher behaviors. Nevertheless, the BERI remains an important part of the research, as it allows for quantitative comparison of engagement and supports the triangulation of observational data.

4.2.2 Ethnographic Methodology

The ethnographic methodology was used in several studies to observe student engagement, disengagement, and teacher actions throughout entire class sessions. This method allowed the observer to document what students and teachers were doing over time, providing a more detailed understanding of classroom dynamics than numerical observation tools alone.

Across the studies, the ethnographic method was applied multiple times over different school years, depending on the course and research design. In some courses, the method was used for student-led presentations, debates, collaborative writing sessions, or game-based activities, while in others it was applied during regular class sessions. The number of observations varied by course due to scheduling constraints and course structure.

During ethnographic observations, the observer acted as a non-participant observer and took continuous notes throughout the session. These notes focused on how long students were engaged or disengaged, the types of activities students were involved in, and the level of teacher involvement during the class session. In cases where class sessions were divided into

multiple segments or held in separate rooms, the observer remained in one classroom for the entire session to ensure consistency and allow for a deeper understanding of student engagement.

In some studies, the ethnographic method was used before or in place of the BERI, particularly when the observer realized that numerical counts alone did not provide sufficient contextual information. The ethnographic observations were later analyzed using a timeline approach and, when applicable, interpreted through the ICAP Framework to better understand students' cognitive engagement. Further methodological details are provided in the Introduction to the Studies section.

4.2.3 Modes of Engagement: ICAP Framework

The ICAP Framework (Interactive, Constructive, Active, Passive) (Chi & Wylie, 2014) was used as an analytical tool to analyze the observational data collected in this research and to provide a visual representation of students' cognitive engagement. The framework was applied across studies to better understand how students were cognitively engaged during class sessions.

The data used for the ICAP analysis were drawn from ethnographic observation notes and from the Behavioral Engagement Related to Instruction (BERI) descriptions of student engagement and disengagement (see the charts in the Introduction to the Studies section). These data were used to categorize student engagement into the four modes of engagement defined by the ICAP framework: Interactive, Constructive, Active, and Passive.

By combining data from both observation methods, the ICAP framework allowed for a clearer interpretation of students' cognitive engagement and supported the visualization of engagement patterns across different courses and instructional approaches. The resulting charts and tables present an overview of how students were involved in the learning activities throughout the observed sessions.

4.3 Teachers' Perspective

From the teacher's perspective, this study seeks to understand the change in instructional approach from lecture-based learning to a more interactive, student-centered approach, such as student-led presentations, collaborative writing, role play, debates, or game-based activities, depending on the course.

The research questions guiding the teacher's perspective are: "What has influenced the teacher to change their instructional approach from lecture-based learning to a student-centered approach?" and "What student outcomes do they perceive or anticipate as a result of this change?" These questions aim to better understand why teachers chose to modify their courses and how they perceive the impact of this change on student engagement, participation, and learning outcomes.

To explore these questions, semi-structured interviews were conducted. The interviews took place before the course observations and, when applicable, were conducted for each

cohort. This approach made it possible to gather insight into the teachers' motivations, their pedagogical intentions, and their reflections on how the new instructional approach influenced student engagement during class sessions.

For each semi-structured interview, there were five questions that were asked before any course sessions were observed and for each year that was included in the study. The five questions were:

1. Why did you decide to change your course?
2. How long have you been teaching this approach?
3. How did you learn about this instructional approach, or what gave you inspiration to change your course?
4. What were the adjustments you have made since you started using this approach?
5. What have you noticed or seen from the students after you have changed your course?

Since the interviews were semi-structured, there was flexibility to ask additional questions that emerged during the interview. These questions focused on what the teacher had done differently compared to previous years, their role in the course, and their perspective on student engagement and participation. The use of a semi-structured format allowed the observer to go deeper into the reasons behind the change from a lecture-based approach to a more student-centered instructional approach, while still ensuring that the same core questions were addressed across all interviews.

4.4 Data Analysis

The data analysis for this study combined quantitative and qualitative methods in order to examine student engagement from the student, observer, and teacher perspectives.

The quantitative data from the Classroom Engagement Inventory (CEI) were analyzed using PSPP, an open-source statistical software developed by GNU. The CEI consists of 24 Likert-scale questions, each with five possible responses: *always*, *almost*, *sometimes*, *almost never*, and *never*. To calculate the mean for each question, numerical values were assigned to each response (*always* = 4, *almost* = 3, *sometimes* = 2, *almost never* = 1, *never* = 0). PSPP was then used to calculate the mean and standard deviation for each item across all 431 participants. This analysis provided a quantitative overview of students' emotional, behavioral, and cognitive engagement across the nine courses.

The qualitative data from the three open-ended student questions were analyzed using a thematic analysis approach. Excel and Microsoft Word were used to organize and code the data. Student responses were reviewed multiple times in order to identify recurring patterns and themes. Using Excel, responses were color-coded to group similar ideas, allowing for the identification of common themes across the 431 students and providing deeper insight into how students described their engagement in their own words.

Both the CEI and the open-ended questions were administered during the final 10 minutes of the last lesson of each course. This timing was intentionally chosen to allow students to reflect on the course as a whole and to express how they felt about the instructional approach and their engagement throughout the course.

The observer data were analyzed using a combination of systematic observation and qualitative interpretation. The Behavioral Engagement Related to Instruction (BERI) instrument was used to record quantitative counts of student engagement and disengagement at specific moments of instruction, such as during group work, lectures, and presentations. These counts provided a behavioral snapshot of engagement during different instructional activities.

In addition to BERI, an ethnographic methodology was used to capture classroom dynamics that could not be fully represented through numerical counts alone. Detailed chronological observation notes were taken during class sessions to document student interactions, engagement patterns, and teacher actions. These notes were later analyzed using a timeline approach, making it possible to visualize changes in engagement over the duration of the lesson and across different instructional phases.

To further interpret the observed behaviors, the ICAP framework (Interactive, Constructive, Active, Passive) was applied as an analytical lens. Observed student behaviors recorded through BERI and ethnographic notes were categorized according to the ICAP modes of engagement. This process allowed for a deeper interpretation of behavioral engagement in terms of underlying cognitive engagement, linking what students were doing in the classroom to how they were engaging with the learning process.

The analysis of the semi-structured teacher interviews focused on identifying recurring themes and patterns across different academic years and, when applicable, across multiple interviews with the same teacher. During each interview, the observer took notes to better understand the teacher's instructional approach, the motivations behind modifying the course, and how the teacher perceived student engagement and learning outcomes.

These interview notes were used to construct a narrative analysis that responds directly to the research questions from the teacher's perspective. When interviews were conducted with the same teacher over more than one year, the analysis also considered consistencies and changes over time in the teacher's reflections, instructional practices, and perceived student outcomes.

Together, the quantitative analysis of the CEI, the qualitative analysis of student responses, the behavioral and ethnographic observations, the ICAP categorization, and the teacher interview analysis provide a comprehensive and triangulated understanding of student engagement across the nine courses.

5. Pedagogical Characteristics of the Student-Centered Approaches

Across the nine university courses, student engagement was examined within the context of three student-centered instructional approaches: inquiry-based, collaborative-based, and game-based instruction. While each course was situated in a different disciplinary context, these approaches shared common pedagogical characteristics that allowed for meaningful comparison across courses.

Inquiry-based approaches were implemented by placing students in an active role where they were required to explore course content through questioning, problem-solving, and investigation. Rather than receiving information through lectures, students were guided to construct knowledge by researching topics, formulating explanations, and presenting their findings to their peers.

Collaborative-based approaches emphasized learning through interaction and peer exchange. Students worked in small groups to discuss concepts, complete tasks, and make collective decisions. These approaches were designed to promote dialogue, shared responsibility, and the co-construction of knowledge, with the teacher acting primarily as a facilitator.

Game-based approaches integrated structured games or game-like elements into the learning process. These activities required students to apply course content in playful, rule-based contexts that encouraged participation, competition or cooperation, and immediate feedback. The goal was to increase motivation and engagement while supporting active and interactive learning.

Although the specific activities varied across courses, the underlying pedagogical principles of each approach remained consistent. This common structure makes it possible to examine student engagement both across all nine courses and within each instructional approach, as presented in the following chapters. The following chapters (3–11) focus on the results of each case study from the observer and teachers' perspective. Each case study is presented by the characteristics of the instructional approach and research design, then gives the results of the observations of the course and the teacher interviews and finishes with a discussion and limitations of the case study. Chapter 12 presents the students' perspective results for all nine case studies. Chapter 13 exemplifies the three-point perspective in action through a published article based on two case studies from this thesis, providing the concrete empirical grounding necessary to demonstrate what a full triangulation of the student, teacher, and observer perspectives looks like with real data.

Chapter 3

Case Study 1

Cellular Biology: Inquiry-Based Approach

Case Study 1

Cellular Biology: Inquiry-Based Approach

This case study focuses on a Cellular Biology course that uses an instructional approach, interactive student-led presentations, which can also be considered inquiry-based, to engage students. This course's objective was to use presentations as a form of learning for students. The students created their own slides and information by researching and selecting relevant content, to prove that they were well informed about the topic, as if they were the teachers themselves.

After a couple of years of changing their instructional approach, the teachers decided that presentations alone were not sufficient for the students. They wanted the presentations to be interactive. They realized that the students who were listening to the presentations were too passive and needed to be more involved. In doing that, one of the criteria that each presentation must have is interaction between the presenters and the audience. The teachers wanted both sides of the students (as presenters and as listeners) to be active.

This approach is also inquiry-based, as students are required to investigate a topic, ask questions, and construct their own understanding before and during the presentations. Girand, Pinar and Trapp (2011) stated that the presentation-based instructional approach is beneficial because it promotes critical thinking, communication amongst their peers and class discussion. This ties in with what the teachers wanted: students taking the role as teachers, class discussions, critical thinking through inquiry and interaction between the presenter and the listener.

The interactive student-led presentations used both a qualitative and quantitative methodology that focuses on the teacher's and observer's perspective. The methodology used for the teacher's perspective was an interview. The research question for this perspective was "What has influenced the teacher to change their approach to teaching and what student outcome do they perceive?" The research question for the observer's perspective is "As an outside observer, how are students engaged and what role does the teacher play in the classroom?" The methodology for the observer's perspective was to use a few instruments to have a clear understanding of what was done in the classroom. The first instrument, the Behavioral Engagement Related to Instruction (2015), also known as the BERI, is a qualitative method that uses a guide to determine if a student is engaged or disengaged during a class lesson. The second instrument is an ethnographic method of observation. And the last instrument is an analytical tool that uses observations to present cognitive engagement, known as the ICAP Framework (2014) (Interactive, Constructive, Active, Passive).

1. Research Design

The total number of hours the students have for this Cellular Biology course was 18 hours. The hours are then divided into three parts, 6 hours each. Since each session consisted of 3

hours long, each part had two sessions each (see table 7). The first part consists of analyzing results when the students are in the laboratory. The students had activities that allowed them to experiment on plants and animals. The second part focused on the students who work in groups so that they can prepare their material for their presentations and also reading material so that the other students can use it to study for the final exam. The students were divided into groups of two to three and were assigned a topic to focus on. Their goal was to prepare an interactive student-led presentation and prepare reading material (two pages maximum) for the final exam. During the group work hours, the students discussed the topic, asked questions to their peers or the teachers, prepared slides for their presentation and any other necessity to complete the work. The third part is the presentations of the students. Each group had about 30 min to present their work to the class and teachers. Each part of this course was graded differently. The grades during the laboratory hours are based on 20% of the total grade. The group work, preparation for the presentation and reading material grades are based on 60% of the total grade and the exam is worth 20%.

Before the start of the observations in 2016-2017, the observer decided to interview one of the two Cellular Biology teachers on January 15, 2017. The decision to interview one of the teachers and not the other was only because she already knew that teacher beforehand. The second interview was done on January 27, 2018, and the last interview was done on February 6, 2024, both done before the course started.

Table 7. Cellular Biology Sessions (Total 18 hours)

Laboratory = 6 hours		Group work = 6 hours		Presentations = 6 hours	
Session 1 (3 hours)	Session 2 (3 hours)	Session 1 (3 hours)	Session 2 (3 hours)	Session 1 (3 hours)	Session 2 (3 hours)

The three cohorts that were observed had different observation methods (see table 8). In 2017 with cohort 1, three sessions were observed (a total of 9 hours). One of the sessions was a groupwork session, where they prepared the presentation and writing component. During that session, the Behavioral Engagement Related to Instruction (BERI) was used as an observation instrument. Two of the sessions of the presentations (12 hours total) were done using two different instruments: the first session used the BERI and second session used the ethnographic method. During the observation of cohort 2 in 2018, the observer observed the second presentation session (3 hours) using the ethnographic method. Cohort 3 was done in 2024 (total of 4 hours), where the observer used the ethnographic method for two out of the three presentation sessions.

Table 8. Observation of the Cohorts during the Group and Presentation Sessions

Cohort 1: 2016-2017				Cohort 2: 2017-2018				Cohort 3: 2023-2024			
Group Session		Presentation Session		Group Session		Presentation Session		Group Session		Presentation Session	
X	February 27 (BERI)	March 6 (BERI)	March 8 (Ethno)	X	X	X	March 23 (Ethno)	X	X	X	March 7 (Ethno) March 13 (Ethno)

Notes: The “X” placed in the box means that the observer did not observe that session. BERI= Behavioral Engagement Related to Instruction (Lane & Harris, 2015). Ethno= ethnographic methodology.

During the first year of observations (2016-2017), The observer decided to use the BERI as a quantitative instrument to measure the behavioral engagement of the students. As a validated instrument from Lane and Harris (2015), the observer felt that this would be a good idea to help guide what she should be looking for in terms of student engagement during the first observation session of a group work (February 27, 2017) and one presentation session (March 6, 2017). Unfortunately, she didn’t get much information from what the students were actually doing. By just marking “engaged” or “disengaged,” that didn’t give her a clear idea of the dynamics of the course. Because of that, she decided to change to the ethnographic method for the second presentation session on March 8, 2017, which followed right after the BERI observation. The ethnographic method involved the observer to write everything the students and teachers were doing during the course. As you can see in table 16, the BERI was used twice, and the other four times were done using the ethnographic method. In the school year 2017-2018, due to availability, she was only able to observe one session (March 23, 2018). After a few years later, especially after COVID, the observer decided to observe another cohort during the 2023-2024 school year. She observed the two out of the three presentation sessions of that year (March 7 and March 13, 2024). She was only able to attend two sessions (4 hours) instead of the three sessions (6 hours) because she was informed by the teacher that there was a date and time change (there would be three sessions of 2 hours instead of two sessions of 3 hours) the day after they had the first session.

2. Observer’s Perspective

The first observation using the BERI was used during a group work session, where the students worked together to prepare for two assessments: their presentation in front of the class and a two-page information handout for their fellow classmates. This course session was the second of the two sessions given. The class was about three hours long, starting at 9:00 AM to about 12:00 PM with 20 students present during the session. The chart in figure 1 presents the students’ engagement over the three hours of the class.

2.1 Behavioral Engagement

The first observation using the BERI was used during a group work session, where the students worked together to prepare for two assessments: their presentation in front of the

class and a two-page information handout for their fellow classmates. This course session was the second of the two sessions given. The class was about three hours long, starting at 9:00 AM to about 12:00 PM with 20 students present during the session. The chart in figure 1 presents the students' engagement over the three hours of the class.

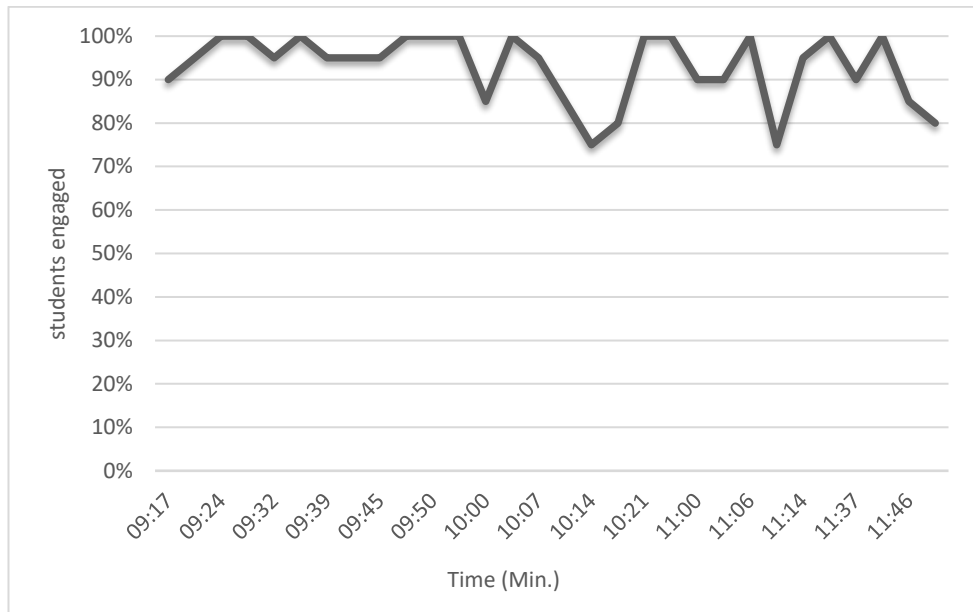


Figure 1. Cohort 1: BERI results for a group work session on 27 February 2017

During the group work session, there were four times where there was dip where the students were seen as disengaged. The first dip went from 100% (n=20) engaged to 85% engaged (n=3 was not engaged). During that first dip, a group of two were not working on the assignment, so one of the teachers went over to see what they could do to help them. After the teacher helped them, they went back to work and engaged in the assignment. The second dip went from a slow decline from 100% engaged to 95% engaged to 85% engaged to 75% engaged. During that time, the loss of engagement from the students went from everyone engaged (n=20) at 10:04 to one student disengaged at 10:07 then 3 students disengaged at 10:10 and finally 5 disengaged at 10:16. The teachers both realized that there was a slow increase of students not concentrating so they told the students that they needed to continue and that they would give them a break shortly after, which started at 10:28. The third dip at 11:11 went from 100% (n=20) engaged students to 75% (n=5 students disengaged out of 20). During that decline of engagement, there was a group of 3 students that all decided to stop working at the same time. Noted just before they were disengaged, one of the teachers was with them at 11:06 until the teacher left at 11:11. At 11:41, which was the start of the fourth dip, went from 100% engaged (n=20) to 85% engaged (n=17) at 11:46 and then declined again at 11:49 with 80% of the students engaged (n=16). During that time, one of the students leave class early and the other three students (one from three different groups) become

disengaged. Considering it was near the end of the course, those students probably were ready to leave.

The second session using the BERI was done on March 6, 2017. The second session was conducted during an interactive student-led presentation session. The BERI measured the engagement of 19 students in a 3-hour class session. During this session, there were four groups that were present.

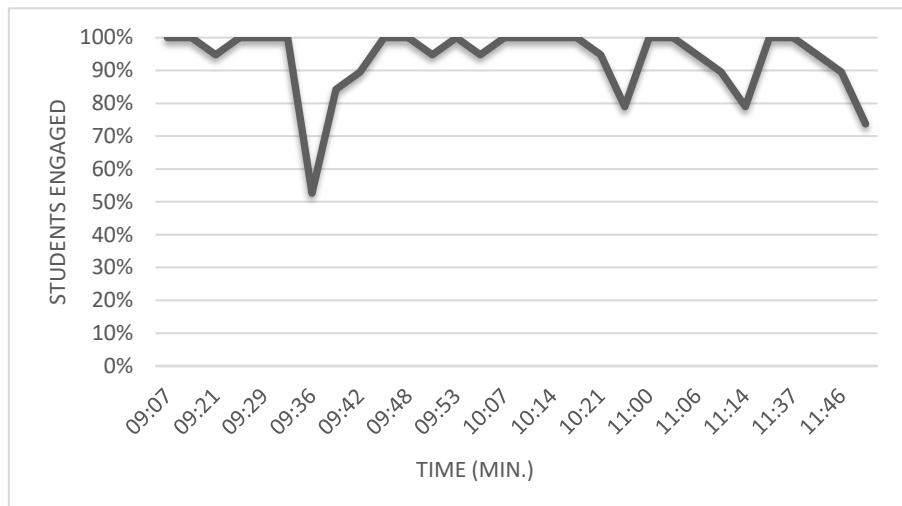


Figure 2. Cohort 1: BERI results for a presentation session on 6 March 2017

Figure 2 represents how the BERI was used during a presentation session. During the interactive student-led presentation class, there were four occasions when most of the students were not engaged: at 9:36 with 50% engaged ($n = 10$), at 10:25 with 80% engaged ($n = 15$), at 11:14 with 80% engaged ($n = 15$), and at 11:49 with 74% engaged ($n = 14$). These lapses in engagement occurred because when one group finishes their presentation, the students are left waiting for the next group to start their presentation. In the first decline, it is presented as 100% engaged to 50% engaged, which is a drastic drop once the presentation was over. The last three decline in engagement was gradual because the students became aware of the transition from group to group that some of the students started to disengage once the teachers were giving their feedback to the students who were presenting. According to the BERI description table, the students were noted as not engaged since they were on a break without any presentations or discussions happening.

2.2 Timeline Analysis (Using the Ethnographic Method)

The ethnographic methodology was used for four out of seven presentation sessions over three school years. Based on the notes taken from the ethnographic method, four timeline analysis was created to show a narrative of what was happening during the class sessions.

The first timeline (Figure 3) was based on the second presentation session of the first cohort during the 2016-2017 school year. Analyzing the ethnographic timeline of the

interactive student-led presentation session in Figure 7 reveals that students were generally more engaged than disengaged during the lesson. The figure highlights three specific instances of disengagement: students using their phones, chatting inappropriately, and one student leaving the room in tears due to feeling she had performed poorly in her presentation. It was known that she left because she said she wasn't prepared for her presentation because she came back into the room and had a chat with the teachers about it.

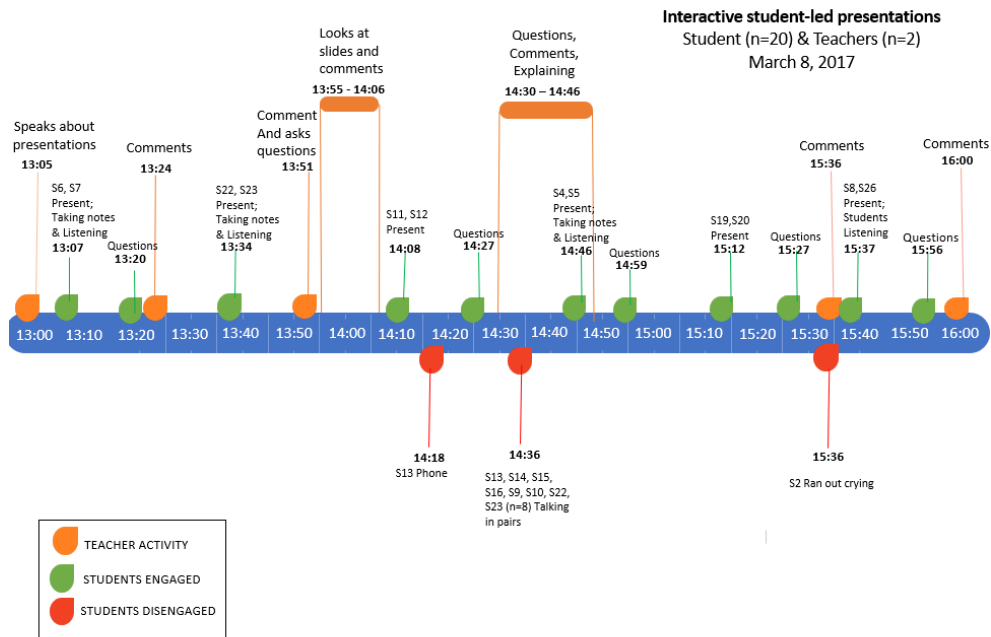


Figure 3. Cohort 1: Timeline analysis of an observation of an interactive student-led presentation session with 6 groups

Looking at Figure 3, students that were engaged showed that they were taking notes, listening (i.e. they were facing forward with eyes on the slides), engaged in discussion by asking questions and responding during the interactive part of the presentations. There are also points when the teachers were active during the session, see the orange flesh in figure 3. The teachers were engaged in the presentation and gave feedback/comments about what the students presented.

The next timeline was done during the second presentation session with Cohort 2 during the school year 2017-2018. Figure 4 presents a similar timeline analysis of the ethnographic observation for cohort 2 as Figure 3. Over the course of 3 hours, twelve instances of student disengagement were noted. Among these, a small number of students frequently disengaged by either chatting with peers ($n = 3$) or using their phones ($n = 4$), while others exhibited disengagement twice, with four students talking to each other and one student using their phone multiple times during the session.

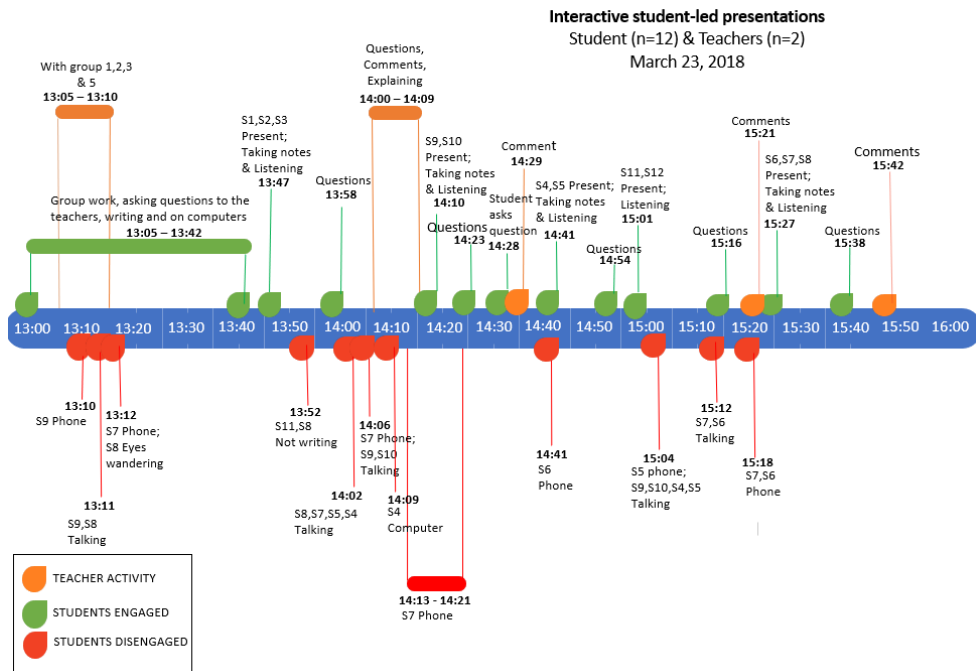


Figure 4. Cohort 2: Timeline analysis of an observation of an interactive student-led presentation session with 5 groups

The difference in this session compared to the first session on March 8, 2017, was that during the first 45 min of the course, the teachers gave the students time to work in their groups so that they can finish their presentations and papers. The teachers also used that time to go around and visit the different groups so that they could see if their material was acceptable.

The third and fourth timeline was used with cohort 3 during the school year 2023-2024. The observer was present during the second and third presentation sessions. Figure 5 and Figure 6 present the engagement and disengagement of the students during the presentations and also the interaction between the students and the teachers.

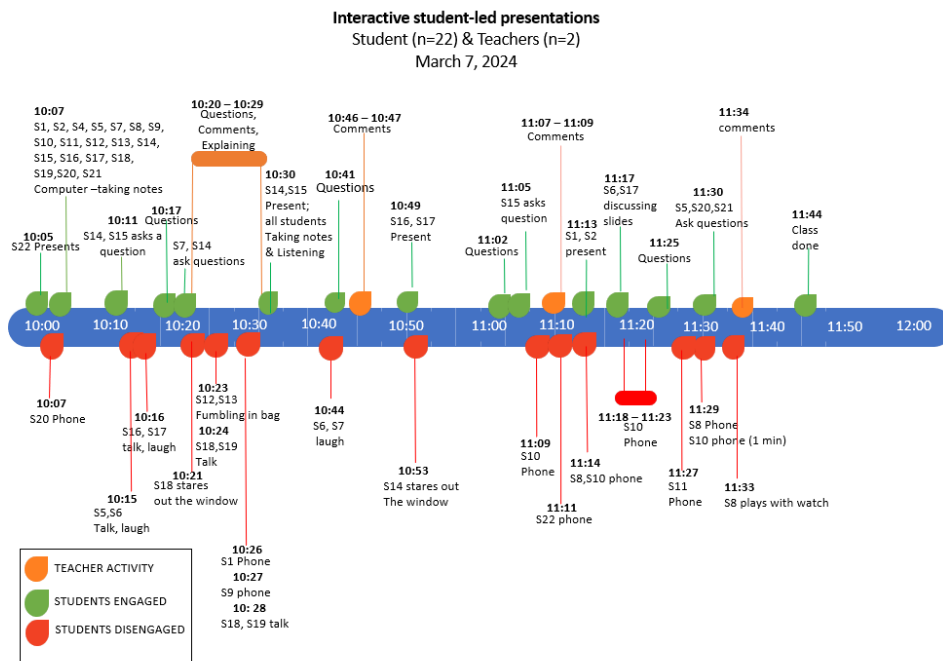


Figure 5. Cohort 3: Timeline analysis of an observation of an interactive student-led presentation session with 4 groups

The timeline in Figure 5 was the second of the three sessions and was done on March 7, 2024, where there were 22 students present. Figure 5 presents 15 periods when the students were disengaged, either by being on their phones, talking/laughing with others, doing other things that shows that they were not paying attention when it was necessary (i.e. staring out the window, looking for something in their bag and playing with their watch). There were seven students that were on their phones during the session. Student20, Student9, Student1, Student11 and Student22 were all on their phones once and for less than a minute while two other students were on their phones more often and for a longer period. Starting at 11:09, student 10 loses interest in the last hour of the session, was on their phone four times and two of those times they were on their phone for 1 to 6 minutes long. The other two times they were on their phone for less than a minute. Starting at 11:14, Student 8 loses a bit of interest during the last hour of the course, was on their phone two times and played with their watch. Although there were some disengagements, there were an equal number of engagements. These times were students who were engaged by writing or typing notes from the slides of the presentations and also were in discussion during the interactive part of the sessions. There were more times where the students were faced forward and engaged in the slides based on their movements (eyes forward, writing notes, asking questions, not doing anything other than just listening).

The next timeline was done on March 13, 2024, and was the third session out of the three sessions of presentations. There were 4 groups that presented over a class session of two hours long with an attendance of 22 students. There were 9 periods when the students were

disengaged: three times on their phone for less than a minute long, two times talking to their neighbor for less than a minute and four times, where the students are doing something other than listening, taking notes, discussing etc. During those four times, there were students who were checking their email, having their head down on the desk, staring in another direction than the front, where the slides and presenters are located, and playing with their hair, where their eyes and head are no longer facing forward, see Figure 6. Otherwise, there were 11 periods that were marked on the chart when the students were engaged. Besides the times where it is labeled that the students are presenting, the other times all of the students were engaged in discussion, listening to the discussion, listening to the presentation, writing notes, asking questions and listening to the answers to the questions. Majority of the students were engaged during the session besides the 9 times that were marked in the timeline.

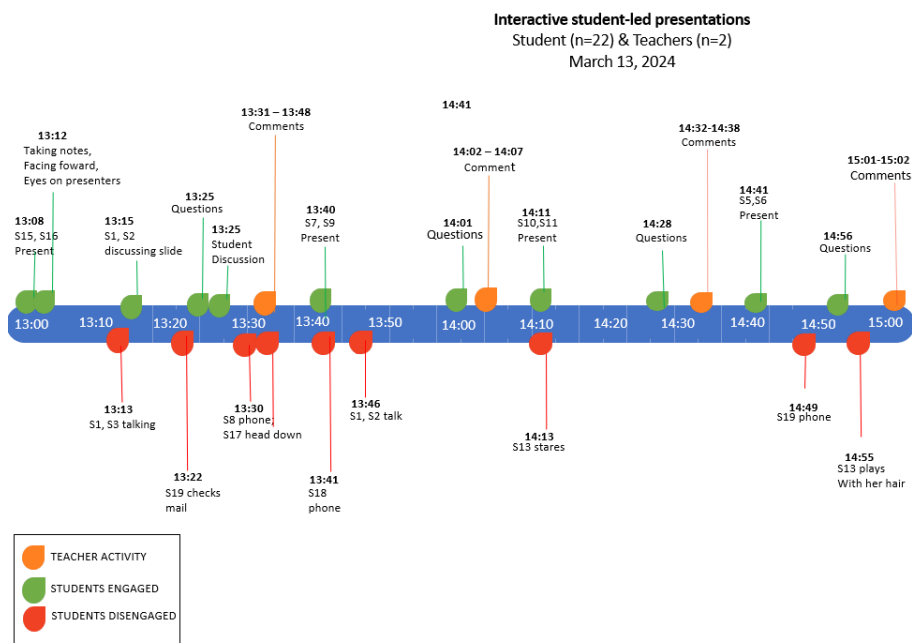


Figure 6. Cohort 2: Timeline analysis of an observation of an interactive student-led presentation session with 4 groups

2.3 Modes of Engagement: ICAP Framework

The ICAP framework served as a guide for evaluating student engagement levels, whether passive, active, constructive, or interactive—based on the observations presented in Figures 1, 2, 3, 4, 5 and 6. Table 9 illustrates examples of varying engagement levels from our data across all five sessions of interactive student-led presentations, highlighting both the presenters and the audience members.

The students presenting operated in a constructive mode, as they were required to self-explain their understanding. Self-explaining is characterized by articulating learned material to peers during their presentations (Chi & Wylie, 2014). This approach enabled the presenters

to convey what they had learned (constructive) rather than merely reciting the teacher's notes (passive).

Meanwhile, the audience shifted between active and interactive engagement at different points during the session. There were moments when students were 'active' by listening to and taking notes (copy-and-paste directly from the presentation itself or from what they heard) and other times when they engaged in a more 'constructive' way by rephrasing the information in their own words.

Additionally, the presenters incorporated interactive activities centered around questions related to their topics. This approach aimed to assess whether the audience was paying attention and grasping the content. Such activities fostered an interactive and constructive mode of engagement, allowing presenters to deepen their understanding of the material (interactive) while enabling audience members to process and articulate what they learned, generating their own questions and answers (constructive).

Table 9. ICAP Mode of Engagement – Interactive Student-led Presentations

	<i>Passive Receiving</i>	<i>Active Manipulating</i>	<i>Constructive Generating</i>	<i>Interactive Dialoguing</i>
Students Presenting	Using notes that the teacher gave them	Copy-and-paste from teacher notes or information from texts and documents	<i>Self-explaining</i> and reiterating to their peers	Created questions/discussion for their peers
Students Listening	Sitting and not taking notes	Copy-and-pasting the notes	Writing notes in their own words/way; self-explaining the presentation	<i>Collaborative</i> note-taking in innovative ways

Note. This table demonstrates the use of the ICAP framework to categorize students' learning activities during five sessions of interactive student-led presentations.

3. Teacher's Perspective

A key takeaway from the semi-structured interview with one of the teaching teams was the teacher's desire to shift her teaching strategy towards interactive student-led presentations. She found that traditional lectures were unproductive, and her students reacted negatively to her previous methods. In the initial interview in 2017, when asked about her goals for transitioning away from lecture-based teaching, she expressed her aim for students to "understand the texts they read and extract key concepts."

Although she had been contemplating changes to the course structure since 2013, she hadn't fully embraced a new approach. With years of experience in teaching the course, she took the time to evaluate what was necessary to meet the course's goals. Upon gaining clarity, she initiated the design process, determining that four sessions—two for group work and two for presentations—were essential.

She also recognized the importance of student interaction during presentations to enhance engagement, preferring that the audience (other students) actively participate rather than listen passively. Over the past few years, she has experimented with various methods. One

approach involved having students present different topics, but she noted that many focused solely on their own presentations, neglecting their peers' work. Since 2016, both teachers agreed that an interactive student-led presentation format suited both their teaching styles and the students' needs.

So, what did an interactive student-led presentation entail for them? It involved small groups of students (typically 2-3) presenting their work to their classmates as if they were the instructors. To make the experience interactive and engaging, the presenters encouraged audience participation through discussion questions, a question-and-answer segment at the end, or by prompting classmates to provide examples or summarize the content. Many students responded positively to open-ended questions, addressing the teachers' concerns. This study offered valuable insights into their quest for a more engaging instructional approach.

4. Discussion

This study highlighted the connection between interactive student-led presentations and both behavioral and cognitive engagement in students. While many university courses rely on lectures to deliver content to large audiences, such formats often encourage passive and superficial learning (Harlen & James, 1997). This passivity can hinder students' ability to focus effectively. The findings from this study suggest that implementing an interactive presentation method significantly increased student engagement, fostering active learning and participation.

These results emphasize the effectiveness of employing diverse qualitative and quantitative tools, which capture various perspectives (the 3-point perspective) alongside an analytical framework (the ICAP framework). This multifaceted approach provided us with a deeper understanding of how a student-centered instructional approach influences engagement. Consequently, the key discussion points in this study revolves around what does this approach have to engage the students and why is it important to use these instruments to as a better way to understanding this instructional approach.

Student presentations are increasingly utilized in university courses due to their numerous learning advantages, including the enhancement of critical thinking, communication skills, and the promotion of discussion (Thor et al., 2017). As an active learning strategy rooted in constructivist philosophies, student-led presentations empower learners to take charge of their education and share their insights with classmates (Marvell, 2008), which was shown here in this Cellular Biology course through the students' presentations, as well as, the interactive part of their presentations that provoked class discussions and questions. This method places the responsibility for learning squarely on the students, allowing them to build self-confidence in discussing their chosen topics (Tuncel, 2015) and ensuring accountability for the accuracy of the subject matter (Weimer, 2013). By preparing thoroughly for their presentations, students can communicate effectively (Sewasew et al., 2015) and assume the role of 'experts,' equipping them to address questions and engage with comments. This approach fosters critical thinking by prompting students to analyze and conceptualize their

research findings and apply these insights to relevant examples, ultimately encouraging class discussions (Girard et al., 2011).

However, student-led presentations can also be among the least preferred methods of learning due to challenges such as group dynamics, the demands of preparation and presentation, and insufficient guidance throughout the learning process (Remsburg & Hagar, 2019), but this shouldn't really be the case in this study because the teachers were available for the students and gave them class time to work on their presentations knowing the teachers were there for them.

When presentations are interactive and stimulating, students are more likely to participate, share comments, and provide examples. Ultimately, interactive student-led presentations can significantly enhance student engagement in the learning process, making them a vital component of effective education.

5. Limitations

While the data from various instruments indicated that students were both behaviorally and cognitively engaged, certain limitations need to be acknowledged. First, the observer did not attend all seven sessions of the student-led presentation sessions, missing one session for cohort 2 and one session for cohort 3. More comprehensive attendance might have provided additional insights and revealed potential similarities or differences among the cohort groups.

A second limitation is that the interviews with the second teacher could have provided further insights into their perspectives on the course. Finally, there was a challenge in locating recent studies on interactive student-led presentations, as there is a scarcity of relevant publications available.

Recent studies on presentation-based learning have shed light on the advantages of student-centered instructional methods in higher education. The findings of this study indicate that such approaches create a new and engaging learning experience for students. Additionally, employing the 3-point perspective demonstrates that using diverse tools enhances our understanding of the three dimensions of engagement, particularly in observing cognitive involvement. Future research could build on this project by incorporating an additional instrument to analyze emotional engagement more thoroughly. Ultimately, the evidence suggests that exploring interactive, student-centered approaches with varied assessment methods will contribute significantly to the research on effective strategies for engaging students.

Chapter 4

Case Study 2

Molecular Biology: Inquiry-Based Approach

Case Study 2

Molecular Biology: Inquiry-Based Approach

This case study is based on a Molecular Biology course that an interactive instructional approach used known as *classe renversée* in French or classroom reversal in English. This course wanted to further the known ideas of the flipped classroom approach by adding specific variations to it and making it its own instructional approach. Since *classe renversée* comes from a variation of the flipped classroom approach (*classe inversée* in French), it shares a similar name. *Classe renversée* is a student-centered instructional approach in which students take on the role of the teacher by creating the course content, while the teacher assumes the role of a student (Cailliez, 2019).

Three different student-centered teaching activities are used: chapter creation, rotating tables and exam creation. In the first part of the course, the students create the chapters so that the other students have the reading material available that will help them with the other two parts of the course. The second part of the course, called the rotating tables, is when the students will use what they learnt in the first part of the course to educate their peers and also to show the teacher that they understand the concepts that the teacher has given them. It is called rotating tables because students travel from group to group to add/delete/question the information that was already written by other students who were previously discussing the given topic. And the last part of the course is the creation of the exam. Here the students work on writing the exam as if they were the teacher. If the students were able to produce high level questions, they would be able to answer them as well, making it suitable for them to be teachers themselves.

Based on the methodological approach described in the previous chapter, classroom reversal is analyzed through both a non-participant observer's perspective and the teacher's perspective. The following section presents the results of this study. First, the results from the Behavioral Engagement Related to Instruction (BERI) instrument are presented, followed by the classroom observation timeline. Finally, the ICAP framework is used to analyze and interpret students' cognitive engagement.

1. Research Design

The Molecular Biology course is taught during the second semester to students at a French university. The course has a total of 24 classroom hours and is usually divided into 12 sessions (2 hours per session). Prior to the start of the course and not included in the 24 classroom hours, the teacher meets with the students to explain the structure of his course. This is an important part of the course because it shows the students what the objectives are and what is expected from them. During this meeting, the students also have the chance to ask questions.

The course has three parts: creation of the chapters, rotating tables and creation of the exam. These parts are divided evenly, eight sessions of two hours per part. In the first part, students collaborate in groups to develop a chapter based on a teacher-assigned topic. With roughly six working groups (5-7 students in each group), there will be three topics that the teacher will distribute to each group, which means two groups will have the same topic. Although the groups focus on the same topic, they work independently, which fosters diverse ideas and insights. This approach encourages students to grasp the topic's significance, preparing them to teach it to their peers during the rotating tables portion of the course. Upon completion, all chapters are compiled into an online shared document, allowing the class and teacher to review and provide feedback. This collaborative effort deepens understanding from multiple perspectives.

The second part of the sessions, called rotating tables, involves students sharing knowledge by moving between groups. Initially, students work in their assigned groups to tackle a problem posed by the teacher, using tools like mind maps and drawings to illustrate their understanding. This hands-on approach promotes engagement and learning (Rotbain et al., 2010). After the group is finished, the teacher tells the groups that they must move to other tables, and they do this until all the students have rotated to all the groups. Although the students are changing from table to table, some students remain at their table to explain their work, while others rotate to discuss and critique the explanations. In the final round, groups reconvened to review the feedback and new insights of the students who added to their original task. The teacher then asks a group to present their best solution to the class. This method reinforces the understanding of the material from their earlier chapter creations and demonstrates the flipped classroom principle that teaching others enhances learning (Lebrun, 2014).

The third part involves students creating questions for their exam. They collaboratively generate a range of questions, both easy and difficult, which the teacher then answers as if he were a student to assess their suitability for the exam. This approach promotes student engagement through discussion and fosters a deeper understanding of the subject (Jobs et al., 2013; Brown, 1991).

By incorporating these three activities, the teacher empowers students to take ownership of their learning. While facilitating and guiding the process, the teacher also adopts the role of a student, allowing for an evaluation of whether the explanations and examples provided adequately support learning for all students.

There are two assessments for this course: a midterm (30%) and a final exam (70%). The midterm is based on points given by the teacher, both an individual and team grade. For the team grade, everyone will receive the same grade, but each student's grade can change based on what they received on the peer-evaluation. The peer-evaluation is a rubric where the students must give a grade about their work during the course and the work of the people in their group. The final exam is based on the content that was produced during the creation of the chapters, rotating tables and more specifically the creation of the exam itself.

Table 10 shows the days when observation was done for each school year and during which part. The first observations were done during the school year 2015-2016. There were two courses using the same instructional approach but from different departments (Fac and an engineering school). The observer attended a total of 10 hours of the 24 hours with the students from the Fac and a total of 12 hours of the 24 hours with the students from the engineering school. All of the observations during that year used the ethnographic method. During the second year of observations (school year 2016-2017), the observer was able to attend four hours of the 24 hours with the Fac students. There were scheduling conflicts that didn't allow her to attend any more sessions. For the four hours, the observer used the BERI. During the last observation year (2017-2018), the observer attended 14 hours out of the 24 hours offered with the Fac students, in which the ethnographic method was used for all sessions.

Table 10. Molecular Biology Sessions – observed dates for 3 school years.

	Part 1 – Creation of the chapters	Part 2 – Rotating tables	Part 3 – Creation of the exam
School year 2015-2016 (Ethnographic)	Fac: Jan. 11, 2016 (2 hrs) (n=47) 1 st session Jan. 27, 2016 (2 hrs) (n=41) 2 nd session	March 17, 2016 (2 hrs) (n=37) 7 th session March 22, 2016 (2hrs) (n=36) 8 th session	March 29, 2016 (2 hrs) (n=38) 9 th session
	Engineering School: Jan. 13, 2016 (2 hrs) (n=20) 1 st session Jan. 28, 2016 (2.5 hrs) (n=20) 2 nd session	March 9, 2016 (2 hrs) (n=20) 7 th session March 22, 2016 (3 hrs) (n=20) 8 th session	April 6, 2016 (3 hrs) (n=18) 10 th session April 21, 2016 (3hrs) (n=19) 12 th session
School year 2016-2017 (BERI)	Fac: Jan. 23, 2017 (2 hrs) (n=41) 2 nd session		March 21, 2017 (2 hrs) (n=43) 9 th session
School year 2017-2018 (Ethnographic)	Fac: Jan. 12, 2018 (2 hrs) (n=32) 1 st session Jan. 26, 2018 (2 hrs) (n=33) 2 nd session Feb. 5, 2018 (2 hrs) (n= 32)	March 14, 2018 (2 hrs) (n=27) 7 th session March 19, 2018 (2hrs) (n=33) 8 th session	March 29, 2018 (2 hrs) (n=26) 9 th session

	3 rd session Feb. 9, 2018 (2 hrs) (n=28) 4 th session		
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The teacher believes in an open-door classroom, where students are free to express themselves (he collects feedback) and take breaks when necessary (use the toilet, get coffee, etc). The teacher often collects feedback from the students after each session. He asks the students to write about one positive and one negative aspect that they have about that session. He asks them to write in both sections even if they don't know what to say. After each session, he analyses and treats the data. From the start of the course, the students are aware that they have tasks that they need to finish before the end of the session. If they feel like they need a break from what they are doing and the teacher is not lecturing, they can do so, if necessary.

2. Observer's Perspective

In the observer's perspective, there are two observations done using the BERI and 18 observations using the ethnographic method. Those 18 observations are then analyzed using a timeline that is color coded to show the movements of the teacher, students that were engaged and students that were disengaged.

2.1 Behavioral Engagement

The BERI was used twice during the 2016-2017 school year. The first session was on January 23, 2017, where the students were using the creation of the chapter approach. In figure 7, it shows the percentage of how many students were engaged during the two-hour course. Within the first 54 min of the course at approximately 8:54, there was a decline in students that dropped to 73% (30 out of 41 students that were engaged). The decline that happened from 8:54 until 9:04 was because the students were done with the tasks that were given at the beginning of the course, which meant that at its lowest, 29 out of 41 students were engaged. From 8:00 to the decline at 8:54, there was a fluctuation of students engaged from 100% to 90% (41 out of 41 to 37 out of 41 students that were engaged). The task that was given was to have the students write something from their chapter on boards, so that other groups could see what they were working on. At 9:04, the engagement of students rose to 88% (36/41 engaged) because the teacher went over the group's boards, focusing on the content given. During that time the engagement of students then rose to 93% (38/41 students engaged) until 9:12. From that time on until the end of the course at 9:47. The number of students engaged staggered from as low as 76% (31/41 students) at 9:15 to the highest, 85% (35/41 students) at 9:12, 9:19 and 9:42.

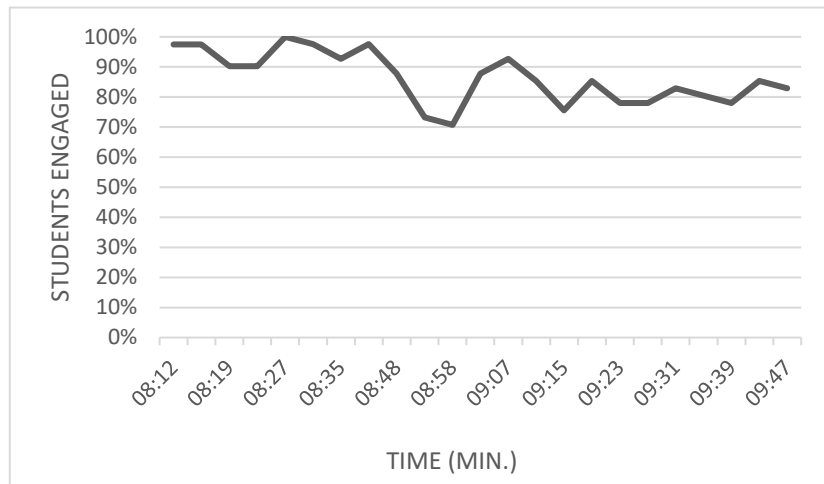


Figure 7. Cohort 2: BERI results during the creation of the chapter on January 23, 2017

The second observation using the BERI was on March 21, 2017 from 8:00 to 10:00 AM. This session focused on using the creation of the exam. For two hours, the students were given tasks to help build the exams for the course. Figure 8 represents the fluctuation of the students' engagement during the session. The percentage of students (total $n=43$) engaged over time was relatively the same until the 18 minutes of the session at 9:42. From 8:14 to 9:42, the number of students engaged ranged from 86% (37 out of 43 students) at 8:45 to 100% (43 out of 43 students) at 8:22, 8:40, 8:58 and 9:24. There are only two times when the number of students went below the 90 percentile, at 8:45 (86%) and at the end at 9:42 (51%).

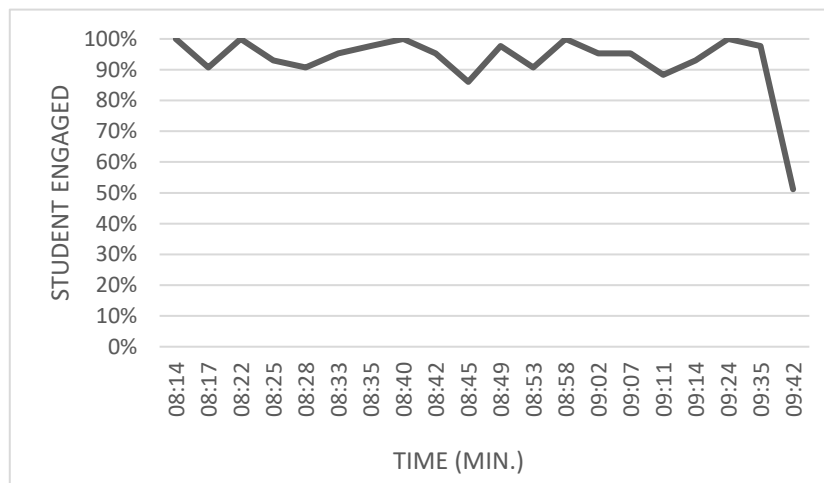


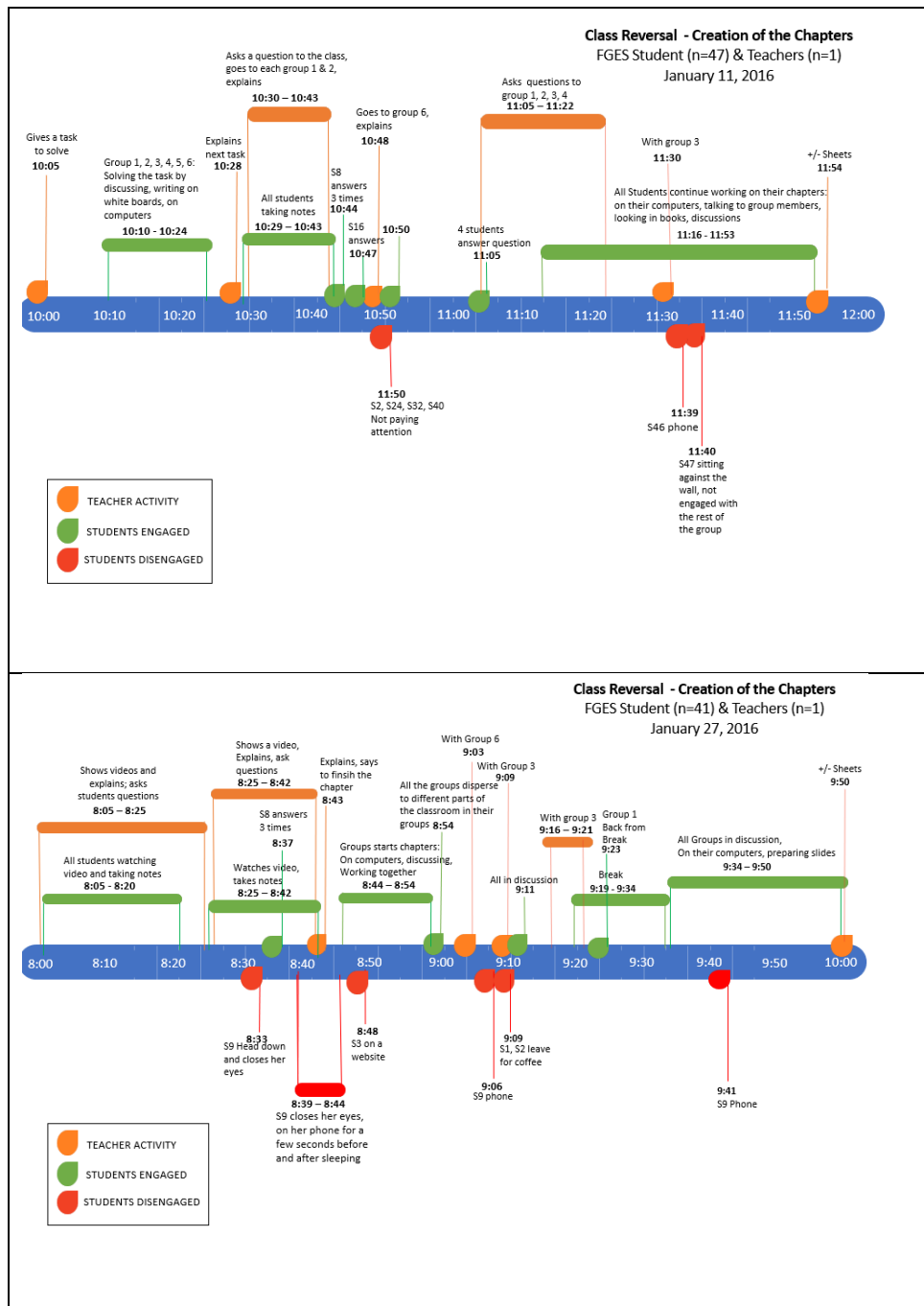
Figure 8. Cohort 2: BERI results during the creation of the exam on March 21, 2017

2.2 Timeline Analysis

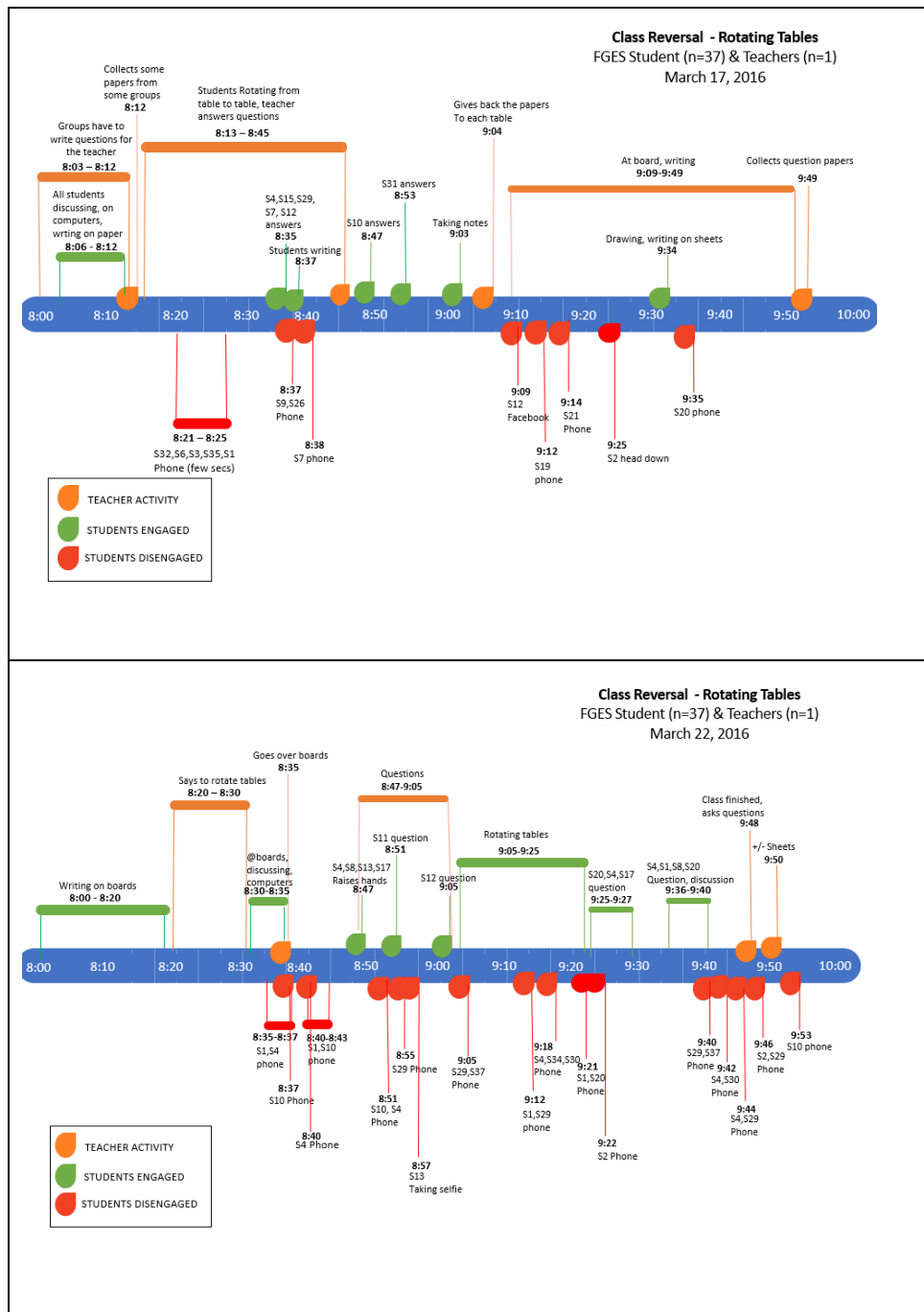
There are two cohorts that used the ethnographic methodology during the 2015-2016 and 2017-2018 school year. The first cohort had two different groups of students, one that studied in the Faculty of Management (Fac) and the other that studied at the Agricultural School (engineering school). In this part, cohort 1 is separated by both departments. During the first cohort (2015-2016), there were twelve observation sessions: five observations from the Fac course and six observations from the engineering school courses. During the observations, each part of the classroom reversal was observed: creation of the chapter (n=5), rotating tables (n=4) and creation of the exam (n=3). There were seven observations during the third cohort (2017-2018) with the Fac. Four sessions were focused on creating the chapters, two were done using the rotating tables method and there was one observation that used creation of the exam. All sessions are presented using a timeline analysis grouped by cohort.

The timeline analyses for cohort 1 will be divided by department, starting with the Fac and then the engineering school. Figure 9 presents the five timelines of the Fac during the 2015-2016 school year. Figure 3 shows overtime, when students were engaged or disengaged during the session. It also shows what the teacher was doing and what tasks the teacher asked the students to do. All five timelines show that the students are very active during the course session. The first two figures dated January 11 and 27, 2016, have a total of 10 students that were disengaged during the sessions. Of those 10 students, Student 9 (S9) continuously lacked focus at times during the session on January 27, they were either on their phone or had their head down on the desk. With a class total of about 47 students, 10 students disengaged for less than a minute each, shows that majority of the students were engaged. The majority of the students were disengaged because they were on their phones when they shouldn't have been. For cohort 1 Fac, the total amount of students for each session that were disengaged were 4 on January 27, 6 on January 11, 10 on March 22, 10 on March 29 and 13 on March 17, which totals 43 students. Of those 43 students, eight of them were on their phones for over 1 minute long and 35 students were on their phone for less than a minute long.

The students that were engaged during the 2015-2016 school year, were working together in groups so that they can finish their tasks. They were often found discussing with their peers, looking up info on the internet or books, taking notes when the teacher was talking, writing on boards or on their computers. The teacher during the five sessions was also active in the sessions. You can see him at different points in the session, talking to different groups and asking questions to see if the students understood the different concepts.



Student-Centered Instructional Approaches to Engage Students in Higher Education



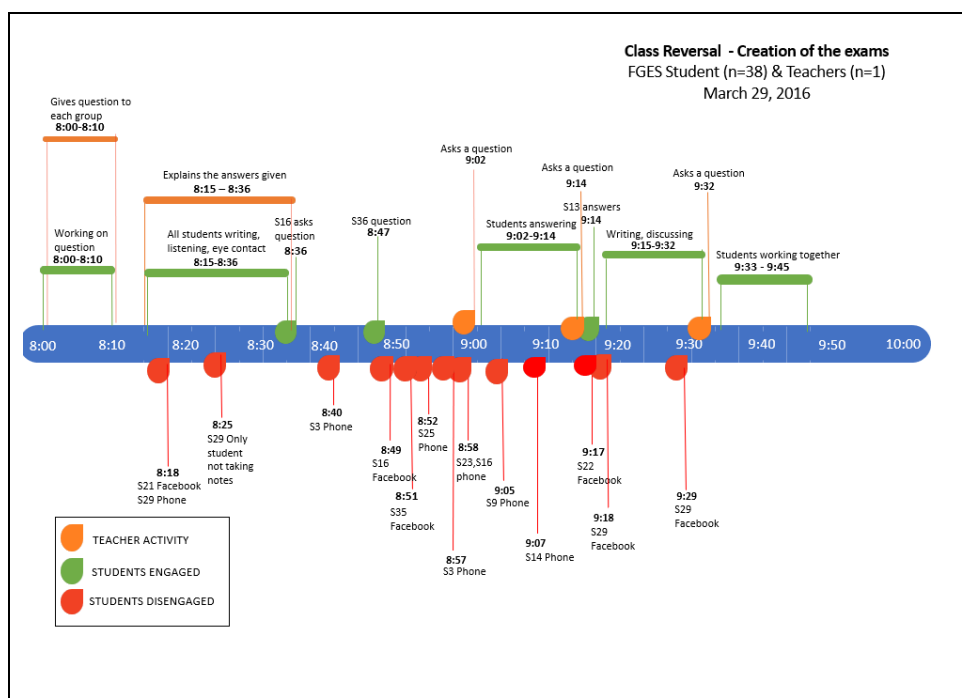
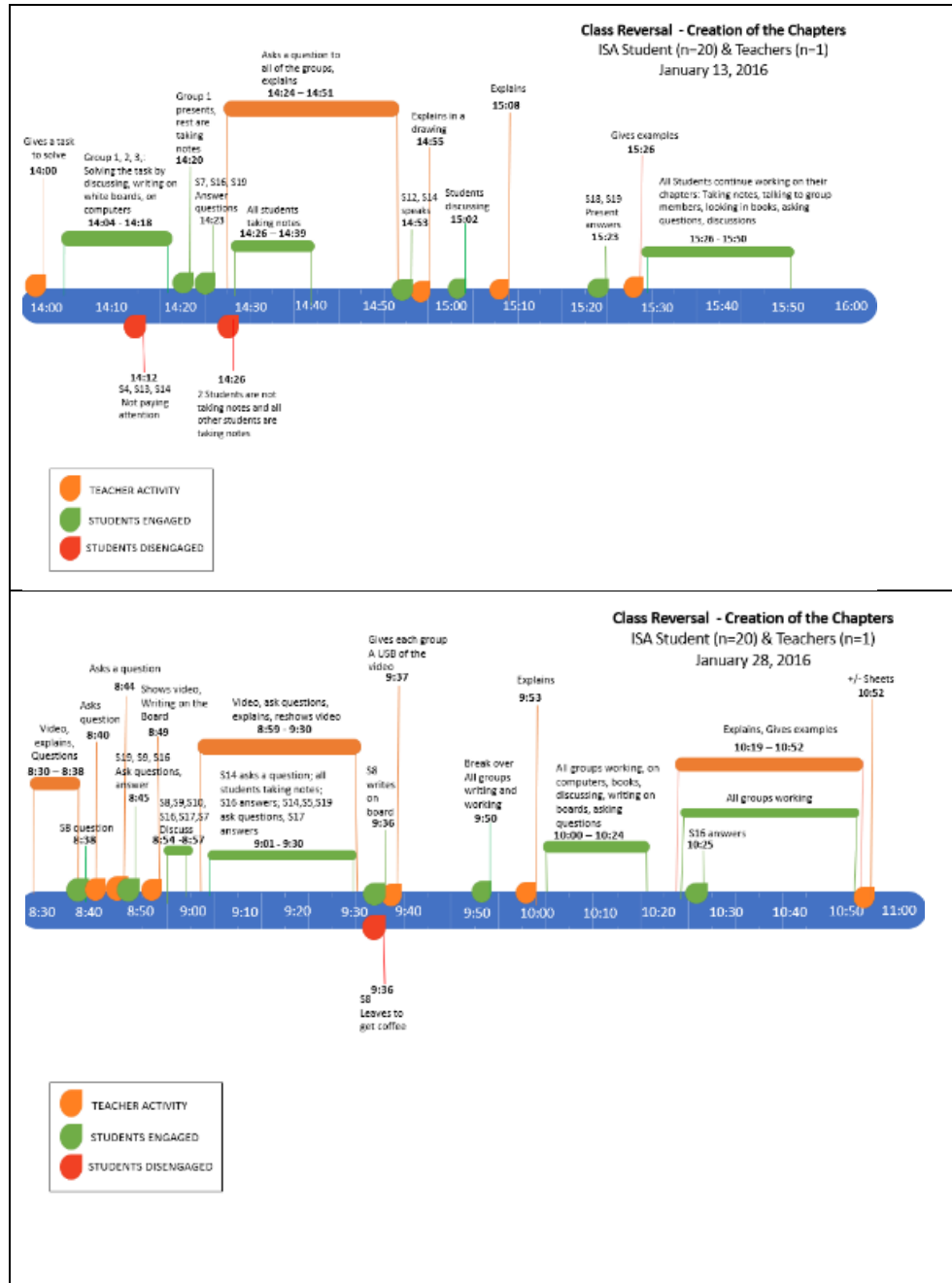
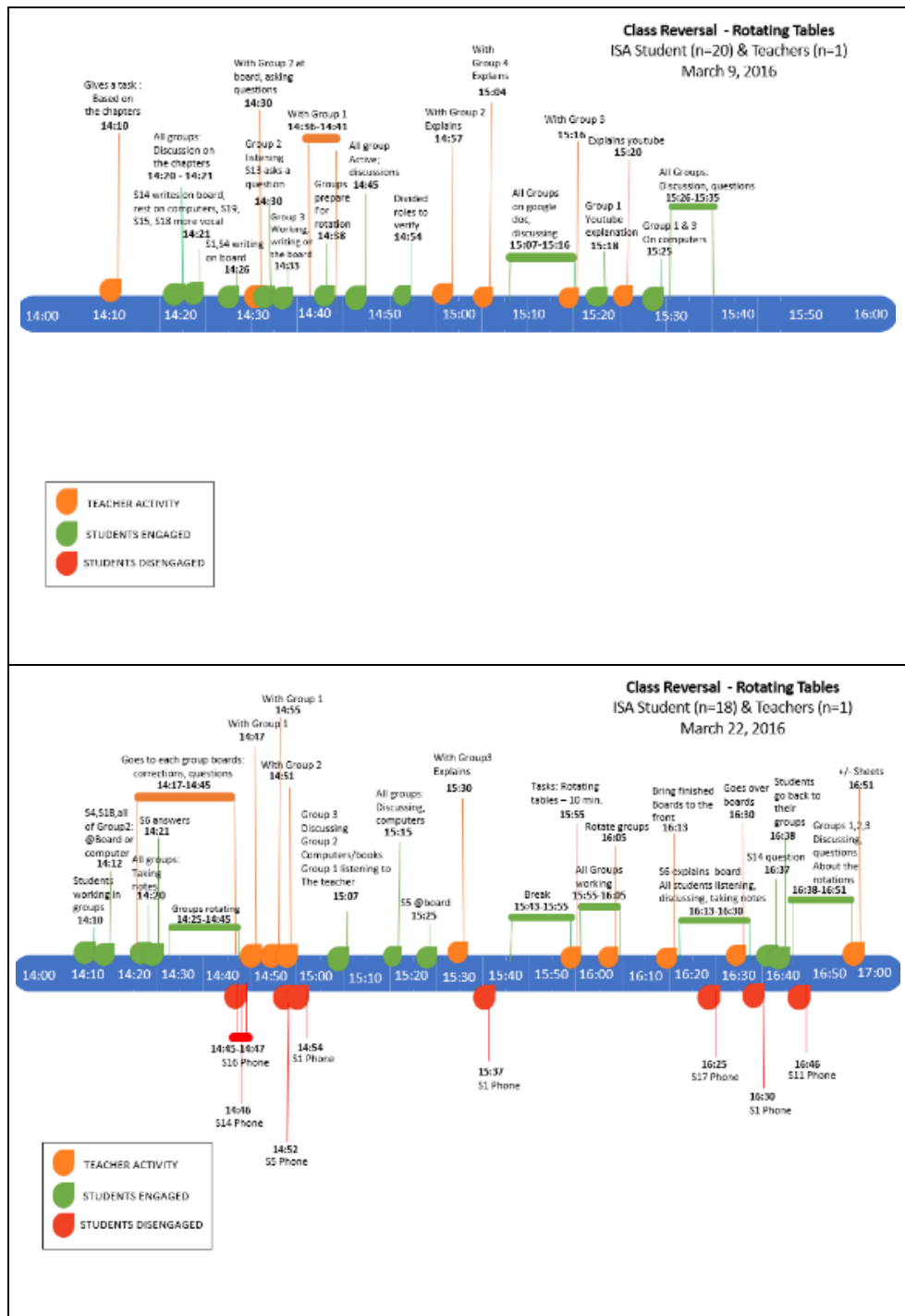


Figure 9. Cohort 1 (Fac): Timeline analysis of 5 sessions using the Classroom Reversal during the 2015-2016 school year

There are six timelines that were used when observing the engineering cohort 1 group, see figure 10. Of the six timelines, three sessions had a full class of 20 students, two sessions of 19 students and one session of 18 students. Students that were engaged during the course showed that they were finishing the tasks by writing on boards, taking notes, answering questions, discussed with their group, etc. The teacher is also shown to be active during the sessions by giving tasks, asking questions, going to groups that need help, giving explanations and examples, etc. From the six sessions in figure 10, there are a total of 21 students that were disengaged. They were known to be leaving the room, on their phones, not paying attention by not looking at those who were talking, had their head down on the desk for long periods of time. The majority of the students that were considered disengaged were on their phones. The ones on their phones didn't stay on their phones for more than a minute long. There were only two that stayed on their phones longer, one for 2 minutes and the other for 28 minutes. In the last three sessions (March 22, April 6 and April 21), it may appear that there were many disengaged students but there are 15 students that were disengaged throughout the session. For example, on April 21, it showed that there were eight times when students were disengaged but of those eight times, it was actually four students that were disengaged and not eight students. For example, one student (S7) put their head down and closed their eyes four times on their desk. Another student (S9) was marked down two times for being on their phone when they shouldn't have. The repetition of students disengaged during class can be seen in different sessions: Student 1, three times on March 22; Student 4,

two times (one of those times for 28 minutes), Student 19, five times and Student 17, 2 times on April 6; Student 7, four times and Student 9, two times on April 21.





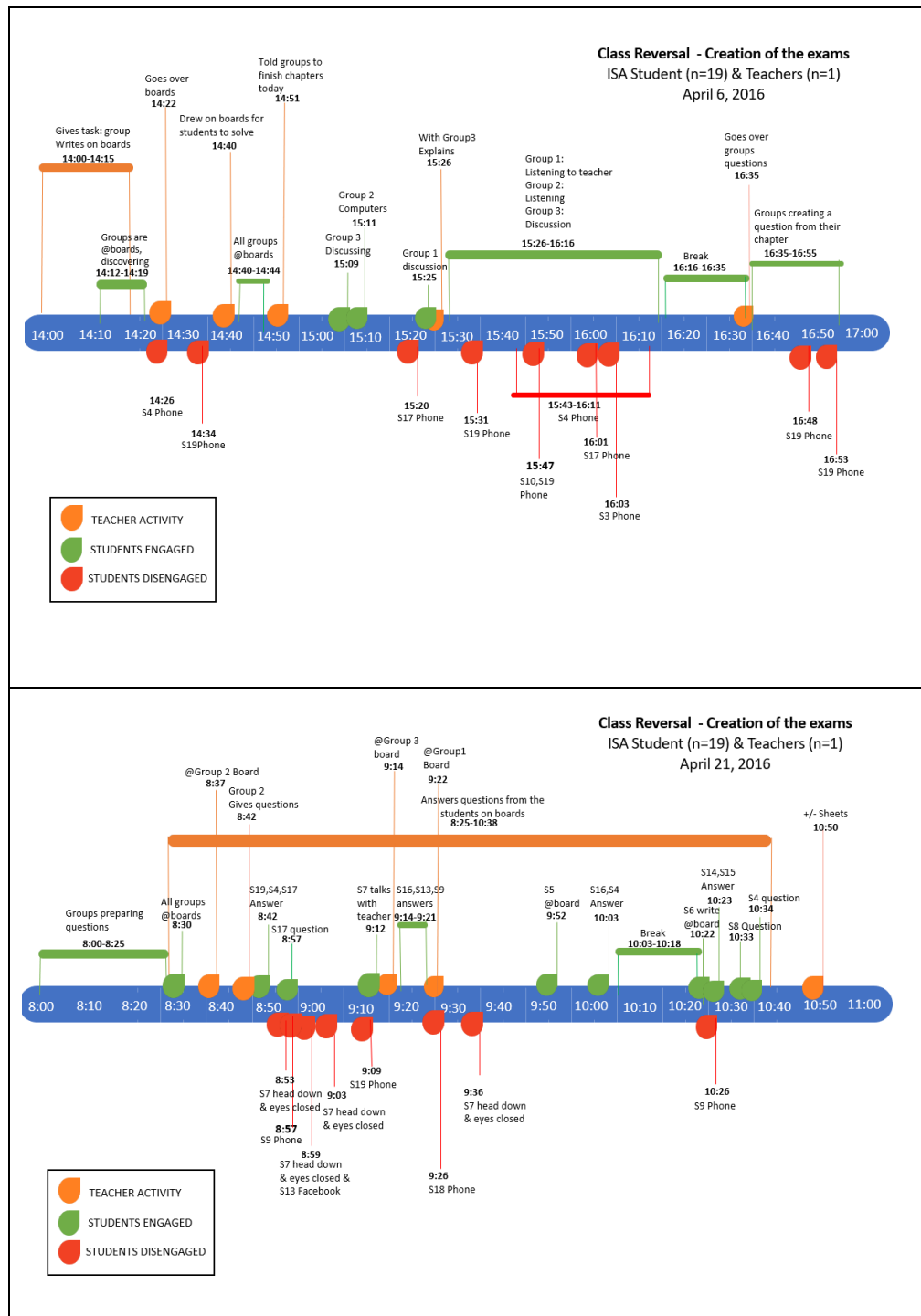
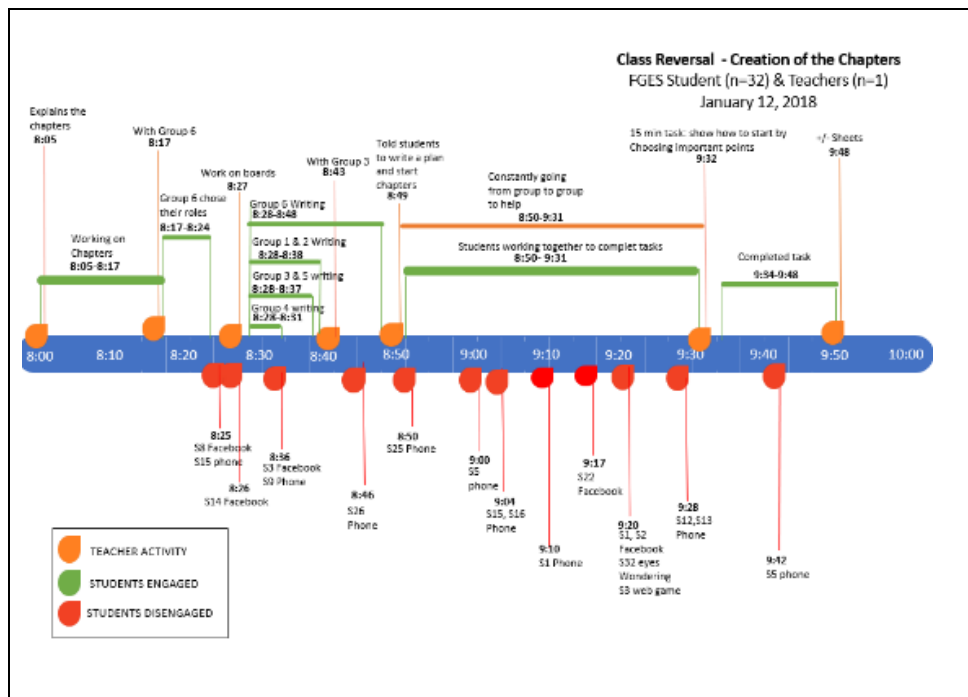
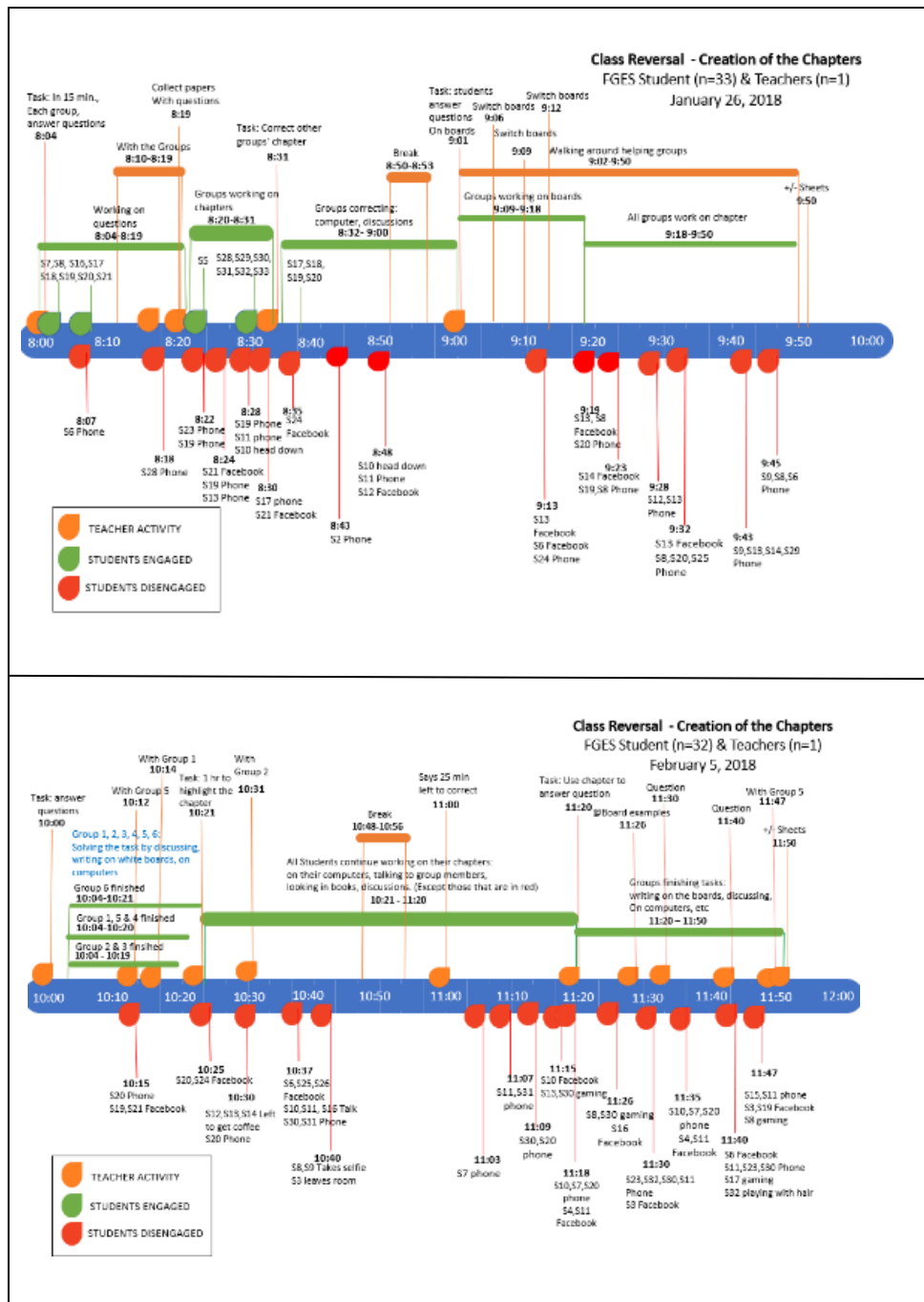


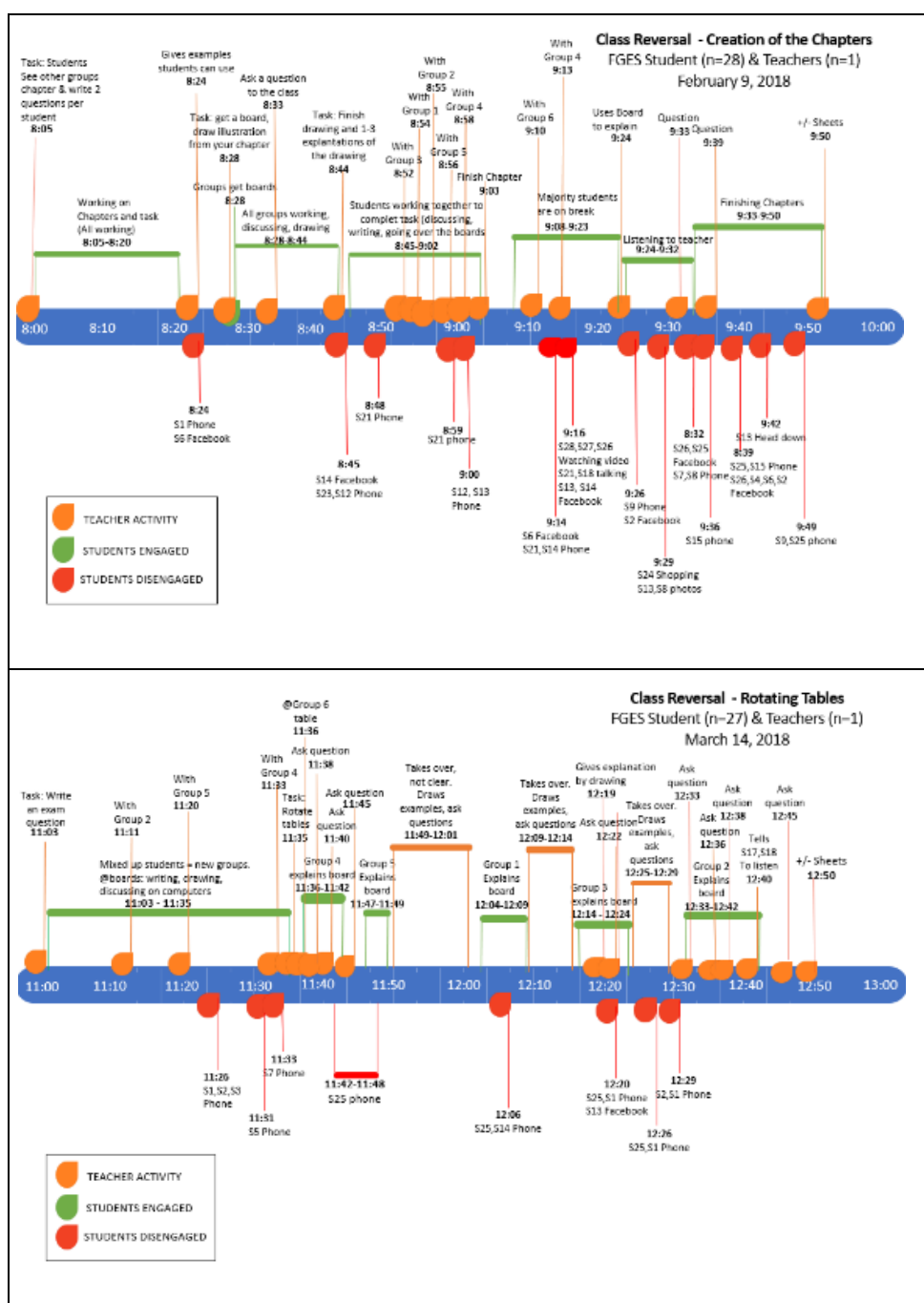
Figure 10. Cohort 1 (Engineering): Timeline analysis of 6 sessions using the Classroom Reversal during the 2015-2016 school year

Figure 11 presents seven timeline analyses of cohort 3 during the school year 2017-2018. The observations for cohort 3 were done during four creation of the chapter sessions, two rotating table sessions and one creation of the exam session. The students who were disengaged during the sessions were caught on their phones (n=62), on Facebook (n=33), had their head down (n=3), playing games (n=4), talking to others (n=14), leaving the classroom (n=5), eye wandering (n=1), taking photos (n=4), watching a video (n=3), shopping (n=1), surfing the web (n=3) and playing with their hair (n=1). The number of students that were disengaged during the first session of observations was on January 12, 2018 with a total of 15 students (32 students in class) and a total of 19 times of disengagement. The second session on January 26, 2018 had a total of 18 students disengaged when there was a total of 33 students during the session. During that session there were 12 students who were disengaged multiple times: eight students were disengaged twice; one student was disengaged three times; two students were disengaged three times, and one student was disengaged five times. The third session had 24 disengaged students with a total of 32 total students in class. The fourth session had 19 students disengaged when there were 28 students in class. The fifth session had eight students that were disengaged about 15 times with a total of 27 students in attendance. The sixth session had 21 students who were disengaged in a class of 33 students in total. The seventh session had 15 students disengaged in a class of 26 students in attendance.



Student-Centered Instructional Approaches to Engage Students in Higher Education





Student-Centered Instructional Approaches to Engage Students in Higher Education

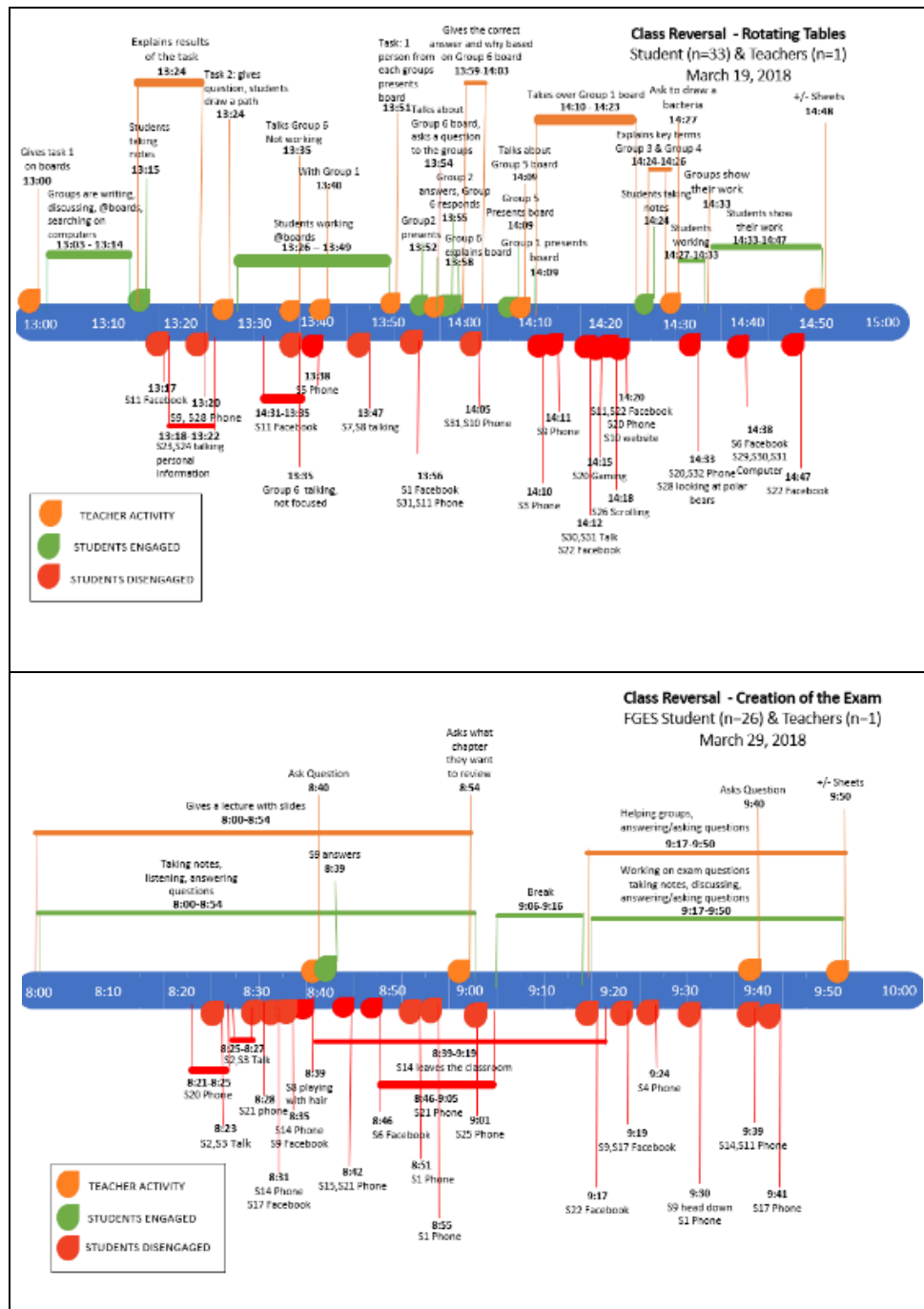


Figure 11. Cohort 3: Timeline analysis of 7 sessions using the Classroom Reversal during the 2017-2018 school year

For a clearer view of the timeline analysis as a whole, table 11 presents the number of students that were disengaged from all the observed sessions in cohort 1 and 3. In addition to the number of students engaged, the table also presents a total number of students that were present for all of the observation sessions during the ethnographic methodology. The total number of students that were disengaged in all of the timeline analysis was 126 students. Since there were a total of 527 students during the same observation sessions, that leaves about 29.7% of the students that were disengaged, which leaves about one fourth of the students occupied with something other than what was asked by the teacher.

Table 11. Total number of students disengaged in cohort 1 and 3 in 18 sessions that used the timeline analysis

	Number of students disengaged during the course	Total number of students during the course
Cohort 1 Fac (Ethnographic)	43 students	200 students
Cohort 1 Engineering (Ethnographic)	21 students	116 students
Cohort 3 Fac (Ethnographic)	62 students	211 students
TOTAL:	126 students	527 students

2.3 Modes of Engagement: the ICAP Framework

The use of the ICAP Framework helps in understanding cognitive engagement among students. Table 12 presents the ICAP Framework of the classroom reversal showing when students are passive, active, constructive and interactive during the course sessions. There are three main activities that are used in the classroom reversal: creation of the chapters, rotating tables and creation of the exam. Within these three activities, there are commonalities that can be used within the three. The four modes can also have an impact on each other. For example, in the activity section (creation of the chapter), a student can be constructive by reflecting, monitoring and explaining their understanding of the information that was spoken, yet be interactive by asking questions to promote discussion with their group members and the teacher as well. To better understand the ICAP, there is flexibility when students are “cognitively” engaged. For example, students can pass through the different modes at different times during the class sessions or students can remain in one mode the whole session. Depending on the students’ motivation, their goals could range from being passive to being interactive and in order for that to be seen, one can use the ICAP as a guide to understanding the ouverte behaviors during the class sessions. For the classroom reversal, a student who is passive is listening and “engaged” in the activity but is not active because they didn’t push the learning a little more by being vocal or active in writing, such as expressing what they think in their own words. That same student can also be constructive if they push their learning a bit more by having a deeper understanding of what they are working on. For example, students are considered constructive because they are reflecting on their own work and the work of others. They can also obtain a lot of the information that was given to them

and then draw on some of those ideas and ask “why.” For students to be interactive, they must incorporate two behaviors: multiple students who are in constructive mode and those students must be in conversation, talking back and forth. Table 12 presents students as interactive when they are helping their peers, promote discussion based on the activity they just performed, expressing new ideas through conversations, encouraging others to write based on group discussions, etc.

Table 12. The ICAP Mode of Engagement – Classroom Reversal

	Passive <i>Receiving</i>	Active <i>Manipulating</i>	Constructive <i>Generating</i>	Interactive <i>Dialoguing</i>
Creation of the chapters	Copy-paste information found, watch videos	Write information in their own words, ask for more clarification, verify if information is correct	Reflect, monitor and explain one’s understanding of the subject, ask questions to compare and contrast information, generalizing the information obtained	Help group members, promote discussion with group members and teacher, create organizational tools to explain information
Rotating tables	Listen to what others are saying, closely observe what is written, watch videos, take notes	Write on boards, ask for clarification, take notes in their own words, read what is written on the boards and question it without saying it out loud	Explain why their response is correct, expressing concerns based on others’ responses, write on board to promote discussion, comparing and contrasting what is written on the boards	Promote discussion with others and teacher (verbally), help peers in understanding the subject, expressing new ideas that emerged from the discussions, incorporate feedback and responses from the group
Creation of the exam	Listen to group, write a question (copy-paste), take notes	Write a question in their own words, take notes in their own words, ask question for clarification	Explain why their question should be used, connecting, comparing and contrasting which is a good question,	Ask questions to promote discussion for their question, incorporate feedback and responses to create a new question, encourage others to write new questions

Note. This table demonstrates the use of the ICAP framework to categorize students’ learning activities during 18 sessions of the Classroom Reversal.

3. Teacher’s Perspective

The semi-structure interview presents the teacher’s perspective of the instructional approach: creation of the chapters, rotating tables and creation of the exam. The questions in the interview seeks to understand the reason why the teacher wanted to change their course from a lecture-based instructional approach to a student-centered instructional approach, a short history of some of the situations that happened during the course, the student dynamic during the course and the expected knowledge level of the students. The teacher teaches a Molecular Biology course a French university. He decided to completely change his instructional approach in 2012 after being influenced by doing Codesign (Binder et al., 2008)

workshops with companies. Codesign is a methodology where a group of people come together to co-create ideas and concepts by achieving a common goal. He realized that his codesign workshops were a new way of learning, so why not do it with his students in his courses? That is when he decided to change his class and make it like the Codesign methodology.

The first year that he decided to change his course, it took him three months to find a method that would work for his course. A couple of months after he designed it, he arranged a meeting with his incoming students to inform them of the new instructional approach. He wanted them to be fully informed of the process and to have them ask questions. From 2012 to 2014, he had specific details about what he wanted from the students, i.e. Chapters had to have 5-8 pages, including pictures and links, etc. But realized that he wanted to give them the freedom to do what they wanted, if they understood what they were including in their chapters and that they were not just copy-pasting whatever they find. They must choose any sources as long as they are reliable, which include articles, books, online sources, etc. Another change that was made in 2015 was that he felt that two- or three-hour courses were sufficient because it allows students to present, discuss, to do activities that allow students to exchange with others, and have time to ask questions and give answers.

Another important factor that the teacher wanted to add in 2012 was the feedback from the students. The teacher wanted to make sure that what he was involving the students and their feedback into the design of the course. Just before the end of each session, he gave the students a few minutes to fill out a piece of paper where they could write positive and negative aspects. He told them that they can write whatever they want but write something in both areas. He would then collect all the sheets of paper and analyze the results in a clearer concise graph.

In addition to being a teacher, he was also a part of the Laboratoire d'Innovation Pédagogique (LIP) at the university. The LIP consisted of a group of teachers and administration, who were interested in sharing innovative instructional approaches. Being a part of this group, he was able to discuss and share best practices with other teachers who were interested in changing their courses from a lecture-based instructional approach to a student-centered instructional approach.

4. Discussion

This study emphasizes the key points when using classroom reversal. The main points that will be discussed are the use of the BERI and the ethnographic methodology during observations, and the added value of the ICAP Framework when focusing on cognitive engagement.

The Ethnographic methodology brought forth interesting insight into understanding when the students were engaged and disengaged during the course session. Throughout the three activities of the classroom reversal, students were able to gain autonomy and try a new role as “teacher.” The point of the classroom reversal was to have students take the lead in their learning, for them to have the role of being a teacher (prepare reading material and exam

questions for the students) and to have the students teach each other in the process. This approach can motivate students to engage in the learning process through discussion and gain a deep understanding of the topic (Jobs et al., 2013; Brown, 1991). There are certain activities that had similar ways of learning, such as writing on boards so that students can write their understanding of the topic (creation of the chapter and rotating tables), watching videos to give a visual of what they are learning (creation of the chapters and rotating tables), asking question (creation of the chapter, rotating tables and creation of the exam) and discussing topics and information given (creation of the chapter, rotating tables and creation of the exam). These activities promote student learning by way of drawing and visual tools, which are physically and mentally engaging for students (Rotbain et al., 2005).

Although there were many students that were engaged during the activities, there were still several students that were disengaged. The number of students that were disengaged in class never exceeded the number of students that were engaged in the activities. There were three main factors that should not be overlooked concerning those students that were disengaged. Firstly, there were only a total of eleven times during the eighteen sessions when students were disengaged for more than a minute long. Majority of the students that were marked as disengaged were noted to have stopped what they were doing for less than a minute long and then continued to be engaged in the activity. Which brings up an important topic of engagement, how long does a student have to be disengaged to be considered not learning? Secondly, among those students that were disengaged, many of them were marked multiple times during the session that they were disengaged. Students who come into class can often carry other burdens in their life. Sometimes it shows in class when they should be learning but that all depends on the student and how severe the issues are for that student. In figure 5 (Cohort 3, March 29, 2018), Student 14 was seen to have been on their phone two times (both less than a minute long) before leaving the classroom for 40 minutes and when they returned, went on their phone one more time (less than a minute) before the session was over. Thirdly, the teacher stated an open-door policy, which means that the students can go out of the classroom or take a break whenever they feel necessary. The main objective in doing this is to have students free to do what they deem is necessary while working. They should be responsible for what they need to do, and they can decide to take breaks amongst themselves. This is important because those students that were noted as disengaged have the right to take a break and go on their phones, go for coffee or do what they want to do at any time during the class session. As an observer, I'd be more cautious with the students who are constantly disengaged throughout the sessions.

Another important aspect this course had was the presence of the teacher. When you look at all 18 timeline analyses, you can see that the teacher is constantly working with groups and giving tasks. When the teacher realizes that the students are not understanding the content, he would ask questions and try to promote discussion with certain groups or the class as a whole. The classroom reversal doesn't only focus on the students; it also focuses on the teacher and their role during the class sessions. Since the students take the role as teacher, the teacher therefore takes the role as students. He is often challenged by what the students

present to him and must answer the questions during the rotating tables and creation of the exam.

The final point that should be addressed is the use of the ICAP Framework. The ICAP Framework helped the observer see what cognitive engagement looks like based on what the observer had seen during the ethnographic methodology. The ICAP looks at the behavioral engagement of students and uses clear guidelines to determine what passive, active, constructive and interactive looks like. In the classroom reversal approach, there are different criteria that can establish the cognitive engagement of students. Because this was a course with constant movement, where students were performing different tasks throughout the session, the ICAP was constantly changing as well. This is beneficial because the ICAP can help the teacher understand when the cognitive engagement of the students.

5. Limitations

There are three limitations for this study. The first would be the use of the BERI. Since the BERI was only used for the second cohort and it was only used twice, it didn't give much information to be able to really assess the sessions during that school year. It was also difficult to see why the students were disengaged. With the BERI, it was not a part of the protocol to write what the students were doing. It would have been best to use the ethnographic methodology for all three cohorts. Another limitation is that not all of the sessions in each cohort were observed. Since the observer had other responsibilities, she was only able to attend half the number of sessions in all three years. The last limitation was interviewing the teacher during the other two school years. The observer only interviewed the teacher the first year that she observed the sessions. Having answers to the same questions for the other two years might be an advantage in understanding what the teacher thought of the school year that was observed the year before. It could have shown patterns or differences than with just one interview.

Chapter 5

Case Study 3

Research Training in Psychology: Inquiry-Based Approach

Case Study 3

Research Training in Psychology: Inquiry-Based Approach

This case study is based on a course called Research Training in Psychology. In this master's course, the teacher applies a student-centered instructional approach, where the students obtain information based on a given topic and then present what they know to their fellow peers. The students who present their topics, take the role as teacher and initiates a dialogue to have interaction between the presenters and the audience. This interactive student-led presentation is a form of student-centered learning.

The methodology used for the Research Training in Psychology course focuses on a non-participant observer's perspective and teacher's perspective. The non-participant observer's perspective employs both qualitative and quantitative methodologies. The research question guiding this perspective is: "As an outside observer, how are students engaged, and what role does the teacher play in the classroom?" To address this, two instruments are utilized: The Behavioral Engagement Related to Instruction (BERI) (2015) and an ethnographic methodology.

For the teacher's perspective, the research question is: "What factors have influenced the teacher to modify their instructional approach, and what student outcomes do they perceive as a result?" To explore this, semi-structured interviews were conducted. Additionally, the ICAP Framework (2014) (Interactive, Constructive, Active, Passive) serves as an analytical tool to deepen the understanding of cognitive engagement.

This course has two types of courses that the students must attend: lecture-based and tutorial work sessions. These two types of courses work together to help the students be better equipped to understand research in Psychology. The first type of course is a lecture-based course, where the students listen to and take in the information that the teacher has given (citation) and second type of the course is the tutorial work session. During these sessions, the students are now given the role as teacher, and they must present their information to the rest of the class. In addition to the presentation, the students must also have a thematic poster that represents what they have presented through an infographic format. This allows students to have the ability to be able to produce a poster if they want to be a part of a conference. It also gives the audience a visual view of the presentation. The third part of the session, the students must provide an interactive activity among the audience based on the information that was presented in the presentation. This can consist of question-and-answer discussions, games, etc.

1. Research Design

The Research Training in Psychology course has a total of 32 hours divided into 18 hours of lectures and 14 hours of tutorial work. The lecture-based approach was used for 18 hours

(2 hours per session) focusing on significant research in psychology. The tutorial sessions were 14 hours (1 hour per session), where the students were divided into two groups: social and clinical psychology. However, during the first two sessions all of the students attended together to receive guidance from the library staff, where they helped the students understand the services that they can receive. This study focuses on the tutorial work sessions, where students are teaching their peers their research work through presentations, thematic posters (suitable for academic conferences) and question-and-answer discussions to assess audience understanding. The grading for the course consisted of the students' themed presentation (30%), their posters (based on their research topics) (30%) and a final exam (40%), which consisted of the information based on the students' work.

To better understand the dynamics of the course, a three-point perspective was used, consisting of a teacher interview, closed- and open-ended questionnaires, two types of observations, and an analytical framework. In the beginning of the course during the school year 2015-2016, the observer had an interview with the teacher on 7 January 2016. During the school year 2015-2016, the observer used the ethnographic methodology to better understand the course. The observer was able to attend six sessions of the tutorial work sessions (3 February, 2 March, 23 March, 30 March, 30 April, 27 April), based on availability. During the school year 2016-2017, the observer administered another quantitative observation method called the Behavioral Engagement Related to Instruction (BERI). The BERI was used one time during the 2016-2017 school year and three times during the 2017-2018 school year. The availability of the observer was limited because she was also observing other courses that were at the same time. Table 13 is a breakdown of the observations that were used during this course.

Table 13. Tutorial work session observations during the school year 2015-2016, 2016-2017 and 2017-2018

2015-2016	2016-2017	2017-2018
Ethnographic Methodology 3 February (n=27) 2 March (n=22) 23 March (n=27) 30 March (n=23) 30 April (n=22) 27 April (n=32)	BERI 8 March (n=23)	BERI 21 September (n=51) 9 November (n=33) 16 November (n=51)

2. Observer's Perspective

In the observer's perspective, it highlights four observations done using the BERI and seven observations using the ethnographic method. Those seven observations are then analyzed using a color-coded timeline that shows the movements of the teacher, students that were engaged and students that were disengaged.

2.1 Behavioral Engagement

In the observer's perspective, it highlights four observations done using the BERI and seven observations using the ethnographic method. Those seven observations are then analyzed using a color-coded timeline that shows the movements of the teacher, students that were engaged and students that were disengaged.

The BERI was used four times over two school years: one in 2016-2017 and three in 2017-2018. Figure 12 shows the use of the BERI on 8 March 2017 with 23 students present. During this session, students were engaged majority of the class session with one fall at 16:06 at 65% engaged. Otherwise, the students were steadily engaged from 100% to 80% throughout the course.

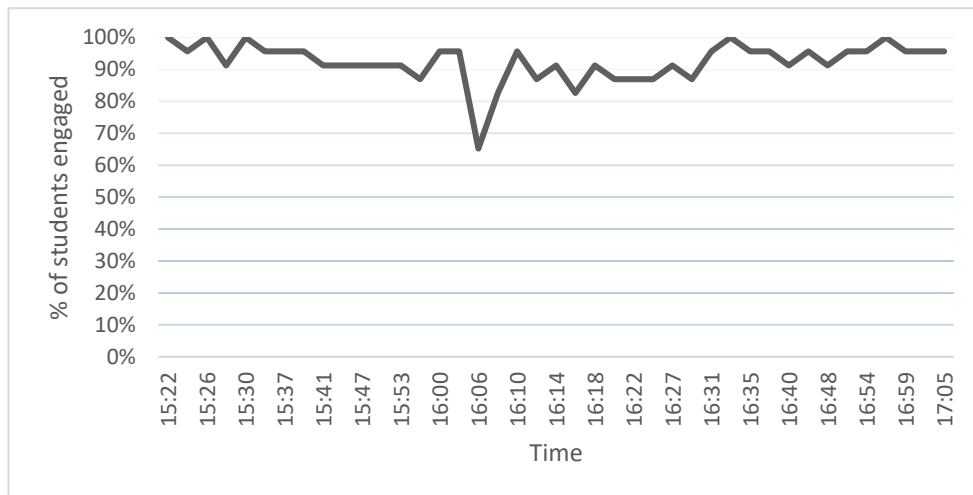


Figure 12. Cohort 1: BERI results on 8 March 2017 (n= 23 students)

The next three figures of the BERI were done with the second cohort during the school year 2017-2018. Figure 13, which was done on 21 September 2017, had 51 students attend class that day. Throughout the session, majority of the time, 50% of the students were engaged in the class activities. There was a decline for 9 minutes where the students were sitting passively because they were listening to the teacher explain the grading process. After the 9 minutes had passed, there was an increase in student engagement that plateaued in the 80 percentiles for 18 minutes before it rose again to 98% of students engaged. Shortly after the rise at 14:47, there was a decline into the mid-70s for 8 minutes long. During that time, students were getting ready to leave the course.

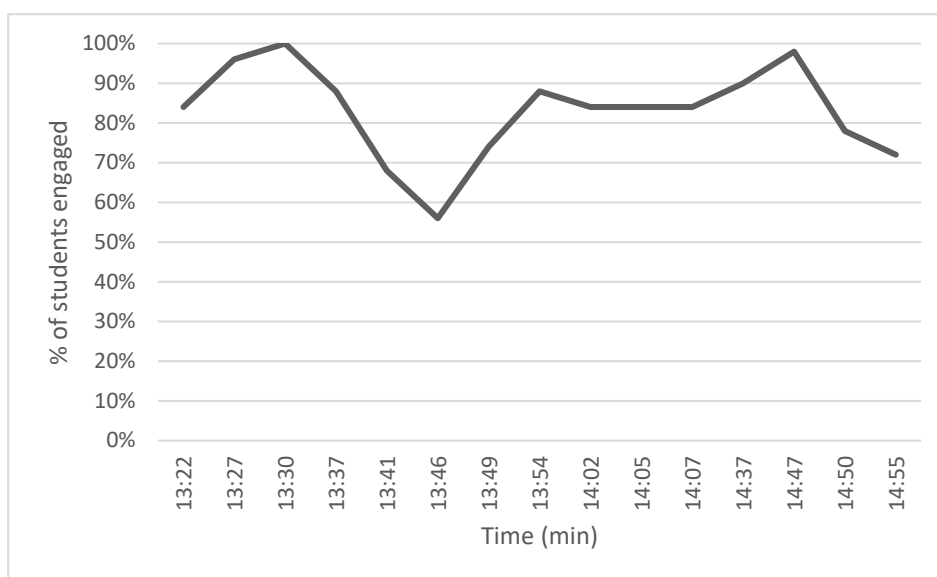


Figure 13. Cohort 2: BERI results on 21 September 2017 (n=51 students)

Figure 14 was done on 9 November 2017 with 33 students in attendance. During this session, there was more increase and decrease in student engagement throughout the whole course. The lowest decline of student engagement was at 13:52, where the students were listening to the teacher's feedback about the poster that was just presented. That decline in engagement lasted approximately 4 minutes before the rise in engagement of 84%.

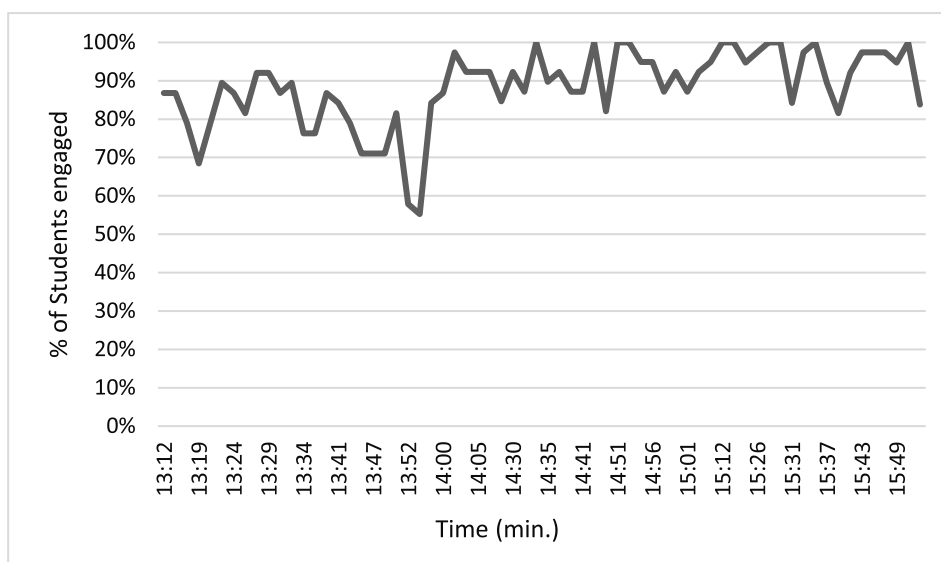


Figure 14. Cohort 2: BERI results on 9 November 2017 (n=33 students)

The last BERI observation for cohort 2 was on 16 November 2017 with 51 students in class. Figure 15 showed six declines of engagement in the 60-70 percentile. The first decline at 13:34 happened right when the students' presentation ended and right before they presented their posters. The second decline at 14h17 was the same as the first decline because it happened right at the end of the students' presentation. The third decline at 14:41 and again at the end of class from 15:52 to 15:54, was during two poster presentations. Otherwise during the three-hour course, majority of the time the students were engaged during the course session.

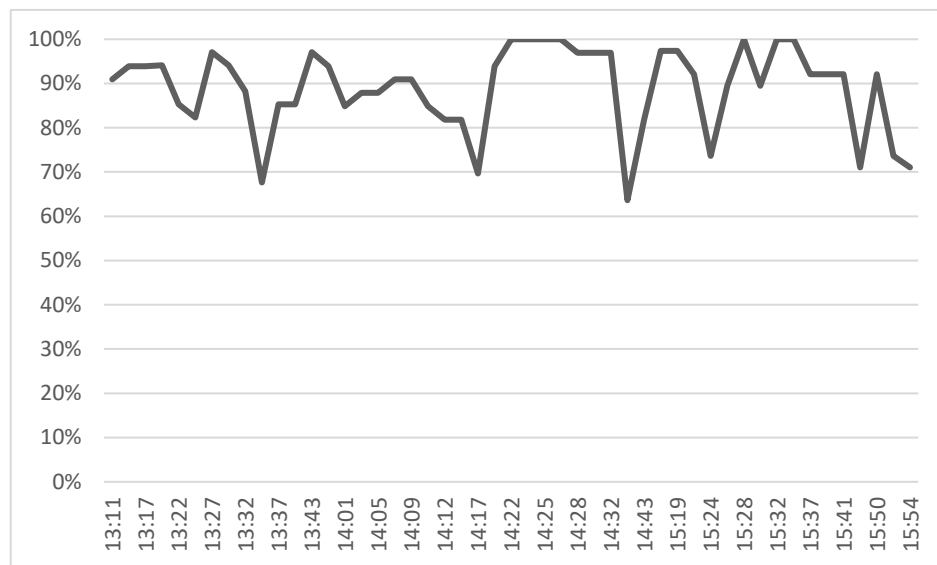


Figure 15. Cohort 2: BERI results on 16 November 2017 (n=51 students)

2.2 Timeline Analysis

The ethnographic method was used seven times during the school year 2015-2016 across six sessions (3 February, 2 March, 23 March, 30 March, 30 April, 27 April). Each session except the last session (27 April) was one hour long, the last session was two hours long. The ethnographic method was used to have a visual idea of what the students and teacher were doing over time during class. In doing that, it presents what the students and teacher were doing and if they were engaged or disengaged.

Figure 16 presents the first observed session (3 February 2016) of the semester, and it had 27 students present. During that session there was one activity (15:52 to 16:00) for the students, where they were asked to write their ideas on three different posters. There were no signs of disengagement during the teacher's presentation (15:13-15:20), yet there were signs of engagement (students listening and students taking notes). There was a total of three times when there were students that were disengaged (15:31, 15:37, 15:42). The students were showing signs of disengagement by talking to others (n=6), on the phone (n=1) and eyes' wondering and not focused on the presenters (n=3). There were two students (S26 and S27) that were talking to each other at two different times (15:31 and 15:37). The two of the three times when the students were disengaged was during the time the teacher was explaining the evaluation of the course. The first disengagement was done at the end of the theme presentation and before the evaluation explanation.

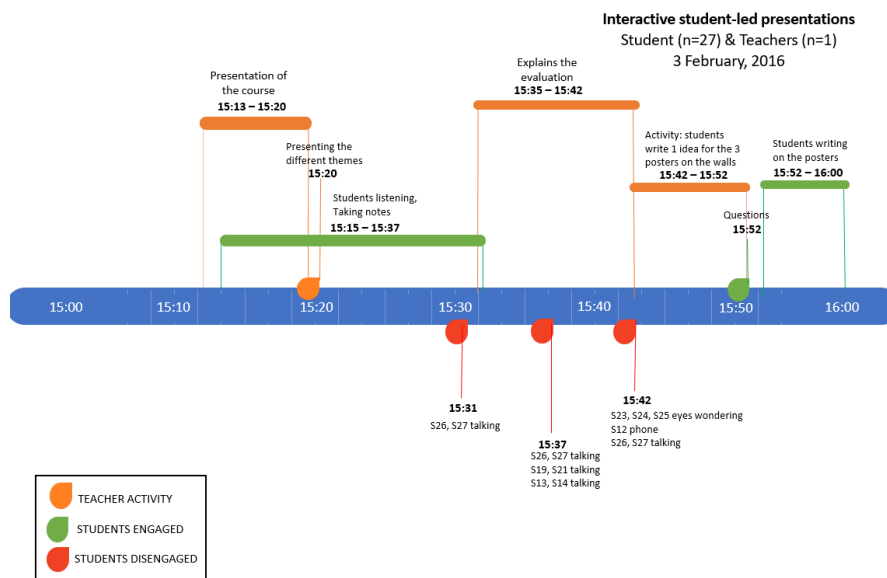


Figure 16. Cohort 1: Timeline analysis of an observation of an interactive student-led presentation session

The second session of observations was on 2 March 2016 with 22 students present, see figure 17. The first 16 minutes, the students were asked to fill in a class survey (15:00 – 15:16). After that, the students needed some time to set up their presentation, which they did from 15:25 to 15:46. During the presentation there were two times where the students were disengaged (15:36 and 15:43). The students showed signs of disengagement by talking to others (S21 and S22), on social media (S18) and on their phones (S17 and S18). After the presentation, the students presented their posters (15:46 – 15:49) and then asked the audience to work in groups to play a game (15:49 – 16:00).

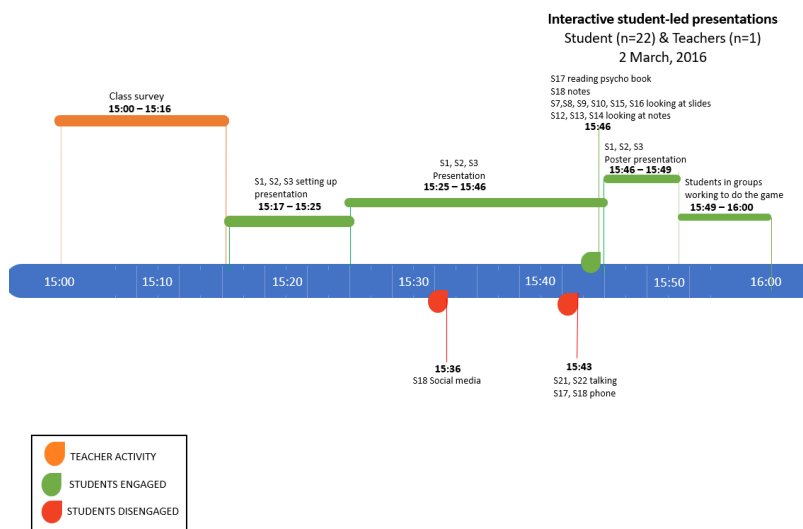


Figure 17. Cohort 1: Timeline analysis of an observation of an interactive student-led presentation session

In Figure 18, there were more noted times of disengagement (n=10). During this session, there was one group that presented to the students and presented their poster immediately after. Their presentation also sparked engagement through discussion between two students (S26 and S27) at two different times (15:20 and 15:30). Although there were 10 times when the students were disengaged, it shows that some of the same students were seen talking multiple times. S26 was on the phone (15:18 -15:20) and talking to S27, S25, S15 (n=4). S12 was seen talking to S13 and S14 for 2 minutes and on the phone for 4 mins (15:27 – 15:31).

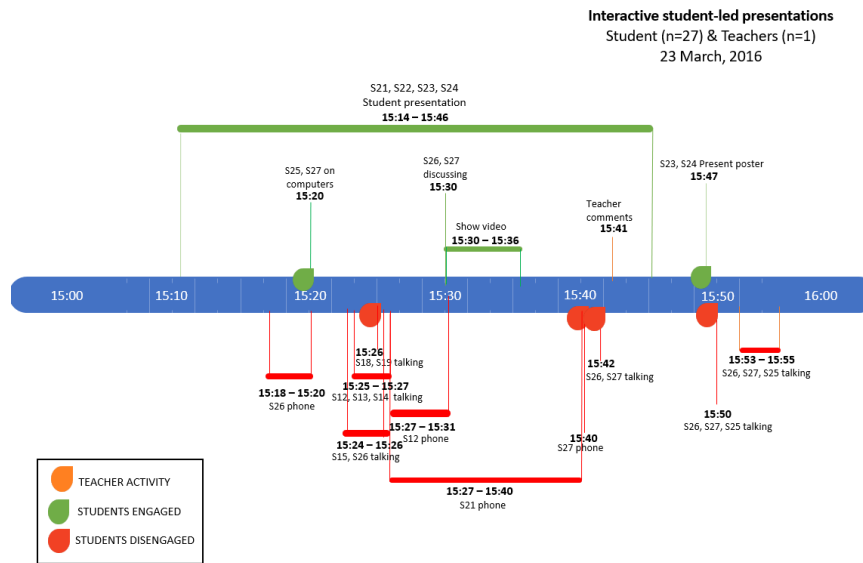


Figure 18. Cohort 1: Timeline analysis of an observation of an interactive student-led presentation session

On 30 March 2016, a group of four students (S1, S2, S3, S4) presented their presentation (15:15-15:42) and provided a poster presentation (15:43-15:49) and multiple-choice questions (15:49-15:53) for the class to answer. During the presentation, there were six times where there were points of disengagement. Figure 19 shows that the students were disengaged because they had their head down on the desk (n=1), on their phones (n=5) and cleaning their computer files (n=1). The students (S18 and S19) that were on their phone three times (S18) and two times (S19).

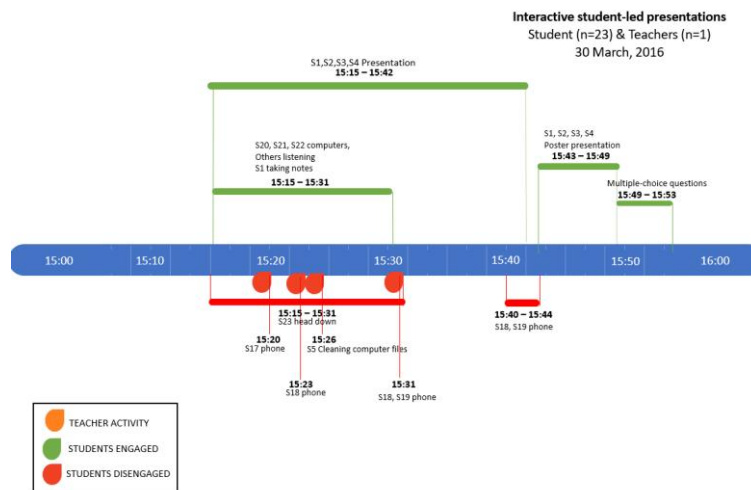


Figure 19. Cohort 1: Timeline analysis of an observation of an interactive student-led presentation session

Figure 20 presents a timeline of an interactive student-led presentation on 20 April 2016. During this presentation there were technical difficulties (15:00 – 15:30) that caused the students' presentation to be delayed. Once the problem was solved, the course started at 15:30. The students presented (15:30 – 15:38) their theme using a video that they created for the session. After the video, the teacher commented on the video and at the end asked a question to the class. One of the students (S6) gave an answer and then another student (S21) responded to S6 answer to the question. From that, the teacher responded to both of their comments. During this session, 7 students (S16, S14, S17, S18, S15, S22) were on their phones (n=7) or talking to each other (n=1). The times that students were on their phone were over a long period of time, ranging from less than a minute to 23 minutes (S16 and S22).

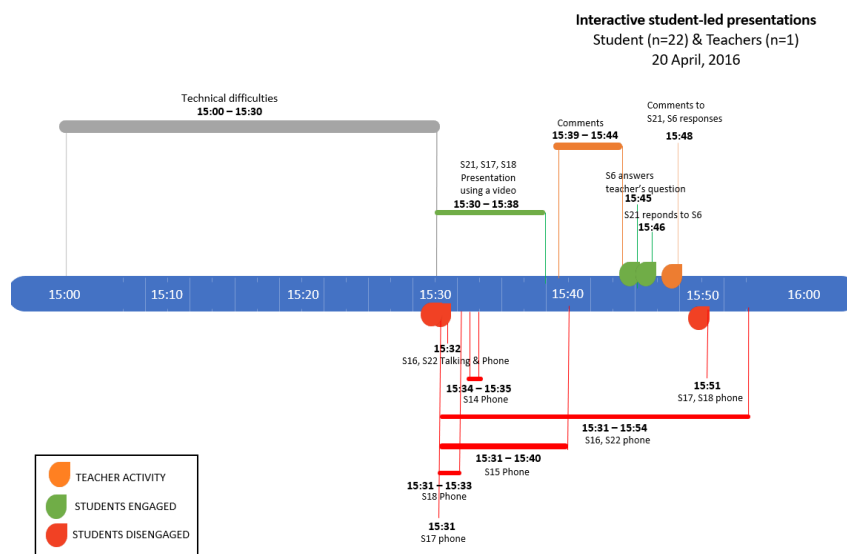


Figure 20. Cohort 1: Timeline analysis of an observation of an interactive student-led presentation session

The last session that was observed and the last session of the class was on 27 April 2016 (figure 21). At the beginning of the class, the teacher explained that they will be giving a grade for each video that is shown. The video presented are videos that the students created based on their thematical presentations. The students were given a sheet of paper that had all the criteria to give a grade for each video. There was a total of 10 videos that were presented during this session. There were no forms of disengagement during this session.

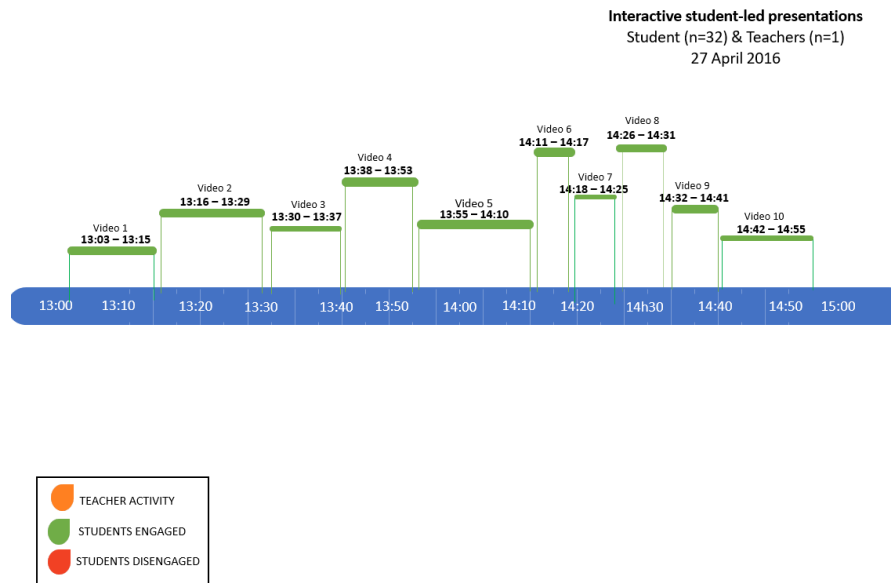


Figure 21. Cohort 1: Timeline analysis of an observation of an interactive student-led presentation session

2.3 Modes of Engagement: the ICAP Framework

Based on the behavioral engagement noted in the ethnographic methodology, the ICAP framework guides when evaluating student engagement levels: passive, active, constructive, or interactive. The varying engagement levels in table 14 presents examples from this study during the 2015 – 2016 school year, where six sessions of interactive student-led presentation were used as an instructional approach in higher education. The interactive student-led presentations (slides and posters) focused on the presenters, the audience and the teacher.

During this study, the mode of engagement has shifted from constructive to interactive throughout the observation session. The students who presented their slides and posters have been operating in a constructive and interactive mode. They were constructive because of the use of self-explanation. They were transmitting the information from their slides, which they created, to their peers. For the interactive mode, the students who presented were able to create an interactive group work activity for the rest of the students so they could collaborate and work out what they learnt from the slides and poster presentation.

For those that were listening during the presentations, there were many shifts from active to constructive mode. There were students that were in active mode by copy-and-pasting the information that was presented and students who were in constructive mode by writing out the information that they received in their own words. There were students (20 April 2016 and 23 March 2016) who were using the information from the slides to bring up discussion about what they learnt. On 2 March 2016, there was a dialogue and collaborative work between groups to produce answers to the questions the presenters gave.

Table 14. ICAP Mode of Engagement – Interactive Student-led Presentations

	<i>Passive Receiving</i>	<i>Active Manipulating</i>	<i>Constructive Generating</i>	<i>Interactive Dialoguing</i>
Students Presenting	Using notes that the teacher gave them	Copy-and-paste from teacher notes or information from texts and documents	<i>Self-explaining</i> and reiterating to their peers	Created questions/discussion for their peers
Students Listening	Sitting and not taking notes	Copy-and-pasting the notes	Writing notes in their own words/way; self-explaining the presentation	<i>Collaborative</i> note-taking in innovative ways

Note. This table demonstrates the use of the ICAP framework to categorize students' learning activities during five sessions of interactive student-led presentations.

3. Teacher's Perspective

The main goal for the teacher of this course was to make her class interactive, so that the students could be motivated to work during class. Before she decided to change her class in 2013, she had the same number of hours for the students: 18 hours of lecture and 14 hours of tutorial work. She felt that during the tutorial work, the students were not interactive at all. She really wanted to motivate the students and by doing that she decided to change her tutorial sessions. She wanted them to oversee their learning and by doing that she wanted to have students create activities for the rest of the class.

The inspiration for changing her class come from attending conferences of people who focused on "innovative" approaches to teaching. One person talked about the flipped classroom approach, which made her think about how she can change her course as well. Another key importance to changing her instructional approach was that the students' grades were not very good. Before the change, 60% of the students were able to pass their course with a passing grade, which meant that 40% didn't have the level and would have issues with psychological research in their future. This course was important for the students who wanted to continue with the master's 2 program because a major part of the program is to be able to do research. Since they will be working in professional settings, they will need to have the skills to read, write and understand research.

Her journey of changing her course in 2012 has changed to what it was in 2016. The first few years, she decided to use the rotation of table approach, where the students would rotate

from table to table and each table would have a specific theme. The role that the students had to take up was that they must write a summary of what they learnt for each table. The last group of students who 'rotated' the tables then had to write a combined summary of all the ideas and information they collected as a group. The summaries were then used as questions for the final exam.

In the following school years after the initial instructional approach, it changed once more before reaching its current form in 2016. The second change, the teacher decided to change the instructional approach to something more game-based, where the students had to invent a game based on their psychological theme. During that school year, the teacher decided that it would become difficult to deal with copyright and games that are already on the market, so she decided to change it again. The next change is where the instructional approach stayed the same, except for some minor tweaks. The idea of having students present as teachers, allowed for the students to do the work necessary to be able to do research and that they oversaw their own learning.

4. Discussion

This study focuses on the importance of interactive student-led presentations, both orally and visually, and the impact it has on student engagement. In this study, students took the role as teacher and presented their given subject to the rest of the class. They presented information by using different mediums: slides, posters, videos etc. In addition to the presentation, they also incorporated an interactive activity that can consist of question-and-answers, group work where they play a game or any other interactive activity that allows them to understand the information that they learnt during the presentations. Another addition to the course was that the students were able to create a scenario by way of video to show the audience what they took from their presentations. It was a way to reinforce their thematical subject that was given to them.

The interactive activities that are done during this course align with the principles of active learning. Active learning is known to have many activities, and the importance of how the activity is implemented (Yannier et al., 2021). Using interactive activities to reinforce learning can be attributed to active learning. Students' participation in class reflects their engagement in active learning and their knowledge (Sarah et al., 2018). The use of question-and-answers activity allowed students to find out the missing information that can be applied to real-world situations, hence, having students understand the information that was given to them (Golman and Loewenstein, 2018). Another implemented activity also involved group work. Group work, chosen as the main learning strategy, has been evident when it comes to active learning (Sajidan and Ashadi, 2021). Another important implantation that was used in this course is how the students who presented sparked debates among the students and teachers. Using debates is a way of thinking that involves discussing difficult topics without a clear right or wrong answer (Hall, 2011). It allows students to resolve their issues and have a deeper analysis for a possible solution (Mumtaz and Latif, 2016). At the end of the school year 2015-2016, the students showcased their videos that reinforced their given topics. Using

videos as another way of enhancing student learning. The use of videos can help raise the students' level of knowledge on given topics (Nascimento et al., 2019).

5. Limitations

Although there were four instruments that indicated that the students were engaged during the interactive student-led presentations, there are some limitations that should be addressed. The first limitation is that the observer didn't attend all of the tutorial session when using the ethnographic method and the BERI. Since the observer didn't attend a lot of the sessions, more attendance during the sessions would be insightful. The second limitation is that the BERI had only been used once in 2016-2017. The number of observations using the BERI for both school years is necessary for a more accurate view.

Chapter 6

Case Study 4

Psychology – Approach to Organizational Change: Inquiry-Based Approach

Case Study 4

Psychology – Approach to Organizational Change: Inquiry-Based Approach

The master's course, Approach to Organizational Change, is a Psychology course that has decided to move toward a more student-centered instructional approach. The approach that the teacher decided to use was student-led presentations and debates/discussions. The student-led presentations were a way for students to gather information as if they were real-life professionals in the field of social psychology. They are acting as if they have been working for some time in the field and are now presenting their work to the class. Student-led presentations have been a beneficial approach to teaching by helping students learn and understand what necessary information is. Having students oversee their presentations (information and presenting it in front of others) gives them the skills to do the research, organize what they found, and gain a clear understanding of what they need to understand is beneficial (Shaw, 2001). Along with the presentations, the students also conduct debates to have the audience engaged in the information that was transmitted to them. The debates/discussions are led by the presenters but the students who were listening are going to use the information that they heard as support to their argument. Debates/discussions is an instructional approach that allows students to work in collaborative group, problem-solve, and improve a learners' level of critical thinking (Fung and Howe, 2014). Although debates/discussions can be beneficial, there can be issues with students who are not quick to respond to the question given (Jonassen & Kim, 2010). Students can feel anxious and not respond to how they really feel.

The Psychology course incorporated student-led presentations and debates/discussions, utilizing both qualitative and quantitative methodologies to analyze insights from both the teacher and the observer. The research question for the observer's perspective was "As an outside observer, how are students engaged and what role does the teacher play in the classroom?" By addressing this question, there are two observation instruments, the Behavioral Engagement Related to Instruction (BERI) (2015) and an ethnographic methodology, that was used. For the teacher's perspective, the research question was "What has influenced the teacher to change their approach to teaching and what student outcome do they perceive?" This will be examined by a semi-structured interview with the teacher.

1. Research Design

This course has 15 hours of classroom time, where students take the role as teachers by presenting information to their classmates. The 15 hours are divided into 5 sessions of 3 hours. The first session is dedicated to teaching, introducing the instructional approach and requirements of the course. The teacher also goes over the necessary elements of the presentation and debates/discussions, also the students will choose their group member and topic. The other four sessions are based on student-led presentations. For each session

(depending on how many students there are), one group of 2 people present and then prompt a discussion with the rest of the class. If there are a lot of students, then they would share the class time in half with another group. The class average is less than 10, so if there is an odd number of students, one student presents by themselves. The sole grade for this course is a critical analysis (written document) based off the research that were done in their presentations (content, classroom exercises, etc.) and debates/discussions.

The presentations are based on topics from real life professional situations related to social psychology. The presentations are designed for the students to dive into what it means to be in the field. The students take on a role and present the issues that they face within their topics. After the presentations, the students prompt debate issues that would arise based on their topics. The audience is then interacting within the role play of the presenters.

This course was observed using the BERI and ethnographic methodology to see the dynamic between the teacher, students and the instructional approaches, student-led presentation and debates/discussions. The BERI was used once with cohort 1, which had six students. The ethnographic method was used in three sessions with cohort 2, which had nine students. Table 15 shows the dates, observation methods and number of students present during the sessions based on the observer's availability.

Table 15. Student-led presentation sessions observed during the school year 2016-2017 and 2017-2018

	BERI	Ethnographic Methodology
2016-2017	31 January 2017 (n=6) 3rd Session (Observed 2 hours)	
2017-2018		17 January 2018 (n=8) 1st session 31 January 2018 (n=9) 3rd session 14 February 2018 (n=9) 5th Session

2. Observer's Perspective

The result of the observation done on 31 Januray 2017, examined the behavioral engagement using the BERI and the ethnographic method on 17 January, 31 January and 14 February 2018. The BERI findings will be displayed in a graph, illustrating the number of students engaged throughout the session from beginning to end. Meanwhile, the ethnographic data will be presented as a narrative, structured using a timeline analysis.

2.1 Behavioral Engagement

The BERI was used as an observational tool to see if students were engaged or disengaged during the student-led presentations and debates. The BERI was used on 31 January 2016 with six students. Figure 22 represents a two-hour session where two students presented their role play to their peers. During the two hours, there were four times where the students were “disengaged” compared to the rest of the time when the students were 100% engaged in the presentation. The first fall from 100% to 80% at 9:21 was due to two out of six of the students that were disengaged because two were on their phones for less than a minute. The second fell from 100% to 83% for eight minutes from 10:13 to 10:16 because one out of six students was on their phone. The third fall from 100% to 83% was for nine minutes because five out of the six students were engaged and one student that was disengaged was on their phone. At 10:52, the students (n=4) were disengaged because the teacher announced that they could start their break and got on their phones.

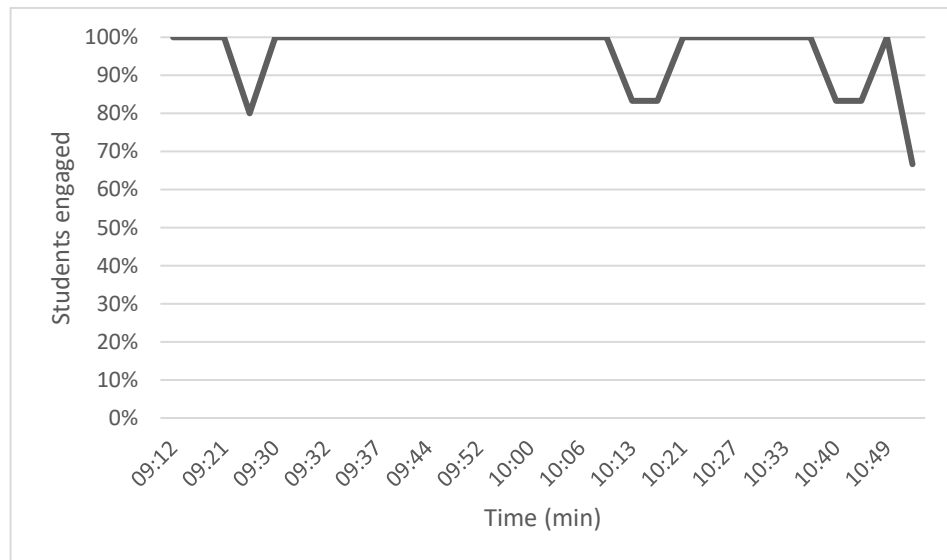


Figure 22. Cohort 1: BERI results for student-led presentations and debates on 31 January 2017

2.2 Timeline Analysis

Cohort 2 used the ethnographic methodology in three sessions. The first session focused on the teacher giving the students all of the information they will need to do their student-led presentations and debates. The other two observed sessions were based on student presentations and debates.

Figure 23 presents a timeline analysis of students engaged and disengaged during the first session of the year. The figure shows there were multiple periods when the students were engaged during the lesson. It also shows that the teacher was engaged with the students and their activities. There were eight counts of student disengagement during the three-hour

session. From those eight points of disengagement, four students (S7, S1, S2, S3) were distracted multiple times because they were playing with their nails, talking to their peers, on their phone or left for the toilet. The two other students (S4 and S6) were disengaged once because they were shuffling through their bag or on their phone.

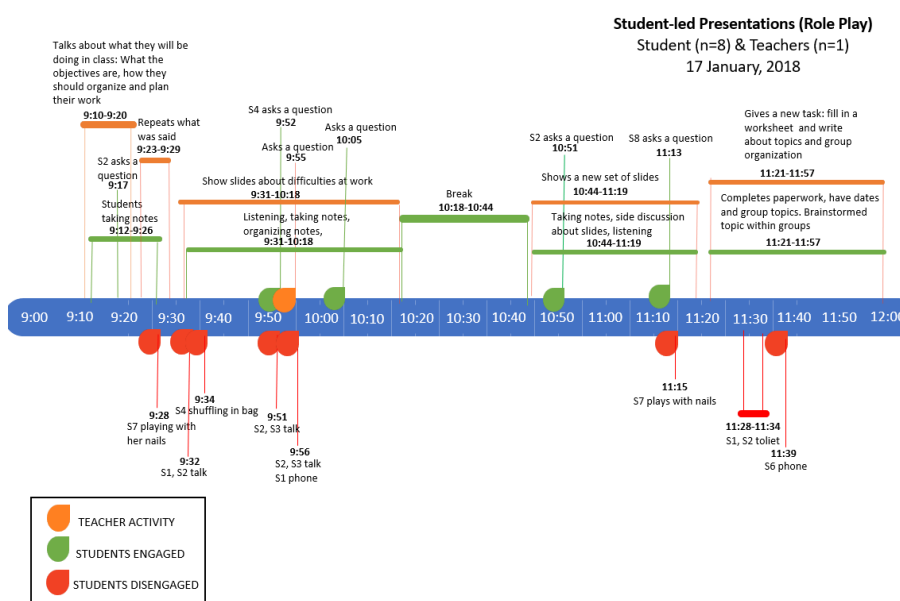


Figure 23. Cohort 2: Timeline analysis of an observation of student-led presentations on 17 January 2018

The second observation session was done using the student-led presentation and debates on 31 January 2018 with nine students. During this session, there were three groups (group1, group4 and group3) that were presented. After each presentation, there were a lot of discussions, questions and feedback from the students and teacher. From 10:46 to 11:50, the students had a lot to say about the information that was on the slides, the roles that they played and questions that they wanted to clarify. This showed the engagement level of the students that presented and the students that were listening.

Figure 24 displays thirteen times when students were disengaged during the session. Of those times, three were longer than one minute long; one was 1 minute (10:09 to 10:11), the second one was six minutes long (11:13 to 11:19) and the last one was four minutes long (11:20 to 11:24). The last two long disengagements were from the same student, S3, and they were on their phone. In fact, S3 had five points of disengagement (9:48, 9:57, 11:02, 11:13-11:19 and 11:20-11:24). There were also other students that had multiple points of disengagement. S9 (n=4), S5 (n=2) and S2 (n=5). These students were disengaged by having their heads down on the desk, talking, on their phones and playing with their nails.

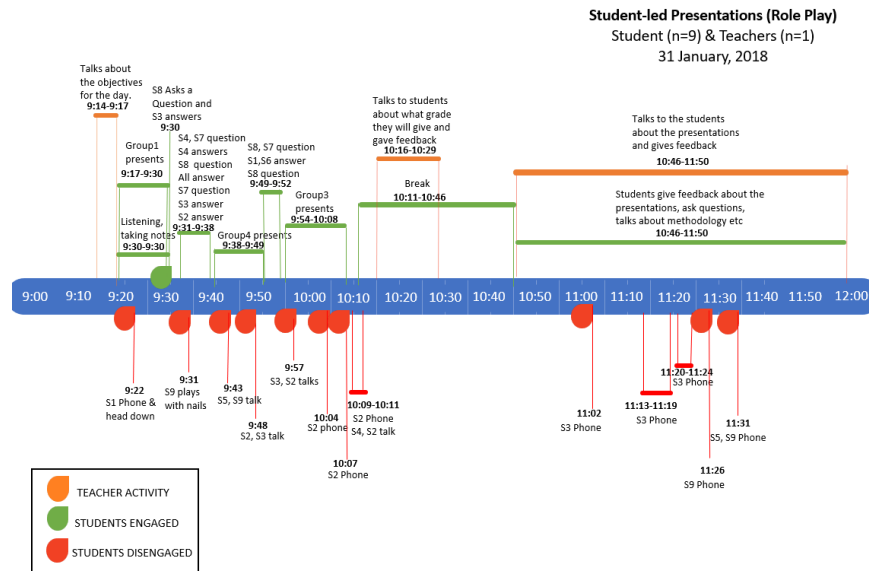


Figure 24. Cohort 2: Timeline analysis of an observation of student-led presentations on 31 January 2018

The third observed session was on 14 February 2018 with nine students present in cohort 2, see figure 25. The observer was not present for the first 45 minutes of the course due to scheduling conflict. Once she arrived, she took notes and went straight into observation mode. There were two groups that presented that day, group 1 and group 3. During the presentations the students were showing engagement in the instructional approach by listening, taking notes and asking questions. The students that were showing signs of disengagement were on social media (n=1), on their phones (n=8), talking to others (n=1), playing games (n=1) and had their heads on their desk (n=1). Out of the eight instances of disengagement due to phone use, three students—S4, S3, and S7—were responsible for multiple occurrences: S4 was disengaged 4 times, S3 twice, and S7 twice.

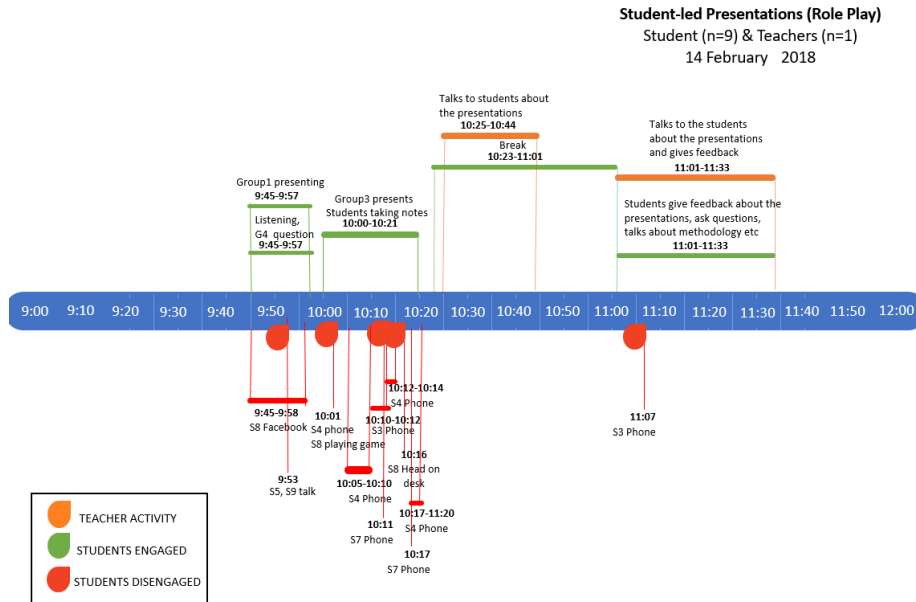


Figure 25. Cohort 2: Timeline analysis of an observation of student-led presentations on 14 February 2018

2.3 Modes of engagement: the ICAP Framework

The ICAP was based off the four observations done in this study (BERI and ethnographic method). The students in the study have varied their modes of engagement from passive to interactive based on the course session. Majority of the students were in the range of active to interactive. Table 16 are some examples of the modes of engagement the students had while doing the activity that was asked of them. During the presentations, those that were presenting stayed in a constructive and interactive mode. Students were not reading what they had written in their slides and were “in their role” when presenting. They also provided a dialogue between them and the students listening, which makes this a mode of interactive during the presentation activity. They are also in the interactive mode during the debates when the presenter and the audience are talking together (in almost the equal amount of time) and incorporating new ideas from what was presented and what the audience brings as their rebuttal of the debate.

Table 16. The ICAP Mode of Engagement – Lectures, Collaborative Writing and Presentations

	Passive <i>Receiving</i>	Active <i>Manipulating</i>	Constructive <i>Generating</i>	Interactive <i>Dialoguing</i>
Students presenting	Using notes the teacher gave them	Copy-and-paste from teacher notes or information from texts and documents	<i>Self-explaining</i> and reiterating to their peers	Created questions/discussion for their peers
Students listening	Sitting and not taking notes	Copy-and-paste notes	Writing notes in their own words/way; <i>Self-explaining</i> the presentation	<i>Collaborative</i> note-taking in innovative ways
Debates	Listen to what others are saying, closely observe what is being said but not contributing in the conversation	Talk about information in their own words, ask for more clarification if needed, verify if information is correct by asking questions, listening to the prompts without saying how they feel out loud	Reflect, monitor and explain one's understanding of the subject, ask questions to compare and contrast information among the group members	Promote discussion with presenters and audience and teacher (verbally), help peers in understanding the subject by introducing new ideas that emerged from the discussions, incorporate feedback and responses from the group

Note. This table demonstrates the use of the ICAP framework to categorize students' learning activities during 4 sessions of student-led presentations and debates.

3. Teacher's Perspective

The semi-structured interview was done on 4 January 2017 with the psychology teacher. During the interview, the teacher explained his course and the learning outcome he would like to have from the students. He also spoke about why he decided to change his course and have the students be more active in the learning process.

The teacher explained that this course was for a specific group of psychology students, who are focusing on the social aspects in companies. Throughout the years he has around ten students per class. Because it is not a big group of students, he wanted the students to be more active and do more amongst their peers. Since this course is about approaches to organizational changes in companies, he wanted to have the students understand what it is like to work in these companies and to visualize the challenges that they face when working with others. The change of instructional approach was geared more towards a real life understanding than a more passive theoretical way of learning. So, he decided that

presentations and debates would be a way to integrate the students into possible situations they would encounter when they finish university.

4. Discussion

The semi-structured interview was done on 4 January 2017 with the psychology teacher. During the interview, the teacher explained his course and the learning outcome he would like to have from the students. He also spoke about why he decided to change his course and have the students be more active in the learning process.

The teacher explained that this course was for a specific group of psychology students, who are focusing on the social aspects in companies. Throughout the years he has around ten students per class. Because it is not a big group of students, he wanted the students to be more active and do more amongst their peers. Since this course is about approaches to organizational changes in companies, he wanted to have the students understand what it is like to work in these companies and to visualize the challenges that they face when working with others. The change of instructional approach was geared more towards a real life understanding than a more passive theoretical way of learning. So, he decided that presentations and debates would be a way to integrate the students into possible situations they would encounter when they finish university.

5. Limitations

The limitations of this study are not observing all of the course sessions, choosing one observation instrument and asking more questions during the interview. The availability of the observer was one of the reasons why all the sessions for both cohorts were not observed. Having the full story of the course would give a better insight into how the students were engaged or disengaged with the instructional approach. The second limitation was that the BERI was only used once with cohort 1 and not again with cohort 2. If the observer stuck to one instrument, then some of the similarities and differences between the two cohorts could have been limited to one collection of data. The last limitation is that the observer didn't ask more direct questions like how long you have been teaching this approach and why did the teacher feel the need to not lecture anymore.

Chapter 7

Case Study 5

Communication and Society: Collaborative-Based Approach

Case Study 5

Communication and Society: Collaborative-Based Approach

Communication and society is a course that is taught at a French university. This course is a part of the Humanities Faculty and is offered in the 3rd year, which is also the last year of the French bachelor's degree. In this course, the students explore communication within society. The teacher chose an instructional approach that combines sessions with both lectures and sessions of collaborative writing. According to the teacher, collaborative writing consists of a group of students working together on a given topic, chosen by the teacher. This writing assignment follows specific criteria that align with the standards for writing an academic paper. Students that participate in collaborative writing could produce better ideas and improve their vocabulary than those who write individually (Storch, 2002). Researchers have seen collaborative writing as an effective instructional approach and recommended teachers use it in their writing courses (Dobao, 2012). The importance of writing collaboratively allows for the common goals that would happen when in a social setting. Group members who work together in writing can also produce discussion, negotiation, meeting common objectives and collaboration (Lowry et al., 2004), other benefits include interaction among students, possible peer feedback, critical thinking and improving writing fluency (Bayat et al., 2022). An important trait of collaborative writing "requires the co-authors to be involved in all stages of the writing process, sharing the responsibilities for the ownership of the entire text produced (Storch, 2019, p.40). This is what distinguishes collaborative versus cooperative writing, where the students divided their roles and work on their sections more individually rather than together.

In addition to the collaborative writing approach, the teacher also has the students present their findings to the class on the last day of the course. The presentation was done with the same group where the students worked together in their collaborative writing assignment. Presentations have been known to be beneficial because they boost critical thinking and communication amongst the group members and the audience (Girand et al., 2011).

The instructional approach, collaborative writing, was carried out using a qualitative and quantitative methodology that comes from the teacher's and non-participant observer's perspective. The research question for the observer's perspective was "As an outside observer, how are students engaged and what role does the teacher play in the classroom? The instruments that were used are the Behavioral Engagement Related to Instruction (BERI) and an ethnographic method of observation. In addition, there is an analytical tool that uses behavioral engagement that was observed to create examples of cognitive engagement based on the ICAP Framework (Interactive, Constructive, Active, Passive). The research question for the teacher's perspective was "What has influenced the teacher to change their approach to teaching and what student outcome do they perceive?" The instruments used for this research question was a semi-structured interview.

1. Research Design

The total number of hours for this course, Communication and Society, was 24 hours. The course is divided into three parts: 15 hours of lecture-based learning, 6 hours of collaborative writing and 3 hours of presentations. The lecture course typically consists of six sessions, each lasting two hours, except for one session of three hours. The collaborative writing sessions are typically done in two sessions, each lasting three hours. The last session of the course was three hours long and was dedicated to student presentations. The presentations must be about five minutes long for each group and after there will be feedback from the teacher. There are two cohorts for this course, cohort 1 consisting of a full class of 59 students and cohort 2 that consisted of about half ($n=21$) of the total number of students for the collaborative writing sessions and 44 students for the presentation session. Cohort 2 was an exceptional year because the students were divided into two for the collaborative writing sessions. The reason why it changed for cohort 2 was because there were no rooms available to accommodate the number of students ($n=60+/-$). The teacher booked two rooms and split the students into two groups. Since there were two rooms, the teacher asked a colleague to stay in one room, while she stayed in the other, and alternated from time to time. This course includes two assessments: the collaborative writing paper as the final exam and a presentation as the midterm exam. To ensure students have accurate information for their papers and presentations, the teacher assigned tasks during lecture sessions. These tasks involved documents that student groups were required to complete, which were then reviewed and corrected in class by both the students and the teacher. There is usually one task per session.

Table 17 presents the dates that were observed and the observation methods that were administered. For cohort 1, the observer was not available to take notes for the collaborative writing sessions and also the presentation sessions. For cohort 2, the observer was not available to observe the lecture-based sessions.

Table 17. Communication and Society Sessions observed (Total 11 hours)

	BERI	Ethnographic Method
Cohort 1 (2016-2017)	18 January – 2 hours ($n=59$) 2nd session - Lecture-based	
Cohort 2 (2017-2018)		21 March – 3 hours ($n=21$) 9th session - Collaborative writing 4 April – 3 hours ($n=14$) 10th session - Collaborative writing 11 April – 3 hours ($n=44$) 11th session – Presentations

2. Observer's Perspective

The observer's perspective is based on the behavioral engagement of the students using the BERI and the ethnographic methodology. The BERI was used once with cohort 1 and the ethnographic method was used three times with cohort 2.

2.1 Behavioral Engagement

There was one observation using the BERI for cohort 1: one lecture-based session (59 students). Figure 26 presents a two-hour lecture-based session on 18 January 2017. There are five peaks (10:15, 10:32, 11:07, 11:30 and 11:50) that occur during the session. The first peak was at the beginning of the session at 10:15. During this time, the teacher was talking about what the students will be doing in class and what assignment she had for them. The second peak was at 10:32. During this time, there was a slow gradual rise from 10:32 to 10:45. At the start of 10:32, the teacher handed back the papers the students had done the class before. She wanted them to go over what they had done and to correct the points she highlighted in the text. At 10:39, she asked the students to go into their groups and finish correcting their papers, which they had done until 10:45. The third rise was at 11:07, when the teacher asked the students a question. The fourth rise from 11:30 to 11:33 was because a student asked a question to the teacher. And the final peak was at 11:50, when the teacher concluded her lecture.

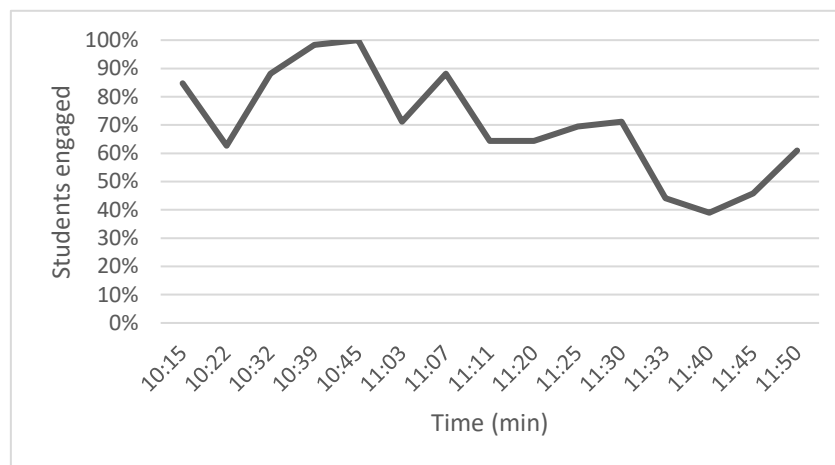


Figure 26. Cohort 1: BERI results during a lecture-based learning approach on 18 January 2017

2.2 Timeline Analysis

The ethnographic method was used three times with cohort 2 during the 2017-2018 school year. There were two sessions of collaborative writing done on 21 March 2018 with 21

students and 4 April 2018 with 14 students. The third ethnographic method was in the last session of the course on 18 April 2018 with 44 students.

The first session of the collaborative writing had five groups with a total of 21 students. Figure 27 illustrates that there were 13 times when students were disengaged by either being on their phones, talking to a classmate, surfing the web or on a social media website. Although student engagement occurred over a period (10:32 to 12:49), there were specific moments when students actively interacted within their groups as well as with the teacher. The students demonstrated engagement by discussing their writing tasks among themselves, asking questions to the teacher, their groups, and the entire class. They also worked on their computers using a shared document, wrote on whiteboards and paper, and searched online for resources to use in their papers. From 11:08 to 12:20, the teacher came into the room and switched with the invited teacher so that the students could ask questions, the teacher could ask questions and see what the students were doing. The thirteen times that the students were considered disengaged, there were certain students that would be disengaged multiple times during the session. There is a total of 14 students that were disengaged for less than a minute each time. Of the 14 students, seven of them (S5, S11, S12, S14, S16, S17, S20) were disengaged more than one time. S14 was disengaged four times because they were on their phone (n=3) and talking to their classmates (n=1). S20 was on their phone twice and on a website that has nothing to do with their writing task. S12 was on their phone (n=2) and was talking to their classmate (n=1). S17 was talking both times and they were disengaged. S11 and S16 both had one time talking to their classmate and one time on their phones.

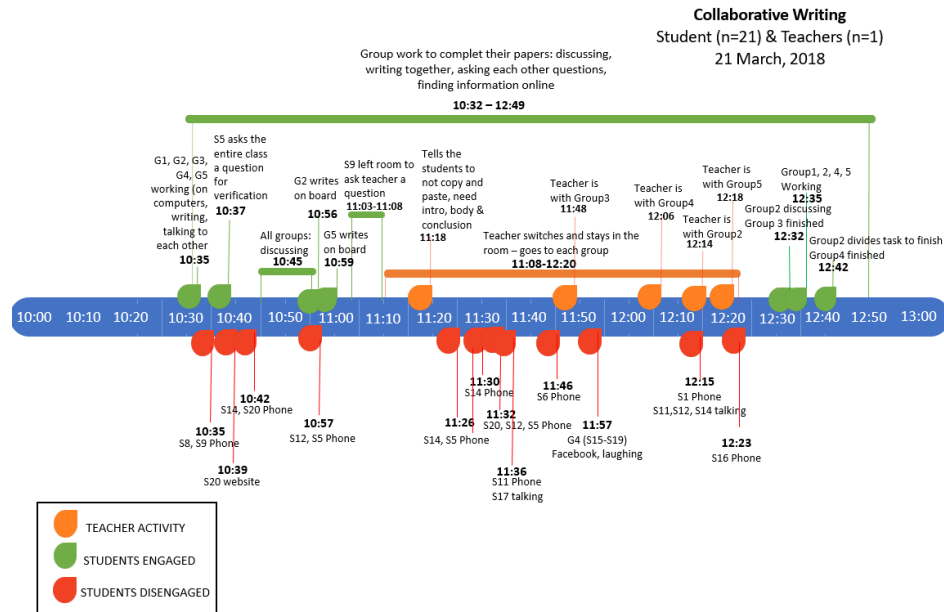


Figure 27. Cohort 2: Timeline analysis of the collaborative writing approach done on 21 March 2018

Figure 28 represents the second (and last) session of collaborative writing on 4 April 2018. During the first 15 minutes of the start of the course, the teacher talked to the students so that they understood what is required of them for them to finish their writing assignment at the end of that session. After the teacher gave her talk, the groups were then divided into two rooms so that they could have the space available to work on their papers. The three groups that were observed were group 5, group 6 and group 7. Majority of the students were engaged during the session from 10:30 to 12:53, except for the nine times when eight students were disengaged. Of the nine points of disengagement, eight of them were less than a minute long when they were on their phones, on their camera, left the room or talking. There was only one instant when a student (S5) was on their phone for five minutes (11:32 to 11:37).

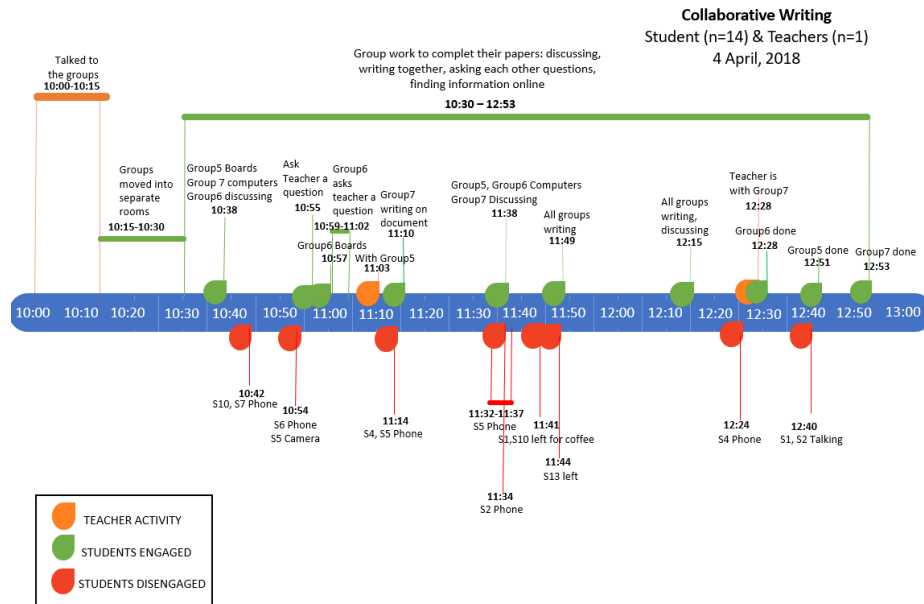


Figure 28. Cohort 2: Timeline analysis of the collaborative writing approach done on 4 April 2018

Figure 29 displays a timeline analysis of students presenting their work to the teacher and their classmates. This session was done on 11 April 2018, which was the last session of the course. On the timeline, the green represents the engagement of the students who presented and those that were listening and taking notes. The orange markers are based on the teacher and the feedback that she gave after each presentation. The feedback also involved discussion and questions that both the teacher and students had. There were seven incidents that involved ten students that were disengaged. Of those ten students, eight of them were disengaged three (S21, S22, S23) to four times (S1, S2, S3, S4, S5) during the class session. They were considered disengaged because they were talking, had their heads on the desk and one student (S21) left the class at 11:58. There were two times when the disengagement was longer than a minute (10:56 to 11:03 and 11:58 to 12:03). The first long disengagement was with student15, who was on his phone for over five minutes long. The second long disengagement was seven minutes long and consisted of over 40 students because they were either talking, on social media or playing games on their phones/computers. During this time, it was noted that the presenters were not prepared and it showed because the rest of the class didn't pay attention and the teacher had to help guide them to finish.

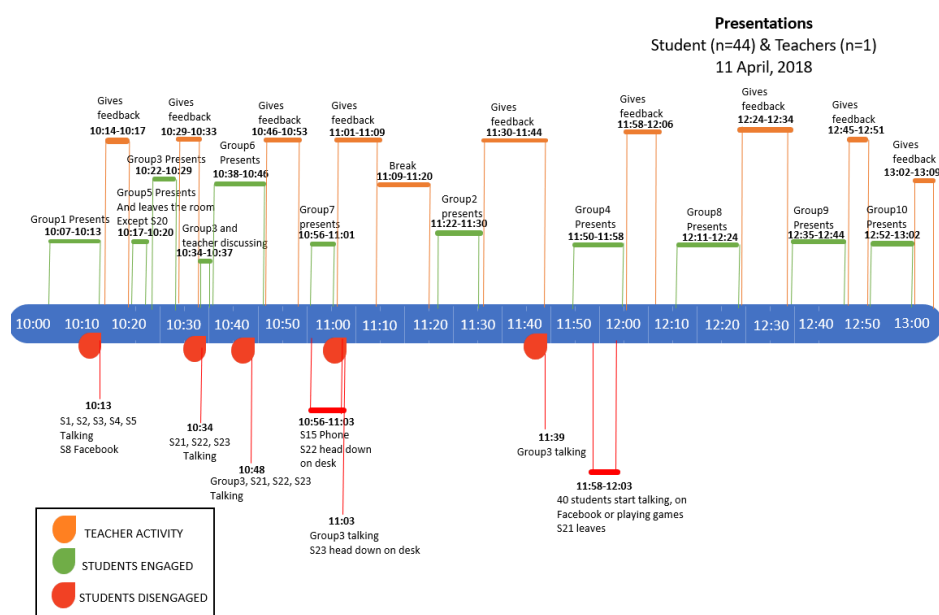


Figure 29. Cohort 2: Timeline analysis of the students' presentations done

2.3 Modes of Engagement: the ICAP Framework

The three instructional approaches (lecture, collaborative writing and student presentations) used for both cohorts have gone through different modes of engagement from passive to interactive. When looking at the timelines that were centered around the collaborative instructional approach in Communication and Society, majority of the time the students that were presenting were mainly in the constructive and interactive mode of engagement. When the students were in their groups and working on their writing assignment, they started off in an active mode of engagement because they were writing on boards, asking for clarification from the teacher and other students about the information that they found, and took notes written in their own words. Once the students were engaged in the active mode, the students moved onto the constructive and interactive modes. Some of the groups that went through the constructive mode were able to express themselves about what they thought and form discussions that can contrast what they discovered in the active mode. Since some of the groups moved to the constructive mode, some groups went straight for the interactive mode, where they were to promote discussion that could help their groups write the essay that they needed for the course. They were also able to create some organizational writing tools (mind-mapping, outlines, etc.) so that they could organize their writing. By being interactively engaged in the collaborative writing approach, students were able to have a critical eye about the information that they found, have a clear organization of the different sections of the writing task and have a written document that showed their own take on their given topic.

The students that were presenting and listening to the presentations fluctuated between an active and interactive mode of engagement (table 18). The students that were presenting their information about their given topics didn't copy-and-paste the information, they were able to "self-explain" what they learnt. Some of the groups were able to move into interactive engagement, which allowed the student to create questions and form discussions about their topic on to the audience and the teacher. Those that were listening to the presentations moved from active to constructive modes of engagement. Some of the students were taking notes and were copying and pasting directly from what was written on the presentations and some of the students were taking what they heard and saw from the presentations and wrote it in their own words.

Table 18. The ICAP Mode of Engagement – Lectures, Collaborative Writing and Presentations

	Passive <i>Receiving</i>	Active <i>Manipulating</i>	Constructive <i>Generating</i>	Interactive <i>Dialoguing</i>
Students presenting	Using notes the teacher gave them	Copy-and-paste from teacher notes or information from texts and documents	<i>Self-explaining</i> and reiterating to their peers	Created questions/discussion for their peers
Students listening	Sitting and not taking notes	Copy-and-paste notes	Writing notes in their own words/way; <i>Self-explaining</i> the presentation	<i>Collaborative</i> note-taking in innovative ways
Collaborative writing	Copy-paste information found. Listen to what others are saying, closely observe what is written.	Write information in their own words, asks for more clarification, verify if information is correct, read what is written on the boards and question it without saying it out loud	Reflect, monitor and explain one's understanding of the subject and then write it in the document, ask questions to compare and contrast information among the group members, generalizing the information obtained Discussion: Explain why their response is correct,	Help group members, promote discussion with group members and teacher, create organizational tools to write about information found Promote discussion with others and teacher (verbally), help peers in understanding the subject, expressing new ideas that emerged from the discussions, incorporate feedback and responses from the

			expressing concerns based on others' responses, write on board to promote discussion, comparing and contrasting what is written on the boards	group, produce a writing piece
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Note. This table demonstrates the use of the ICAP framework to categorize students' learning activities during 4 sessions of lectures, collaborative writing and presentations.

3. Teacher's Perspective

The semi-structured interview with the teacher was done on 16 January 2017 prior to any observations. The purpose of this interview was to understand the structure of the course, the expectations regarding the teacher's approach and the engagement of the students. The research question for the teacher's perspective was why the teacher wanted to change their course from a lecture-based instructional approach to a student-centered instructional approach. Since lectures were still being used, the study also aimed to explore the teacher's reasoning for incorporating a more interactive approach, collaborative writing, to engage the students.

The lecture-based approach that was used in this course has a more interactive element added to the lecture-based sessions. The teacher decided to continue her lecture sessions as a lecture but then add an interactive task in addition to that. The tasks were designed to guide the students so that they would be able to have the information necessary to when they are in their collaborative writing sessions. She struggled to motivate the students during class since it was a mandatory course, and they were required to attend. Another reason she changed her course was the large class size, with over 60 per class. Having the class solely using the lecture approach with a big number of students was very difficult because a lot of the students were often distracted and often not paying attention to the teacher. She also got consultation and guidance from a fellow colleague that works at the university and also belongs to the university's pedagogy group.

In 2016, the teacher decided that she wanted the students to do presentations on given topics so that they can be active in the learning process. Each group had to give a 10 to 15 minute presentation on information that they had found, unfortunately, it didn't work out well. The students that were in the audience weren't paying attention to the students that were presenting. The teacher then decided to keep the presentation process but to limit it to five minutes and give them two sessions of six hours to collaborate and work together to create a written document as well.

4. Discussion

The combination of lectures and collaborative writing in this course provided a balance between delivering extensive information to students and allowing them to process and articulate it in a way similar to the teacher. Having them transmit the information to their peers would allow them to take the role as teacher. Students are taking a lead in their studies which allows them to take part in the learning process and gives them a deep understanding of the topics that they presented and wrote during the course (Girand et al., 2011).

Using the BERI and the ethnographic method as a form of observation showed that the students were engaged when using the student-centered learning activities (group task work during the lectures, collaborative writing and student-led presentations). Group work was an important part of the activities done during the course. The importance of group work allows a group of students to work together to complete a common goal, which in turn helps them learn from each other and have better results (Dobao & Blum, 2013).

The grade consists of a collaborative writing assignment and a student-led presentation. The presentations provide critical thinking and promote discussion among the students (Thor et al., 2017). The students that presented to their peers had a role, which was to facilitate discussion and answer any questions from the teacher and the audience. This provided students with self-confidence (Tuncel, 2015) and empowerment (Marvell, 2008) because they took charge in learning and teaching the students about their topics.

Collaborative writing has many benefits as an instructional approach in higher education. It offers a way for interaction within groups of students who have different ideas and experiences with the subject. It also allows for peer feedback and writing fluency (Bayat et al., 2022). This course had the ability to provide the students with a student-centered instructional approach.

5. Limitations

The limitations of this study involved the inconsistent presences of the observer. For cohort 1 the observer didn't attend the collaborative writing and presentation sessions. For cohort 2 the observer missed the lecture-based sessions. Another limitation for cohort 2 was that the observer was only able to observe half the class and not the class during the collaborative writing sessions. If the teacher was able to have a bigger room, all the students would be together, and the observer would have been able to see all the students work on their collaborative writing assignment.

Chapter 8

Case Study 6

Psychology – Organizational Diagnostics: Prevention and Health: Collaborative-Based Approach

Case Study 6

Psychology – Organizational Diagnostics: Prevention and Health: Collaborative- Based Approach

This course, Psychology – Organizational Diagnostics, focuses on debates/collaborative discussion as a way to engage students in the course. Debates/collaborative discussions used as an instructional approach allow students to voice their opinion and their point of view on given topics. Students can gain scientific knowledge, understand problems when using evidence-based reasoning, and develop critical analytical skills when making decisions (Jonassen & Kim, 2010). The debates/collaborative discussions are led by students who give prior information to the class and then lead them into a discussion on one specific issue that people have in a professional setting. During the discussion, the students collaborate in finding common points that they can agree on. These points are then used to problem solve issues that workers have in their work environment. After the debate/discussion session, the teacher gives feedback on the presentation subjects, the discussion among the students, and his point of view.

Since argumentation skills are not usually taught in schools, teachers face certain challenges when it comes to using debates in their courses (Dawson & Venville, 2010). Using in-class debates during class can be an effective teaching method to enhance students' reasoning skills (Malloy et al., 2020). It allows students to actively participate in the problem-solving process, search for information that is relevant, point out contradictions and gaps in opponents' reasoning, and come up with thoughtful and compelling arguments (Majidi et al., 2021). Although there are positive points, there are also some challenges when it comes to using debates. Debates aren't always taught in schools, so students are not given the proper methods for arguing. One challenge noted was that students find it difficult to argue on certain topics that are too close to what they believe in, i.e. religion, politics, controversial topics (Leith & Baumeister, 1996). An additional challenge involves the ability to identify relevant and credible sources of information (Guo et al., 2023).

1. Research Design

This course, Psychology – Organization diagnostics, used a debate approach to have the students learn the main concepts of the course. This course is taught once a year with a total of 16 hours (two hours per session) of eight sessions. The two first sessions, the teacher lectures and introduces topics and instructional approach to the students. The other six sessions are dedicated to the students, where they would lead the class into a discussion. Each student would prepare an instructional approach based on the debate method, where the audience would need to explain, argue, agree, add information, etc. to get their point across. At the same time, having the student who led the debate/discussion, accountable for the

accurate information said during the session. Each student must pick a topic related to a psychological issue in a workplace setting, which must be given to the teacher in advance before their sessions. With that topic, the students are in charge of understanding all aspects of the subject so that they can lead the discussion with the rest of the class. The first hour (or less) of the session is when the student provides information about their topic to the class so that they can be informed about the subject. The topic doesn't necessarily have to be a presentation; it is up to the students to decide how they want the students to learn about the subject. After the information is presented, the debate/discussion starts and the students work together to have a clear understanding of the issue presented and try to problem solve ways in which the "workers" would be happy. The sole evaluation for this course is a written document from each student that recounts what they did to lead the discussions. The grade consists of all of the elements used during the presentation and discussion, which includes the theme, scientific contributions, contributions from the debates/discussions, and critical analysis of the discussions.

There were two cohorts that were observed for this course. The first cohort had eight students during the 2016-2017 school year, and the second cohort had nine students during the 2017-2018 school year. With cohort 1, an observation method called the BERI was used for one session on 27 February 2017. For cohort 2, the ethnographic method was used three times on 15 January, 5 February and 19 February 2018. Table 19 shows the methods that were used for each cohort and the dates/sessions observed.

Table 19. Psychology – Organization Diagnostics observed (Total 16 hours)

	BERI	Ethnographic Method
Cohort 1 (2016-2017)	27 February 2017 – 2 hours (n=6) 4th session - Debates	
Cohort 2 (2017-2018)		15 January 2018 – 2 hours (n=9) 2nd session – Lecture – Intro to debates 5 February 2018 – 2 hours (n=9) 4th session - Debates 19 February 2018 – 2 hours (n=9) 6th session - Debates

2. Observer's Perspective

The findings for the observer's perspective came from the data collected from the BERI and the ethnographic methodology. The BERI, quantitative method, was used once on 27 February 2017 with cohort 1. The ethnographic method, qualitative method, was used three times (15 January 2018, 5 February 2018 and 19 February 2018) with cohort 2.

2.1 Behavioral Engagement

The BERI was used once for cohort 1 ($n=6$), where the students used the approach, debates. Figure 30 presents a session of two hours (14:12 to 15:54) on 27 February 2017, where six students were engaged for 1 hour and 42 mins, which is majority of the class time. At 15:54, one student was disengaged until the end of the class which was at 16:00. The student was getting ready to leave even though the class wasn't over and the students were still talking.

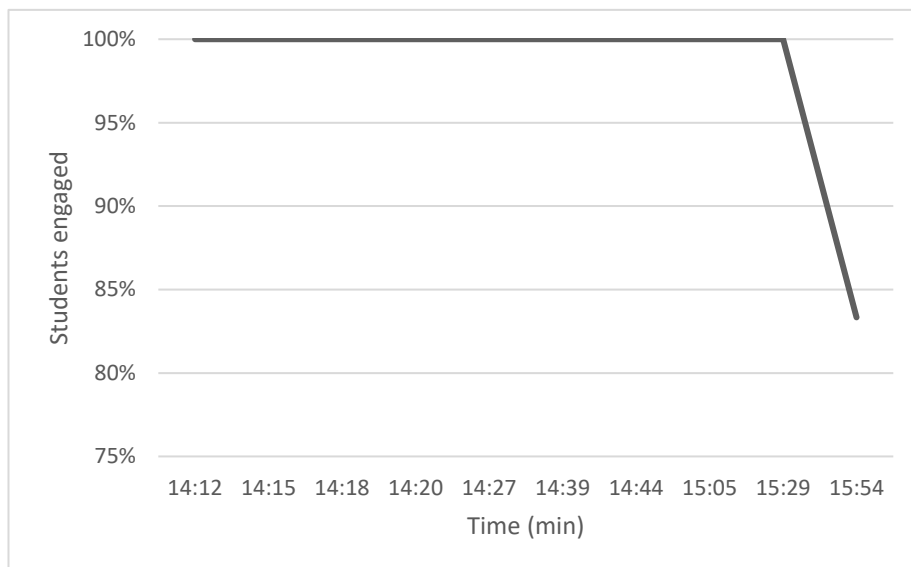


Figure 30. Cohort 1: BERI results during a debate session on 27 February 2017

2.2 Timeline Analysis

There were three sessions (15 January, 5 February and 19 February 2018) that were observed during the 2017-2018 school year using the ethnographic methodology. The first observation was based on a lecture-based approach, where the teacher used examples and information that would help the students when they take their roles as 'teacher.' The students ($n=9$) were asked to simulate a role play scenario so that the students could work on a collaborative activity. The teacher wanted to explain the course structure and requirements. In figure 31 was noted as a lectured observation because the teacher was there to give the information to the students by way of presentation. But the teacher didn't conform to what a

lecture-based approach was because the teacher allowed time for questions and answers during the session and constant interaction from the students. There were 10 instances where there were students that were noted to be disengaged during the two-hour session. From those 10 instances, seven were disengaged because they were on their phones for less than one minute. There were four students that were observed to use their phone: S3(n=1), S6 (n=1), S7 (n=4) and S8 (n=2). The three other times, the students were disengaged talking (n=2) or searching for something in their bag (n=1). All of the times the students were disengaged, all of them were noted to be less than one minute. Otherwise, majority of the time the students were engaged but asking questions, responding to questions, taking notes, engaged in discussion, etc.

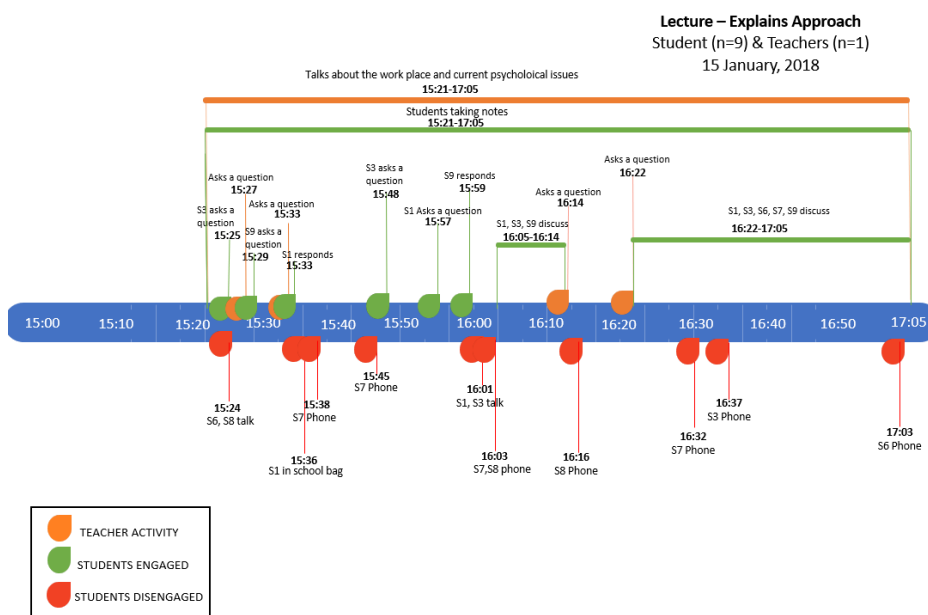


Figure 31. Cohort 2: Ethnographic Methodology results during a 'lecture-based' session on 15 January 2018

In the second observation session, two students were able to conduct debate sessions where the students were able to collaborate and provide clear reasons why their ideas were useful for these two scenarios. Figure 32 represents a timeline of the debate sessions from the start to the finish of the session. The first debate was done by S6. S6 finished their debate in 42 minutes by using slides to facilitate discussion. The first thing S6 did was to divide the class into groups of two, which formed a group of five people in one group and four people in the other group. After the groups were divided, S6 presented some ideas to both groups through slides. S6 gave each group time to look up information and to discuss with their group members before presenting their ideas to the class. After the debates were over, the teacher gave feedback and asked more questions to the presenter and the rest of the students. During the second debate, S7 used video and questions to facilitate discussion.

Their debate lasted 33 minutes long (16:14 to 16:47). The students were in constant discussion and asking questions of each other to have a better understanding of their thoughts. After the second debate, the teacher asked questions and gave feedback about the debate topic and performance.

Based on what is shown on figure 32, one can see that there were only two incidents where three students were disengaged. S3 and S6 were in a discussion for a few minutes that had no reference with the debates or feedback of the teacher. The other incident was when S1 closed their eyes for less than a minute. There were two done just before the class ended.

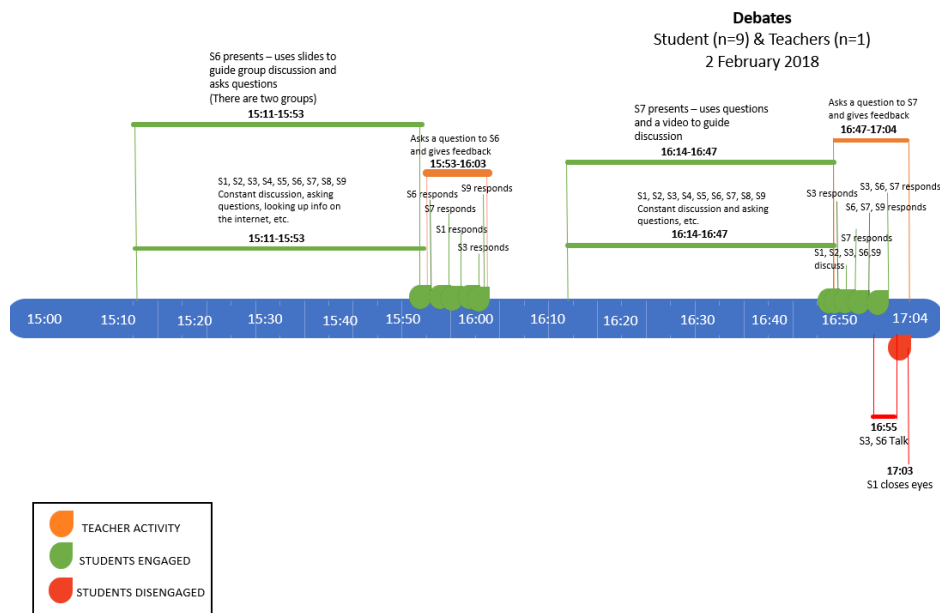


Figure 32. Cohort 2: Ethnographic Methodology results during a collaborative debate session on 2 February 2018

The third observation (figure 33) using the ethnographic methodology was done on 19 January with two students presenting their debates. The first debate lasted 30 mins long and the second lasted 28 minutes long. For both debates, the presenters decided to use slides and video to facilitate discussion among the students. The feedback of S9 was just as long as the debate session, 28 minutes. The teacher had a lot to say and asked the students for feedback as well.

There were six times when students were disengaged. There were three times were students were on their phones. S6 and S7 both were on their phones twice but S6 stayed on their phone for more than a minute, a total of four minutes long. The other two times were done because S3 had their head down for less than a minute and S4 and S6 weren't facing the rest of the class when the class was in a discussion for two minutes. Overall, four of the six times when the students were disengaged was because it was during the time the teacher provided feedback for the presenters and the rest of the class.

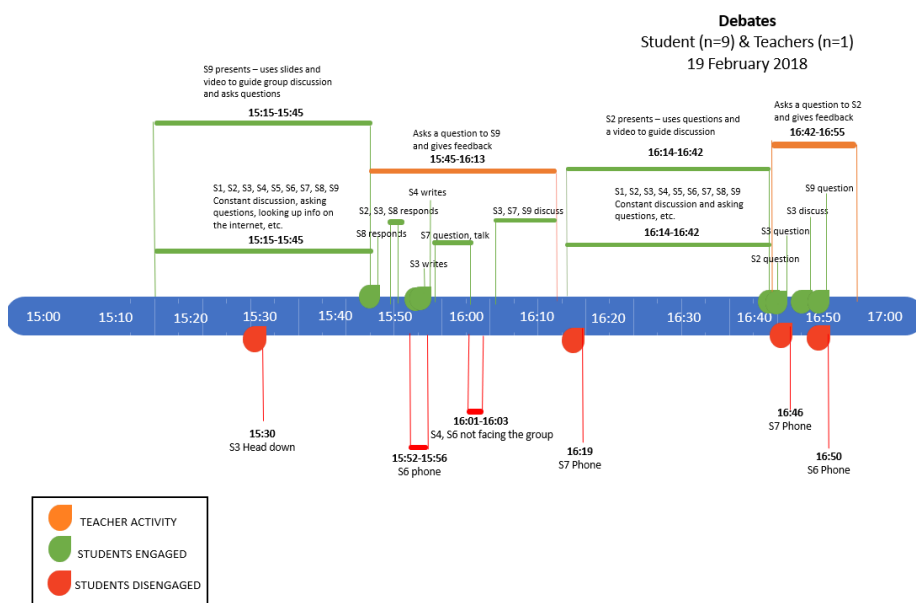


Figure 33. Cohort 2: Ethnographic Methodology results during a 'collaborative debate session on 19 January 2018

2.3 Modes of Engagement: the ICAP Framework

There are two instructional approaches (student presenting and collaborative discussion), where the students were engaged during the observations. The two approaches that were focused on were student-centered approach using debates. During the observation, the students had fallen into all four modes of engagement at different times during the session and in different sessions. 'Students presenting' were dedicated to the students that lead the debates during the session. They were known to have used slides, videos and questions so that the rest of the class could have a discussion and try to have a collaborative response to the debate question given. In figure 20, there were four modes of engagement that ranged from students who were just listening (passive) to students who were questioning their peers and trying to work together, in discussion, to come up with an answer to the debate question (Interactive).

Based on the observation from the timeline analysis, majority of the students were active, constructive and interactive. From the three observation sessions (cohort 1: 27 February 2017; cohort 2: 2 and 19 February 2018) that focused on just the debates, majority of the students were engaged in a constructive and interactive mode. The students that led the presentations were mainly in constructive and interactive mode because they presented information that they had generated and not copied information from documents. They also used other media to help by using videos and photos. They also created a discussion (interactive mode) between the presenter and the students, the students and the students, and the teacher and the students. As for the collaborative discussion among the students listening,

they were mainly in constructive and interactive mode Based on the timeline analysis, there were constant back and forth among the students (discussing and asking questions). There was also constant discussion when the teacher was giving back his feedback to the presenter. The students that were in debate were asking questions or giving responses back to the teacher as well.

Table 20. The ICAP Mode of Engagement – Lectures and debates/collaborative discussions

	Passive <i>Receiving</i>	Active <i>Manipulating</i>	Constructive <i>Generating</i>	Interactive <i>Dialoguing</i>
Students presenting	Using notes the teacher gave them	Copy-and-paste from teacher notes or information from texts and documents	<i>Self-explaining</i> and reiterating to their peers	Created questions/discussion for their peers
Collaborative discussion	Not taking notes, looking up information and not sharing it, listening to what others are saying, closely observe what is written.	Write and talk about information in their own words, asks for more clarification, verify if information is correct, read what is written on the slides and question it without saying it out loud	<i>Self-explaining</i> what they understood from the debate question; reflect, monitor and explain one's understanding of the subject, ask questions to compare and contrast information among the group members, explain why their response is correct, expressing concerns based on others' responses, asks questions to promote discussion	Help group members, promote discussion with group members and teacher, create organizational tools to write about information found Promote discussion with others and teacher (verbally), help peers in understanding the subject, expressing new ideas that emerged from the discussions, incorporate feedback and responses from the group to produce an answer to the debate question

Note. This table demonstrates the use of the ICAP framework to categorize students' learning activities during 3 sessions of lectures and collaborative debates

3. Teacher's Perspective

The semi-structured interview was done on 4 June 2017 with a Psychology teacher from a French university. The research questions that were asked during the interview were based on why the teacher decided to change their course from a lecture-based approach to a student-centered approach and how did they view the engagement of the students during the course.

The use of debates/collaborative discussions was a way for the teacher to have the students research the information and also to have a collective discussion about how they can solve real world issues in the workplace. The teacher had already been interested in the idea of changing his course because he was in contact with others who have also changed their course from lecture-based to student-centered learning. With the help of others and his experience as a teacher, he decided that changing his course to be active was something that would help the students learn about what happens in the workplace. He decided that having an instructional approach that uses debates would have the students work together to solve real world experiences. His objective for the course is to have the students learn about current issues in the workplace and to develop an appropriate professional stance when trying to solve those issues. Using debates as an approach allows students to have a collaborative understanding of a particular subject. Having different perspectives allows students to see what is necessary when solving an issue. Some of the topics that were done in previous years were coworking, the right to disconnect, etc.

Each student must choose a topic that they would like to know more about. With that topic, the students must prepare and collect information so that they can present it to the rest of the class. They need to find a method on how they plan to explain their topic, such as presentations, using images only, giving scenarios, etc. Once they have their topic and method, they then must prepare debate questions/ideas/topics so that they can get different points of view from the other students. The teacher envisioned that this way of working will generate a more collaborative way of problem solving, which engages the students in the activity and have more hands-on approach to learning.

4. Discussion

Using debates as a way of learning offers students different skills in arguing, reasoning, researching and providing thought-provoking responses. Based on the three debate sessions, majority of the students were engaged during the students' presentation and debate/discussion sessions. There was only one debate session, which was on 19 February 2018, when two students were disengaged because one had their head down and the other was on their phone (see figure 4). During those three sessions, some of the students were disengaged when the teacher was giving feedback but not during the student debate part. Even if those students were disengaged, most of them were disengaged for less than a minute at a time. What can be observed is that when the students were engaged, they were in constant discussion with their peers and the teacher. When the students were collaborating, they were gaining skills that promote critical thinking: the ability to think critically, apply scientific understanding, analyze problems using evidence-based approaches, and make well-reasoned

decisions through analytical thinking (Jonassen & Kim, 2010). Some other benefits of debating include being open to diverse perspectives and allowing students to be challenged because of the vast amount of information that is coming from the arguments (Rodger & Stewart-Lord, 2020). Students become quick to respond and question their peers when they agree or disagree with them. This allows students to be versatile in the way they think, react and work together with their classmates. Although it can't always be easy to have everyone agree with what they are saying, the point is to have students practice this concept by way of learning.

The approach of role-play during the debates was beneficial for the students. The students were able to think from the perspective of another persona, which could boost their self-confidence and be challenged by their peers. It pushed them to refine and reshape what they wanted to say so that they had convincing arguments (Chen et al. 2016). And if they had convincing arguments, then the other students would be pushed to see if the argument was in fact true or false. By going through this process, the students are becoming cognitively engaged. This aligns with the suggestion that when students have a positive attitude toward debating, they are more likely to be cognitively invested in the learning process (el Majidi et al., 2018). During role play simulations, students have felt the “power,” as if they have a voice (Rector-Aranda & Raider-Roth, 2015). They can express themselves and their ideas in a place where they know it is accepted by others. The idea of having a safe environment also plays an important role in debates. Having students develop a persona and immerse themselves allows them to have an authentic experimental learning (Sauvé et al., 2010).

This course had nine students, which made their learning experience more intimate and allowed students to discuss without waiting for others to speak. Having a small group of students leaves no time for disengagement because there are so few students to ‘hide’ from the activity. The students were able to speak when necessary and they were cautious of their time by giving others time to speak as well. Effective communication is an important factor in education because in order to gain knowledge, it must be shared effectively by both the teacher and the students (Çelik & Alpan, 2023). Çelik and Alpan (2023) also state that achieve better learning outcomes require students to be engaged (emotional, behavioral and cognitive) in the learning process.

5. Limitations

The limitations for this study include not enough observation time, understanding if role play was an important factor and the use of the ethnographic methodology. Since this study was based on collaborative discussions through debates, it's important to note what was said during the observation sessions using the ethnographic methodology. The wording and argument style could give us a better understanding of how the class collaborated. Another limitation was the use of the BERI. The first observation was done using the BERI, which didn't give us any information about what the students were doing during the debate sessions. Although they were mostly engaged during the session (27 February 2017), the observer didn't know exactly what each student was doing and saying. So that's why the ethnographic

methodology should have been used during all the debate sessions and for both cohorts. The last limitation was integrating role play as an instructional approach. The teacher mentioned that he would like the students to role play people, who are in a work setting, so that they can give their perspectives. Since this approach was focused at the beginning of the study, there was no methodology to measure concerning how role play affects student engagement during the collaborative task.

Chapter 9

Case Study 7

Matrimonial Law: Collaborative-Based Approach

Case Study 7

Matrimonial Law: Collaborative-Based Approach

Matrimonial Law is a course that uses collaborative learning tasks to engage students in learning how to solve real world problems with the law. This course focused on group work where students come together, and problem solve issues. In each session, there was a collaborative task that the teacher sets out so the students can benefit from their classmates' perspectives. This course is taught to first year students at a law faculty in France. The teacher would like students to understand the process that lawyers go through when trying to solve a judicial situation.

Collaborative learning is an active learning method where the key factor is social interaction among students (Hrastinski, 2008). Students who are in an interactive environment function as resources, where students share ideas, discuss with one another, make decisions based on each other's ideas, etc (Strebe, 2018). The group environment allows students to work with one another through discussion and critical thinking exercises. Before each collaborative task, the teacher explained what the students needed to accomplish at the end. The teacher also allowed time for students to ask any questions in case they weren't sure about the task. Collaborative activities allow students to increase their ability to critically think about the subject matter (Garrison et al., 2001). The main importance for the teacher and for the students was to have the students engaged in the activity where they work toward a common goal (Jeong & Hmelo-Silver, 2016).

1. Research Design

This law course focuses on collaborative group activities where students can work together to obtain common outcomes. This course takes place in the second semester for a total of 30 hours (15 sessions of two hours per session). This particular year, the teacher had to change some two-hour sessions to three hours. Two of the three sessions the observer attended were three hours long. The teacher made sure that there was enough time to do the tasks and each part of the instructional approach. The first session (two hours) is dedicated to introducing the collaborative instructional approach and leaving room for questions and answers for the students. The other fourteen sessions are dedicated to different collaborative exercises that allow students to understand the law. Before the second session, the students are given an assigned reading of 15 pages. This allows the students to understand different situations that pertain to the different laws that they are learning. Using this document as a guide could help the students work together and come up with a collaborative response to the teacher's given tasks. The collaborative activities that the teacher had given encouraged students to work together. Some examples of activities are Edward Bono's six hats, using mind-mapping, presentations, debates, using applications such as Wooclap, etc.

The design of each session has three parts: Introduction to the activity (10 minutes), the activity (1 hour 30 minutes) and the discussion (20 minutes). The first part, the introduction, gives the teacher time to explain in detail what the teacher would like the students to do. The second part of the session is the activity. This is where the students work together to accomplish the given task. During this part of the session, students had a lot of discussion and collaborated a lot so they could finish. The last part of the session is the discussion part. It is not just a discussion; it is a time when the students come together as a class and listen to the production of the different groups. Based on the activity, the product can be different but there was always something to share with the whole class. In this study, groups presented their work verbally, shared a poster and provided online documents.

There were two instruments that were used during this study: an observational tool and semi-structured interview. The interview was conducted before the beginning of the course and the observational tool, BERI, was done three times during the school year 2017-2018. The observer went to observe three sessions during the semester, see table 21. There were 62 students on 25 September 2017, where the students did the six hats method. There were 14 groups that had three to six students in each group. The second observation was on 9 November 2017, where 47 students attended the session. The class was divided into eight groups of six to seven students in each group. The teacher used debates as an instructional approach. The last observation date was on 4 December 2017 with 27 students in attendance. There were five groups of three to seven students in each group. During this course, the students were asked to connect to Wooclap and be ready to answer questions that would be projected from the whiteboard.

Table 21. Matrimonial Law Sessions – observed during the 2017-2018 school year

	Collaborative learning
BERI	- 25 September 2017 (2 hours) (n=62) 2nd session – Six Hats (14 groups of 4-6 students) - 9 November 2017 (3 hours) (n=47) 7th session – Debates (8 groups of 6-7 students) - 4 December 2017 (3 hours) (n=27) 15th session – Wooclap (5 groups of 3-7 students)

2. Observer's Perspective

There were three sessions that were observed using the BERI. In these three sessions, the observer used Lane and Harris's (2015) guide to see engaged and disengaged students.

2.1 Behavioral Engagement

The first observation using the BERI was made on 25 September 2017 with 62 students present, where the teacher used the six hats activity to foster engagement. The teacher chose

to use the six hats because she wanted the students to have different mindsets when finding a solution to a problem. Figure 34 presents the group activity and the discussion done at the end of the sessions. There were no observations made during the first part of the session, which was a lecture given by the teacher and was followed by groups (14 groups of three to six people). The lecture was given from 14:00 to 14:22 and after the lecture, the teacher told the students that they are allowed to go on a break from 14:22 to 14:39. By the time all of the students were back in class and working in their groups, it was 14:42. They worked on their collaborative activity until 15:27. They then ended the class with presentations, where each group presented their solution and then other groups had a discussion about each presentation. That lasted from 15:35 to 15:53.

There were three major declines of engagement during the activity and discussion part of the session. The first drop was made at 15:09, where 77% of the students (47 out of 62) were engaged in the activity. The second drop was done at 15:23, The drop went to 60% engaged students. The students were disengaged because most of the groups were finished with their group task. The activity part of the session finished at 15:27, which was five minutes after the big drop of engaged students. The third drop of the session was at 15:51, which was near the end of the class. The class ended at 15:53. The decline in students engaged went from 85 % of students engaged at 15:45 to 61 % students engaged at 15:51.

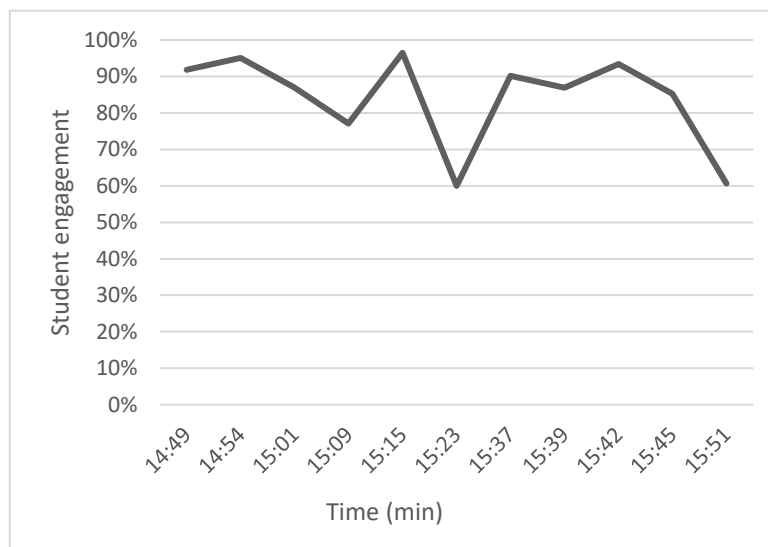


Figure 34. BERI results for a collaborative group session on 25 September 2017

Figure 35 shows the second observation session that used debates as a collaborative activity among the 47 students. The teacher gave instructions from 13:00 to 13:23. Afterwards, the teacher divided the class into groups of eight that had about five to seven students in each group. The students had 30 minutes to prepare three open-ended questions that would spark a debate among the other groups. At 13:56, one question was given to each group, and they had to answer the question in a presentation form to the rest of the class. They had to explain why their answer is relevant to the question given in 45 minutes. The teacher announced that there was a break from 14:21 to 14:39.

There were five drops in engagement during the three-hour course. The biggest drop started at 14:17 and steadily went down at 14:51. It then went back up from 50% to 70% (24 to 33 students engaged out of 47 total students) but then went back down to 40% (19 out of 47 students engaged) at 15:08. The third drop started at 15:08 to 15:16, which showed that 30% of students were engaged (14 out of 47 students). The engagement level then rose up to 70% at 15:25 but then back down to the fourth drop at 15:34 at 40% engaged students. The last drop was at the end of class when 90% of the students were engaged to 60%. There were two activities where majority of the students were disengaged: the 45 minutes to prepare the presentation and during the presentation. From 13:56 to 14:39, the students had to prepare their presentations for the debate question. From 14:39 to 15:46 the groups presented their presentations. During the presentations, the percentage of students that were engaged ranged from 30% to 90% and most of the students were disengaged.

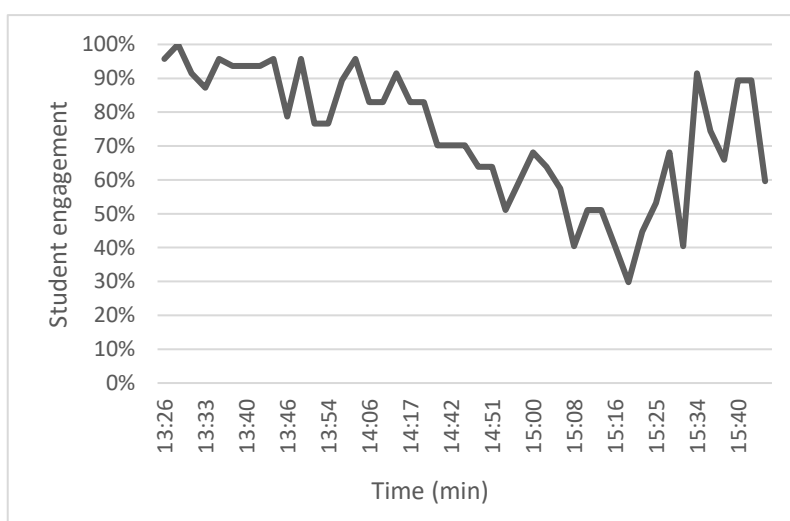


Figure 35. BERI results for a collaborative group session on 9 November 2017

The third observation for this course was done on 4 December 2017 with 27 students in attendance. There were five groups of three to seven students in each group. The collaborative activity that was done that day was based on an interactive learning platform called Wooclap. The interactive activity the teacher prepared was done using the presentation form with multiple-choice questions and voting system. The teacher delivered a presentation, and after

each slide, students were required to connect to the website to respond to the questions provided.

In figure 36, there was a steady rise and fall from the start to the end of the activity (13:12 to 15:20). Throughout the activity, there was no decline that surpassed the 50% engagement of students. There was one time (14:07) when the percentage of engaged students was at 58%, this being the lowest. There were four declines that were between 60 to 70% of engaged students: 14:39 (67%), 14:57 (67%), 15:09 (67%) and 15:14 (63%).

2.2 Modes of Engagement: the ICAP Framework

The use of this collaborative learning approach has helped our understanding of cognitive engagement through the ICAP Framework, which was observed during the observations of the students' behavioral engagement. Table 22 presents the different modes of engagement based on the framework given by Chi and Wylie (2014) and the instructional approach, collaborative learning.

In this study, the ICAP mode of engagement are illustrated through examples taken from the collaborative learning instructional approach, which is based on the behavioral engagement observed during the sessions. There were three key components that were notably visible and are in line with collaborative learning: student discussion, group work and group task completion. With these three examples, there are four modes of engagement that the students have gone through during the course. Students have a transition from passive to interactive throughout the session and throughout the course. When the students were doing the Wooclap activity, the students were moving from passive to interactive within seconds because they were often listening to the presentation so that they could answer the questions directly afterward. Once they were given the question part of the presentation, the students worked together in an interactive mode because they were often discussing which answer they wanted to give as a group. In figure 36, the movement from students who were engaged and disengaged were steadily up and down throughout the activity. Some students who initially appeared disengaged while listening to the presentation became engaged a few minutes later as they actively contributed to group work, demonstrating behaviors ranging from active to interactive modes of engagement.

Table 22. The ICAP Mode of Engagement – Collaborative Learning Tasks

	<i>Passive Receiving</i>	<i>Active Manipulating</i>	<i>Constructive Generating</i>	<i>Interactive Dialoguing</i>
Student Discussion	Listening silently to the group	Responding with short phrases or agreement	Sharing thoughts or connecting ideas to new information	Co-constructing knowledge through dialogue, questioning, and reasoning
Group Work	Sitting in the group but not contributing	Doing a specific task (e.g., typing) without input into the thinking	Suggesting ideas or solutions during group task	Building ideas together through back-and-forth discussion
Group Task Completion	Watching others solve the problem	Contributing small amounts of work	Proposing original approaches or justifying choices	Negotiating strategies, debating approaches, and reaching consensus

3. Teacher's Perspective

The teacher's perspective is based on a semi-structured interview taken on 9 January 2017. This interview was conducted to understand the reasons why the teacher decided to change her course from a lecture-based learning environment to a student-centered learning environment. The questions asked were focused on what instructional approach was used (in detail) and what did the teacher expected from that approach. The instructional approach used was focused on collaborative learning. The teacher wanted the students to work in groups and collectively come up with a solution to a given problem. Having them work in groups allows them to interact with their peers and have different viewpoints on certain subjects.

The activities done during each session were all done to guide students to come up with a solution to each problem. Each session of the course had a different collaborative task, such as the six hats, using a platform called Wooclap, debates, using tools such as mind-mapping, etc. She decided to change her instructional approach because she noticed that the students didn't want to sit and take notes anymore. She saw that students were not coming to class anymore because if they wanted to get the notes from the lesson, the students could easily copy it from their classmates. She wanted to change and find a more interactive way of learning. Through interaction with their classmates, the students can hear all different points of view and work together to come up with one agreed solution. She wanted the students to

work in groups so they can “actively” work and discuss together, which would make them more motivated to come to class. There were times when the students would have to read a text before the session so that they could come to class prepared with facts that could help the groups find a solution. In the beginning of each session, the teacher would give a short lecture and clear instructions on what the activity tasks were and what the students needed to do to finish each task.

Another reason why she wanted to restructure her course was because she saw the shift from the lecture-based learning environment to a more active learning environment. The law department wanted their students to focus on real world situations and less on just theory-based courses. There were teachers that were promoting different environments of learning, and she felt that she wanted to be a team player in her department and try out a non-lecture-based instructional approach. She also joined a community, Laboratoire d’Innovation Pédagogique (LIP), in the university, where teachers help each other transition from lecture-based environments to other forms of learning environments. This community had workshops and meetings to address different topics of teaching and learning and the space and guidance of fellow teachers, who shared their experiences.

4. Discussion

Collaborative learning tasks helped students in fulfilling their objective, to find a solution to the shared problem that was provided by the teacher. Although there were times when students were not engaged in the learning, there was still a majority (more than 50%) that were engaged most of the time. The known times when the students were not engaged in the learning task were when groups finished their tasks before the rest of the class, when the students had to listen to presentations and when it was near the end of the session. Otherwise, there were only three times when the students were less than 50 % engaged in all the sessions observed (9 November). During the three times, the disengagement lasted no longer than 10 minutes before the percentage rose above the 50% line.

The importance of this instructional approach is that the students were able to collaborate with each other and finish their tasks with the shared goal of finding a solution to the tasks that were given. Since majority of the students were engaged in the majority of the sessions observed, the students were able to have an interaction among themselves in their groups where they were able to come to a solution. An important part of this course was the use of collaborative learning based on the teacher’s choice to change their instructional approach. One point is that collaborative learning would encourage students to have peer interaction, which means that students were able to “exchange information, share knowledge, and discuss among group members” (Qureshi et al., 2023, p. 2382). According to Fu et al. (2009), if there was social presence from the students within the working group, then students would be more motivated to learn and to put effort when solving the task. The law students in this study always finished their group work task and finished it within the time frame given. During the observations, the motivation could be seen by how the students worked to finish each task during each session. When students put effort into their tasks, i.e. develop content, and group

effort, i.e. student participation and interaction, then students are engaged in their learning (Lee, 2014; (Qureshi et al., 2023). When students are in a collaborative learning environment, students have an increase in critical thinking skills (Garrison et al., 2001). Having critical thinking skills gives the students the ability to analyze and assess problems that are given to them, which students can use in their studies and also in their future job.

5. Limitations

This study had a few limitations. This is the only study that only used a quantitative methodology, the BERI. The other studies had both a quantitative and qualitative method for observing behavioral engagement. Having a qualitative method could give us more details about the interaction with the students and the students and the teacher. With a qualitative method, we could have had a more in-depth idea of what happened in each session. Since each collaborative task was different, we could have understood the key components that made the session collaborative. Another limitation was that this study was observed for three sessions over one year. If there were more sessions and another year observed, there would be more data that could be analyzed to understand the instructional approach more.

Chapter 10

Case Study 8

Insolvency and Bankruptcy Business Law: Collaborative-Based Approach

Case Study 8

Insolvency and Bankruptcy Business Law: Collaborative-Based Approach

Insolvency and Bankruptcy Business Law is a course that is taught by using case studies and collaborative mind-mapping. The use of mind-mapping allows students to organize their thoughts and gives them a clear path to how they would like to solve their case studies. Bandura (1982) posits that students are more motivated to complete their learning goals and complete difficult tasks, when students could be involved in the collaborative process by observing the group's ideas and participating in discussion. The teacher's decision to change her course from lecture-based to student-centered was centered around the use of mind-mapping and collaboration.

Mind-mapping is a diagram that shows the main ideas of a topic and then branches off into sub-ideas. There is usually one main idea (circled) at the center of the page. There are then other subjects that are branched from the main idea. The branches are related to the main topic in different ways and come be branched out again into sub-topics. This way of group work allows students to improve learning and shows a clear-thinking process for the development (Buzan, 1997). Collaborative mind-mapping allows the group members to make decisions on the same mind-map by adding, editing, and deleting different ideas. There have been positive effects of mind-mapping in different studies (D'Antoni et al., 2010.) Mind mapping offers a way to illustrate students' cognitive processes, including how they comprehend material, organize concepts, and put knowledge into practice (Somers et al., 2014). It also allows students to design and organize their ideas and also highlights how current concepts relate to one another (Liu et al., 2018). Through the design of their mind-mapping, students are able to be more creative and productive when learning because it encourages open thinking (Nabilla, 2022).

1. Research Design

For this course, there were seven three-hour sessions that totaled 21 hours of class time. This course was only taught during the second semester to Master students in their second year of studies. During the three-hour sessions, the students worked together in groups of four to five. The groups were assigned by the teacher and always changed the group members for each session. She wanted the students to work with different students each time they had class. Each session was dedicated to using mind-mapping as a tool to engage students to collaborate in finding a solution to the problem. During the sessions, the groups are given a case study, where they have to collaborate and find a solution, which incorporates the laws involved. In the beginning of each session, the teacher gives a short lecture (using slides). If the information given is not clear, the teacher will continue to give more examples and information, so the students understand how to solve the case study. The teacher gives the same case study topics to two groups, so that each topic is being analyzed by two different

groups. The teacher incorporated the use of mind-mapping so that the teacher could visually see the paths that the students are taking in solving their case study. After the students finish their mind-maps, they give it to the teacher and she gives written comments, which she gives back the following session. This allows the teacher and students to know if they are on the right track. If they were not on the right track, the students can consult the teacher for guidance. The assessment for this course consists of the final exam.

The cohorts that were observed using the ethnographic method during the 2015-2016 and 2017-2018 school year. Cohort 1 had two observation dates 14 January 2016 (n=29) and 21 January 2016 (n=30), and cohort 2 had four observation dates: 19 January 2018 (n=21), 29 January 2018 (n=24), 9 February 2018 (n=24) and 19 February 2018 (n=23), see table 23.

Table 23. Insolvency and Bankruptcy Business Law (Total 21 hours)

	Ethnographic Methodology
Cohort 1 (2015-2016)	• 14 January 2016 – 3 hours (n=29) 2nd session – Mind-mapping • 21 January 2016 – 3 hours (n=30) 3rd session – Mind-mapping
Cohort 2 (2017-2018)	• 19 January 2018 – 3 hours (n=21) 1st session – Mind-mapping • 29 January 2018 – 3 hours (n=24) 3rd session – Mind-mapping • 9 February 2018 – 3 hours (n=24) 4th session – Mind-mapping • 19 February 2018 – 3 hours (n=23) 6th session – Mind-mapping

2. Observer's Perspective

The observer's perspective is based on students' behavioral engagement, analyzed using the ethnographic methodology with cohort 1 and cohort 2. Cohort 1 was observed in three sessions, while cohort 2 had four sessions. The findings were derived from the observer's notes, which were then organized into a timeline.

2.1 Timeline Analysis

The timeline analysis was used to show the results of the ethnographic methodology. There were six sessions that were observed. Two sessions were with cohort 1 and four sessions were with cohort 2. All six of the sessions focused on the behavioral engagement of the students when using mind-mapping as a collaborative approach to learning.

Figure 36 and figure 37 are timelines that observed cohort 1. As the first session of the semester, figure 36 shows that there are no students that were disengaged. For the first fourteen minutes (14:00 to 14:14) of the session, the teacher assigned members for each group and a case study. From 14:14 to 16:38, the students used mind-mapping as a way to find a solution to their given case studies. After the break from 16:38 to 16:43, the teacher went over the group's mind-maps.

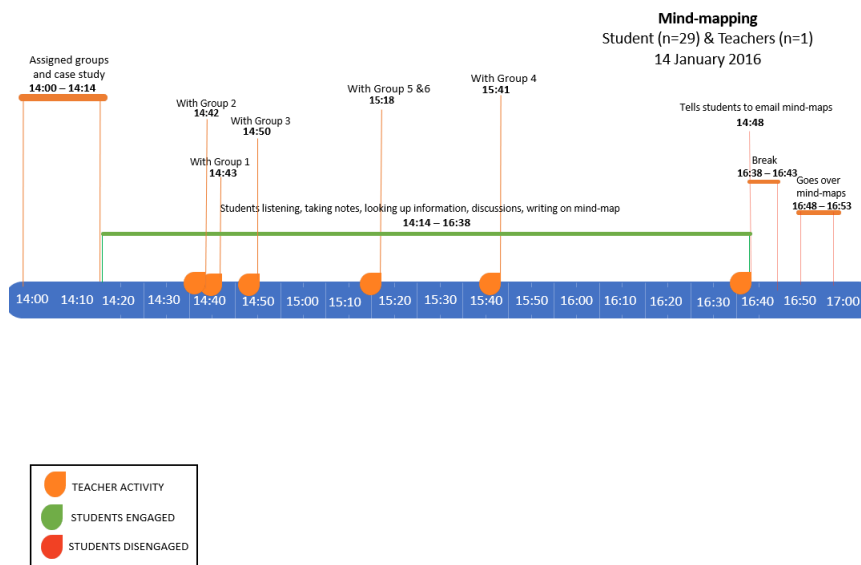


Figure 36. Cohort 1: Timeline analysis of an observation of mind-mapping on 14 January 2016

Figure 37 was done on 21 January 2016 with cohort 1. The observer wasn't available for the first hour and fifty-five minutes of the session (14:00 – 15:55). The hours observed was for one hour and five minutes (15:55 – 17:00). During that time, all the students were engaged except for six incidents (15:57, 16:07, 16:20, 16:29, 16:32, 16:36). For each of those six incidents, the disengagement didn't last more than one minute. There is one student, S3, that was disengaged three times during the observation (15:57, 16:07, 16:32), they were either talking (n=2) or not focused on the activity. Two other students that were also disengaged twice (16:29, 16:32) were S1 and S2 because of talking. During the session, the teacher was with the students five times, one of them lasting ten minutes (16:29 to 16:39) with group 4 and the other four times were under a minute.

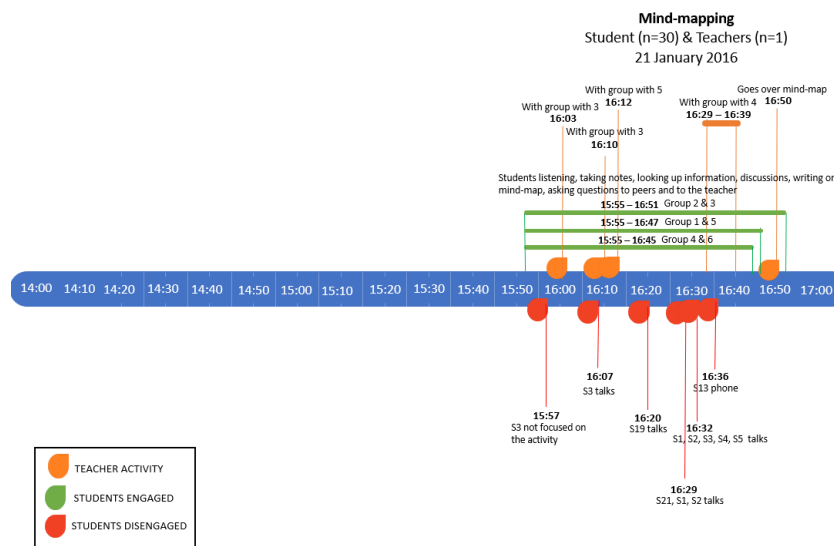


Figure 37. Cohort 1: Timeline analysis of an observation of mind-mapping on 21 January 2016

There were four observation sessions with cohort 2. The first observation session (figure 38) of three hours had fifteen times when the students were disengaged, fourteen were less than a minute and one was five minutes. Of the fifteen times, a student (S19) was disengaged five times by being on their phone, another student (S13) on their phone three times and nine students (S10, S14, S17, S18, S12, S2, S6, S23, S7) disengaged because they were on their phones and one student that had their head on their desk (S16). While the students were working in their groups, the teacher went around the room nineteen times asking questions, checking mind-maps and answering questions.

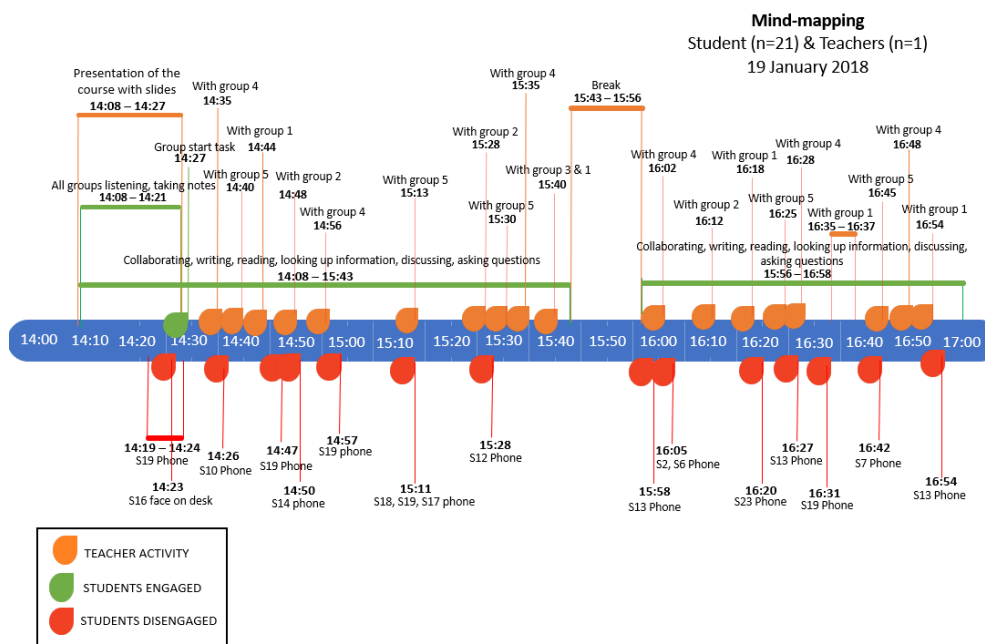


Figure 38. Cohort 2: Timeline analysis of an observation of mind-mapping on 19 January 2018

The second observation session using mind-mapping was on 29 January 2018 with 24 students (figure 39). There were 19 times when the students were disengaged. They were noted to be on their phones (n=9) or playing with their hair and not making eye contact with the others (n=1). During the first part of the class when the teacher goes over the importance of the case studies and talks about some laws that could be used, there were ten times when the students were disengaged. The number of students that were disengaged were more than when the students were collaborating and doing the mind-maps (n=8). The eight times when the students were disengaged, there were four students that were on their phones. S15 was on their phone three times, S22 and S1 were on their phones once. For the 19 times of disengagement, there was only one time that is was more than a minute and that was for three minutes (9:12 to 9:15). The teacher went to talk to the different groups twenty-four times during the collaborative activity.

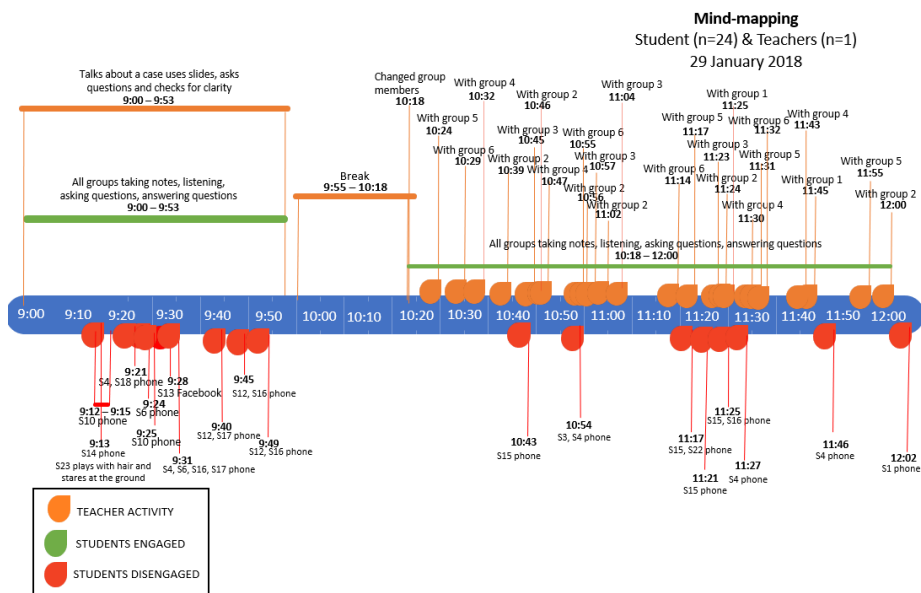


Figure 39. Cohort 2: Timeline analysis of an observation of mind-mapping on 29 January 2018

The third observation with cohort 2 (see figure 40) presented eight students that were disengaged over 17 times during the session. Of those 17 times, 15 of them were disengaged when the teacher was talking from 14:05 to 16:05. The other two times were during collaborative mind-mapping, which was 53 minutes until the class ended. There were three students that were on their phones more than one time during the session. S14 was disengaged twelve times, S20 was disengaged two times and S4 was disengaged two times. The students were on their phones for less than a minute, except for four times (14:20 – 14:23, 14:50 – 14:54, 15:06 – 15:08 and 15:39 – 15:42). The teacher went to different groups seven times during the collaborative task.

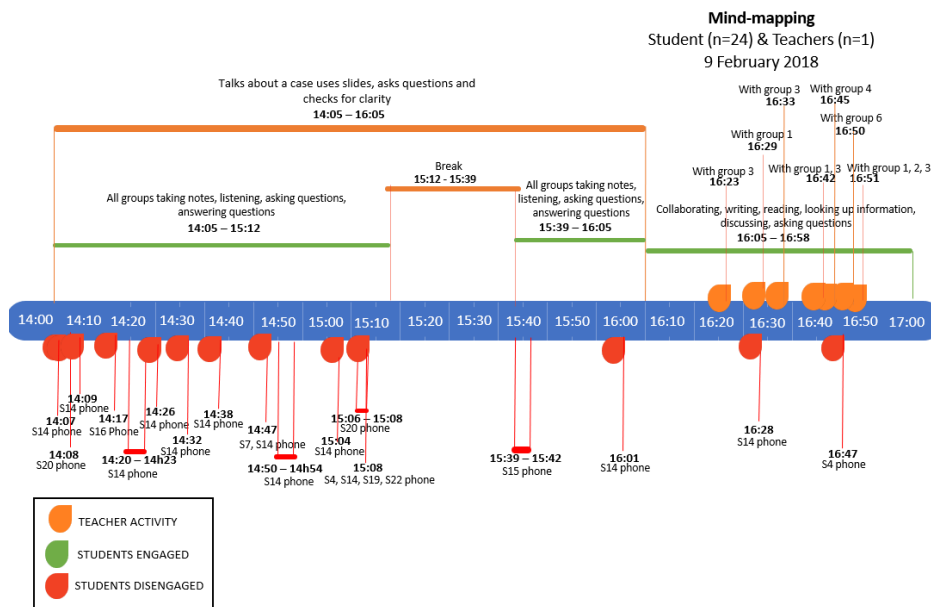


Figure 40. Cohort 2: Timeline analysis of an observation of mind-mapping on 9 February 2018

The last observation session was on 19 February 2018 (figure 41) with five disengaged students. The five disengaged students were known to be on their phone, on Facebook or their computer and talking to each other about something non-related to their given topics. Four students (S1, S5, S4 and S18) were either on their phones or computer, whereas during one time, the group of students (group 5) were talking together. During the collaborative mind-mapping task, the teacher walked around the room and spoke with different groups (n=9).

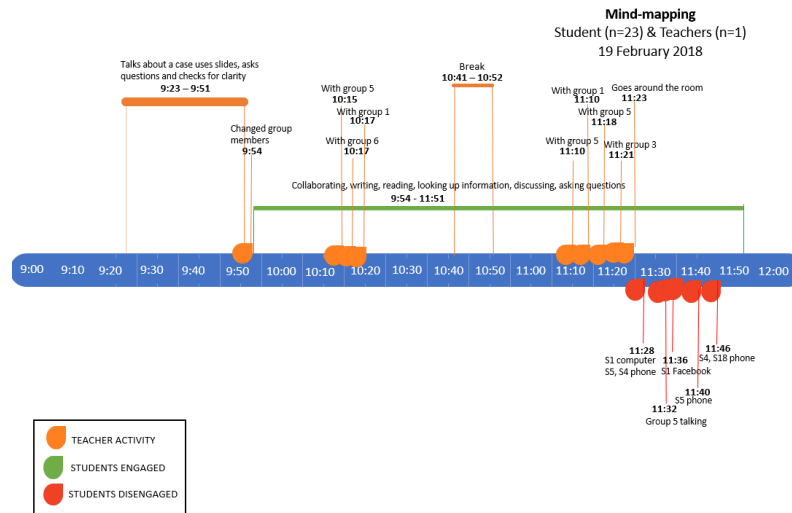


Figure 41. Cohort 2: Timeline analysis of an observation of mind-mapping on 19 February 2018

2.2 Modes of Engagement: the ICAP Framework

Using the ethnographic method that analyses the behavioral engagement of students, the ICAP framework evaluates the four modes (passive, active, constructive, or interactive) of student engagement in the classroom. The four modes focused on the collaborative activity that used mind-mapping and the reaction of students when the teacher is lecturing. As a guide, table 24, displays the engagement of the student in the different modes from passive to interactive. The students usually go through different modes during the length of the session. They are often active and constructive during the lectures, since most of the students that are displayed as ‘disengaged’ during the session was during the lectures. They were usually on their phones. The students were mostly constructive and interactive during the collaborative mind-mapping activity because the level of engagement was higher with less ‘disengaged’ students noted in the timelines.

Table 24. The ICAP Mode of Engagement – Listening during the lecture and collaboration using Mind-mapping

	Passive <i>Receiving</i>	Active <i>Manipulating</i>	Constructive <i>Generating</i>	Interactive <i>Dialoguing</i>
Students listening during the lecture	Sitting and not taking notes	Copy-and-paste notes	Writing notes in their own words/way; <i>Self-explaining</i> the presentation	<i>Collaborative</i> note-taking in innovative ways
Collaborative Mind-mapping	Not taking notes, looking up information and not sharing it, listening to what others are saying, closely observe what is written.	Write and talk about information in their own words, asks for more clarification, verify if information is correct, read what is written on the slides and question it without saying it out loud	<i>Self-explaining</i> what they understood from the debate question; reflect, monitor and explain one's understanding of the subject, ask questions to compare and contrast information among the group members, explain why their response is correct, expressing concerns based on others' responses, asks questions to promote discussion	Help group members, promote discussion with group members and teacher, create organizational tools to write about information found Promote discussion with others and teacher (verbally), help peers in understanding the subject, expressing new ideas that emerged from the discussions, incorporate feedback and responses from the group to produce an answer to the debate question

3. Teacher's Perspective

The teacher wanted to change her course and make it more interactive. She felt that the course was too dense and contained too much information for the students to learn. To address this, she decided to incorporate mind-mapping as a tool, allowing students to collaborate and develop solutions to each case study.

There were two main reasons for this change: to make the course more interactive and to redesign it with the support of the university's community of classroom innovators. This committee, also known as LIP, encouraged teachers to move away from lecture-based teaching and adopt more interactive learning environments. The community shared best practices and exchanged ideas about changes they wanted to implement in their courses.

This study focuses on a law course taught to master's students in their second year. The teacher, a specialist in business law, wanted students to gain practical and professional, real-life experience. Her goal was to prepare them for the realities of the professional world after graduation. Since this was a Master's-level course, the need to acquire and applying knowledge was particularly important. So, Structuring the course so that students could work together using mind-mapping as an organized thought process would help them develop the best possible solutions for each case study.

Another important factor was student performance. The teacher noticed that the students' average grades were well below expectations—around 8 out of 20, with 10 being the passing grade. She wanted this structure because students were struggling to read and interpret the necessary documents, fully understand the case studies, and then identify the most appropriate legal solution for the client. That is why she needed an organizational tool like mind-mapping—so the teacher could observe the students' thought processes before they arrived at a conclusion.

4. Discussion

This study aimed to investigate the use of collaborative mind-mapping and its effects on student engagement. There were two important points that emerged from this study: collaboration and communication using mind-mapping, and teaching involvement.

The results from the timeline analysis showed that during the collaborative activity using the mind-maps, the students were mostly engaged. The students were noted to be constantly discussing what they needed to do to resolve the case study. If there wasn't any talking in the groups, they were still working because they were looking up information in textbooks, online or asking the teacher for help. Before each session, the students had to come prepared to class by reading the necessary material at home. Since students attained information differently, the students were able to talk about the case study and give their point of view based on the same text they already read. Students gain knowledge not only from textbooks but also from practical experiences that enhance their overall learning (Iserte et al., 2023). The use of communicating in a collaborative way allows students to join forces and come up with an end goal they can agree on. Therefore, communication by collaboration using mind-

mapping was a positive experience for the students based on their high engagement in the learning process. Previous studies have shown that students view collaborative mind-mapping positively and are generally satisfied with its application (Huang, 2020; Shih et al., 2009). Students who are satisfied with their work and their social environment are likely experiencing one of the most significant factors influencing the overall effectiveness of the educational process (Bavčević et al., 2024).

The students that were disengaged during the collaborative activity were mostly on their phones. Most of the time, the students who were disengaged were the same ones, and they were constantly disengaged throughout the session. For example, in figure 3, there was a student (S19) who was disengaged fifteen times during the collaborative activity. During that same session, there was another student (S13) who was disengaged five times. In all of the sessions, there were six instances where the students were disengaged for more than one minute, adding up to a total of 20 minutes. That means that over the course of 21 hours, those students were disengaged for only a total of 20 minutes.

A benefit the students received was that the teacher was constantly present in each of the different groups. When a teacher is present, it creates a positive climate in which students engage in positive interactions (Barr, 2016). The timelines show that when the students were doing their collaborative tasks, the teacher was circling the room and making sure the students were on their way to solving their case study. Having a teacher constantly engaged in the students' activity shows that the teacher is there to support and interact positively with the students (Johnson, 2009).

5. Limitations

The limitations for this study would be the need for more observation. Like all of the other studies, the observer was not able to be present for all of the sessions during the course. More observations would be helpful when looking at this course as a whole. Using the collaborative approach, the observer would be able to compare and contrast all of the elements necessary for understanding a collaborative approach learning environment.

Chapter 11

Case Study 9

Spanish: Game-Based Approach

Case Study 9

Spanish: Game-Based Approach

This case study focuses on the game-based approach and how it engages students in a Spanish course. The students observed are all in a bachelor program at a French university. At this university, students are required to learn two languages. The first language is English, and the second language can vary depending on what the student decides. Majority of the students choose Spanish as their second language. Since the students are forced to take a language, this study's observed teacher, decided to make Spanish "more fun."

In research, game-based teaching has had positive impacts on student learning (Sahin, 2017). Some of those studies have focused on the positive aspects that the teachers and students had experienced as well (Bostan and Turan, 2023). The positive aspects can include motivation and satisfaction. According to Bostan and Turan (2023), students that had courses that were using game-based teaching had an increase in motivation when it came to learning. In that same study, students were satisfied with the teachers' involvement during the course.

Game-based approaches can enhance students' engagement because they are forced to collaborate with their peers and deal with problem solving. Problem solving is a skill that students learn when they are confronted with a problem. Active participation, cognitive investment and emotional commitment can be found in problem solving, which can affect the engagement and deeper learning of students (Chapman, 2012). Other key factors that are essential for students are student engagement, learning needs and curriculum aligned objectives (Doğan and Koç, 2017).

1. Research Design

The Spanish course is taught in Spanish and encourages students to learn and speak by using a game-based approach. Each Spanish course has a total of 15 hours per semester. In those 15 hours, there are seven sessions that are two hours long and one that is 1 hour. The teacher divides her instructional approach into two parts within each session. The first part is about an hour and fifteen minutes, where the teacher goes over key vocabulary and grammar. The second part of the session (around 30 minutes, more if needed), the students use what they have learned in the first part of the session and play a game. The games can vary from a board game to a game the teacher created, such as miming a photo or role-playing. The assessments for this course are a written exam at the end of the semester (30%), an oral presentation (21%CC), homework (35%CC) and participation during the course (14%CC).

The Spanish course was observed by using two instruments, the BERI and the ethnographic methodology. The BERI was used with cohort 1 and the ethnographic methodology was done with cohort 2. Table 25 presents the different observations. They have different numbers of students and were observed on different dates.

Table 25. Game-Based Learning session observations during the school year 2017-2018.

	BERI	Ethnographic Methodology
Cohort 1	20 November 2017 (n=17) 7th session – Played Parcheesi Observed 15:02 to 15h27	
Cohort 2		13 February 2018 (n=13) 4th session – Played historical card game Observed 16:14 to 16:46 13 March 2018 (n=11) 6th session – Played Dixit Observed 16:15 to 16:46 20 March 2018 (n=10) 7th Session - Played Mime Observed 16:22 to 16:48

2. Observer's Perspective

Based on the observer's perspective, there are two instruments, the BERI and the ethnographic method that was used for this case study. The BERI was used once with cohort 1 and three times using the ethnographic methodology with cohort 2. The observer observed and noted the behavior of the students and the teacher.

2.1 Behavioral Engagement

There was one session observed using the Behavioral Engagement Related to Instruction instrument (BERI). On 20 November 2017, there were 17 students that attended their Spanish class that used boardgames to help them learn the language. For this session the students were playing the game, Parcheesi, in two groups. One group had nine students and the other group had eight students. Their goal was to play the game by using subjunctives sentences in Spanish. The games started at 15:02 and they finished by 15:27. Figure 42 shows the engagement of the 17 students while playing the game. There were two incidents when the students were at the lowest in terms of disengagement. At 15:09 and 15:24, 76% of students were engaged during the activity, which meant that five of the seventeen students were disengaged. At both those times, the disengagement lasted for less than a minute because the engagement percentage went up to 100% at 15:10 and 94% at 15:25. During the gaming session, majority of the students were engaged in the activity because they were talking and playing the game based and didn't drop down more than 76%.

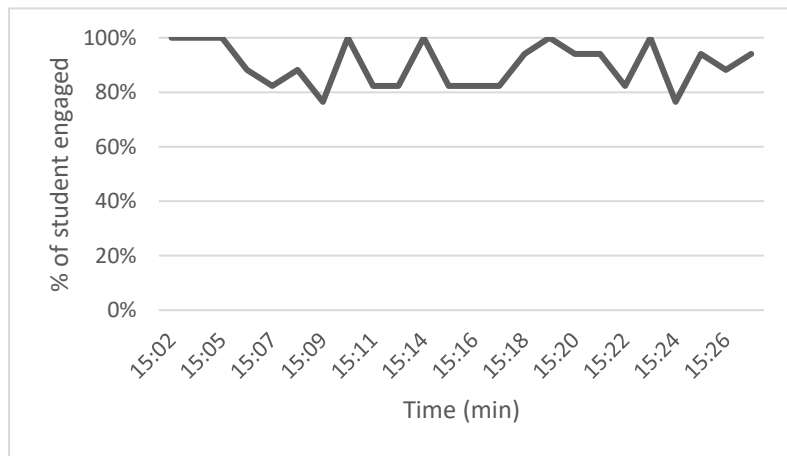


Figure 42. Cohort 1: BERI results on 20 November 2017-2018 (n=17)

2.2 Timeline Analysis

The ethnographic method was used three times with cohort 2. The following three figures show the level of engagement and disengagement of the students while using the game-based approach. The three sessions had about 30 minutes of game time and did not use the same game. Figure 43 showed the level of engagement of the students (n=13) when they played a historical card game. There were 16 times where the students were disengaged. They were on their phones (n=16), talking (n=1) and taking a picture (n=1). Some students were disengaged more than once during the session. For instance, S11 and S1 were disengaged once, S10 disengaged three times, and S13 disengaged four times. S4 was also disengaged four times, with two instances lasting longer than one minute. Both S2 and S3 were disengaged five times, while S6 was disengaged seven times. In addition, two students (S5 and S6) were observed talking, and one student (S4) was seen taking a picture. In total, there were eleven students out of thirteen that were disengaged at one point during the 32-minute game session. That leaves majority of the students disengaged for less than a minute.



Spanish - Game-based
Students (n=11) & Teachers (n=1)
13 March 2018



The last observation session where the students played a mime game was on 20 March 2018 (figure 45). The game session was 22 minutes. There were five incidents when the students were disengaged because they were talking (n=2) or on their phone (n=4). Of the eleven students in the class, four were disengaged. S9 and S10 were talking to each other twice and they were on their phones once. S9 was on their phone for over a minute once and less than a minute the other time. S6 and S11 were also on their phones but for less than a minute.

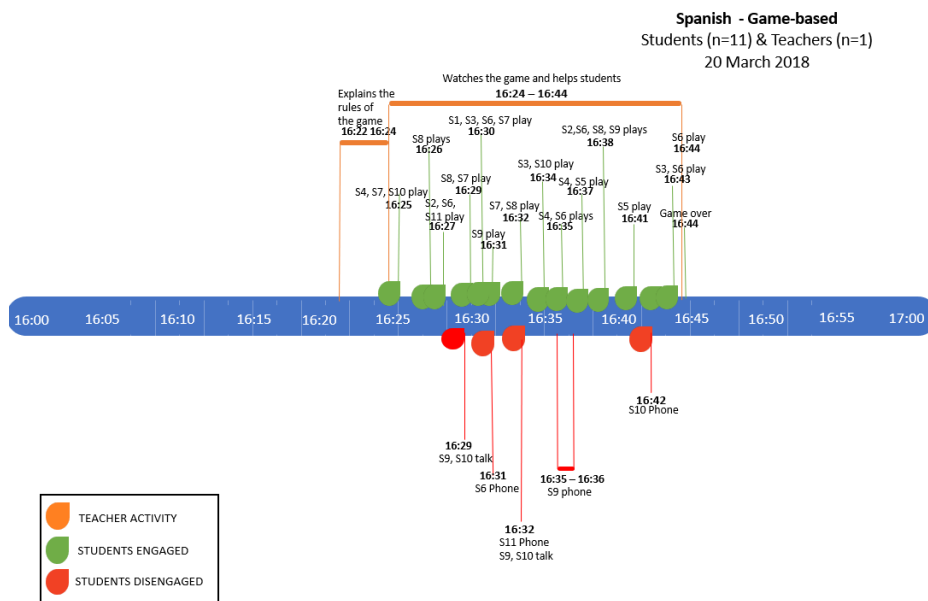


Figure 45. Timeline analysis of an observation of Gaming on 20 March 2018

2.3 Modes of Engagement: the ICAP Framework

The ICAP Framework was used as a guide to understanding cognitive engagement when using the game-based approach to learning. This study used this approach to have students be active in class by speaking Spanish and collaborating with their peers in order to win the game. In table 26, there is one activity that was used to understanding cognitive engagement, students discussing/playing. Using the BERI and the timeline analysis, it was possible to provide examples of when students are passive, active, constructive and interactive. During the four observations, the students moved between active and interactive. There were some students who didn't speak as much as the others, which classified them as being active. Some students were very active in the activity because they wanted to win the game and they were known to be interactive. According to the ICAP Framework, to be interactive the students had to be engaged with other students and connecting their knowledge from what they learnt before (constructive), which allowed them to formulate verbal sentences in Spanish

Table 26. The ICAP Mode of Engagement – Game-based approach

	Passive <i>Receiving</i>	Active <i>Manipulating</i>	Constructive <i>Generating</i>	Interactive <i>Dialoguing</i>
Student Discussing/Playing	Listening to the group and not wanting to speak	Speaking with short phrases	Sharing thoughts or connecting ideas to the information that was taught in the first part of the session	Co-constructing knowledge through dialogue, questioning, playing with others and reasoning by what the students learnt in the first part of the session.

3. Teacher's Perspective

The teacher has been teaching Spanish for many years at the university and had a hard time getting the students to be motivated and to speak during the session. She wanted to change her style and try to get the students to be more active in speaking and using what they learnt in class. After going to different conferences, meetings provided by the university's LIP community and studying different instructional approaches, she decided to try using games. She saw that the students were much more effective in speaking when forced to do it than being asked to say something. She wanted to students to work together and try to speak Spanish while doing something 'fun'. She knew that just using a game alone to speak would be difficult for some of these students because they had a low level, so she decided to split her session into two: activities focused on grammar and written comprehension, and gaming. Having the session start with rules and examples of the use of the language could help students use it during their time to 'play'.

After using this approach for a few years, the teacher realized that the students were motivated to try to speak in class. Although each student is different and each group composition wasn't great, the students still worked together in playing the game. Competitiveness could have been a driving force to have the students learn and speak more in class. Although the students made mistakes and were not speaking perfect Spanish, it didn't stop them from trying and playing. One thing that she did observe was that having a certain number of students in class was very important. If there were more than 15 students, it would be difficult to have the students engaged and active in the game. When she looked at the grading of the students, she saw that students that were in a class of no more than 15 had better results than classes that had more than 15 students.

4. Discussion

The game-based approach in this Spanish course was engaging for the students because they were able to speak and use what they learnt beforehand. The four observed sessions can show that three out of the four, the students were engaged in the activity. There was one time, on 13 February 2018 where there were a lot of students that were disengaged (11 out of 13 students). It is important to note that the game-based approach should be used to facilitate knowledge and acquire skills in the classroom and not to be substituting for direct learning (Avolio et al., 2014). That is why the teacher decided to divide the session into two parts: provide the students with the information they will need for the game and play the game. In the first part of the session, the teacher gives the students the grammar and vocabulary necessary, plus plenty of examples. The teacher also provides an environment where the students are able to ask questions and try to speak using the information they were taught. The teacher sets the environment for the students to be comfortable and fun, so that the students aren't stressed when speaking a language, they aren't fluent in.

An important part of gaming is the environment. When students are in their element, they can be at ease and not fear things they don't have control over. When in a language course, students often feel uncomfortable because they don't want to be judged or make mistakes and learn better when they have an environment of trust, respect and collaborative energy (Dörnyei & Murphey, 2003). They feel that the other students could judge them or make fun of them. That's why using games was important for the teacher, to give them that ease and show them that playing was more fun than in a traditional teacher-centered class. Games in the classroom promote a pathway for learning and thinking (Tilbury and Wortman, 2008). In addition, games offer an alternative from passive learning to interactive learning, allowing students a chance to experience deep learning (Cross, 1987), which is what this course provides.

5. Limitations

The limitations for this study consisted of two points: observer's presence in the sessions and better recording of the observations. The first point was that the observer was not present for all seven sessions, both with the cohort 1 and cohort 2. The observer was not available to go to all of the sessions due to scheduling conflicts. If the observer was able to see all of the sessions, maybe more data could have explained if the approach got better. The second limitation needed a better way of recording all of the data during the observations. The observer was able to see what the students were doing and at what time they were doing it, but it was difficult to see how each game worked with engagement. Because the teacher uses different games each session, there was no way of understanding if the game itself was 'fun' or if the students were engaged because they knew the game beforehand. During the ethnographic method, the first session observed didn't seem to engage the students as much as the other two sessions.

Chapter 12

Students' Perspective on Engagement Across Nine Courses

Students' Perspective on Engagement Across Nine Courses

This chapter presents the students' perspective on engagement across nine university courses that implemented student-centered instructional approaches. It addresses the research question: *What impact do student-centered instructional approaches have on engaging students in higher education?* by establishing a global overview of how students experienced engagement throughout their courses.

While the previous chapter detailed the methodology and the 431 participants across nine courses, this chapter focuses specifically on students' self-reported engagement using the Classroom Engagement Inventory (CEI) and three open-ended questions. These instruments were able to see the emotional, behavioral and cognitive dimensions of engagement, as well as students' reflections on the student-centered instructional approaches they experienced. By focusing on students' perceptions and experiences, this chapter aims to better understand how student-centered instructional approaches were experienced throughout the course.

The nine courses that will be presented in this study will consist of different instructional approaches in student-centered environments. The importance of this study is to understand the perspective of the students and their views of how the approach has or has not engaged them during their course. These courses were selected because they represent a range of student-centered instructional approaches implemented in higher education.

The results presented in this chapter are organized as follows. First, descriptive statistics and reliability analyses of the CEI are presented to establish the quality of the data. Second, overall engagement levels across the nine courses are examined using quantitative results from the CEI. Finally, qualitative findings from the open-ended student responses are analyzed to complement and deepen the understanding of students' engagement experiences. Together, these findings offer a comprehensive view of student engagement from the learners' perspective and set the foundation for the approach-specific analyses that follow.

The two instruments used were a questionnaire called *The Classroom Engagement Inventory (CEI)* and three open-ended questions. These instruments were chosen based on the following criteria: a validated instrument that is current with questions pertaining to cognitive engagement and it focuses on the instructional approach, as well as student engagement. The combination of quantitative and qualitative instruments allowed students to both rate their engagement and express their views in their own words.

1. Classroom Engagement Inventory (CEI)

The Classroom Engagement Inventory (CEI) was used to examine students' engagement across the nine courses included in this study. The CEI captures student engagement as a multidimensional construct composed of emotional, behavioral, and cognitive dimensions. Emotional engagement refers to students' feelings toward the course, such as interest,

enjoyment, and sense of belonging. Behavioral engagement focuses on students' observable participation in learning activities, including attention, effort, and involvement during class. Cognitive engagement reflects the degree to which students invest in understanding the material, use learning strategies, and engage in deeper thinking. Together, these three dimensions provide a comprehensive picture of how students experience and engage with student-centered learning environments.

2. Open-ended Questions

In addition to the CEI, students were given three open-ended questions given to the participants to further explore their engagement in the course. The questions were given to ask how the students felt during their lessons and what did they had to say about the instructional approach they have experienced.

The purpose of these questions was designed so that students could express their point of view in their own words and to capture aspects of engagement that may not be possible when using the quantitative measures. Having this qualitative method offers richer insight into how students experience the instructional approaches and to see if there are any patterns that will emerge. By this way, it shows how it supports the questionnaire about engagement, the observations looking at engagement and the instructional approaches, and if it supports what the teachers had said during their interview about the instructional approaches.

Having both the qualitative and quantitative data allow for a more comprehensive understanding of student engagement when measuring the engagement levels with the students' personal reflections. These responses provide qualitative insight into students' engagement experiences across the nine courses.

3. Results of the CEI and the Open-ended Questions

3.1 Data Quality of the CEI

In addition to the CEI, students were given three open-ended questions given to the participants to further explore their engagement in the course. The questions were given to ask how the students felt during their lessons and what did they had to say about the instructional approach they have experienced.

The purpose of these questions was designed so that students could express their point of view in their own words and to capture aspects of engagement that may not be possible when using the quantitative measures. Having this qualitative method offers richer insight into how students experience the instructional approaches and to see if there are any patterns that will emerge. By this way, it shows how it supports the questionnaire about engagement, the observations looking at engagement and the instructional approaches, and if it supports what the teachers had said during their interview about the instructional approaches.

Having both the qualitative and quantitative data allow for a more comprehensive understanding of student engagement when measuring the engagement levels with the

students' personal reflections. These responses provide qualitative insight into students' engagement experiences across the nine courses

Table 27. The descriptive table of the Classroom Engagement Inventory

Question	Mean	SD	Always	Very often	Sometimes	Rarely	Never
If I make a mistake, I try to figure out where I went wrong	3.17	.74	152	208	62	8	
I think deeply when I take quizzes in this class	3.09	.86	157	170	81	15	2
I feel happy	3.01	.81	127	184	106	6	2
I pay attention to the things I am supposed to remember	2.96	.75	98	227	91	9	2
I feel interested	2.95	.74	99	213	112	3	1
I complete my assignments	2.93	.98	139	168	84	30	8
I just pretend like I'm working	2.93	.87	127	159	127	13	2
I feel amused (smile, laugh, have fun)	2.90	.92	117	185	90	26	6
I work with other students and we learn from each other	2.90	.88	110	195	102	13	8
I ask myself some questions as I go along to make sure the work makes sense to me	2.82	.90	97	197	102	29	5
If I'm not sure about things, I check my book or use other materials like charts	2.81	1.00	125	146	112	39	6
I feel excited	2.81	.76	74	216	128	11	2
I form new questions in my mind as I join in class activities	2.81	.83	97	172	139	19	
I try to figure out the hard parts on my own	2.81	.73	69	222	128	9	1
I listen very carefully	2.77	.76	66	214	135	13	2
I actively participate in class discussions	2.76	.92	99	171	124	30	5
I search for information from different places and think about how to put it together	2.74	.89	80	197	117	26	7
I get really involved in class activities	2.67	.78	54	208	141	25	1
I am 'zoned out,' not really thinking or doing class work	2.46	.86	46	156	186	32	9
I judge the quality of my ideas or work during class activities	2.41	.92	43	165	158	48	13
I go back over things I don't understand	2.37	.95	56	126	180	56	11
I feel proud	2.28	.92	48	99	215	51	13
I let my mind wander	1.91	.83	8	74	252	63	32
I do not stop working at the end of class	1.76	.92	19	48	209	114	38

3.2 Reliability/Internal Consistency of the CEI

An exploratory factor analysis was conducted using the software, PSPP. All of the items in the Classroom Engagement Inventory (CEI) were loaded to see the main factors of the questionnaire. There were 4 factors that were more than 1, see table 28. The highest total of the Initial Eigenvalues was 4.01 (Percentage of variance and the Cumulative % were both 23.2%) and the total of the Extraction Sums of Squared loading was 2.41 (Percentage of variance was 14.0% and Cumulative percentage was 14.0%). Based on the already validated CEI that has 5 factors (emotional, behavioral-compliance, behavioral-effort class participation and cognitive engagement and disengagement), it showed that in this study

disengagement loaded well with behavioral engagement- compliance. Table 29 shows how the factors loaded in PSPP.

Table 28. Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loading		
	Total	% of Variance	Cumulative %	Total	% of variance	Cumulative %
1	4.01	23.2%	23.2%	2.41	14.0%	14.0%
2	1.66	9.6%	32.8%	1.85	10.7%	24.6%
3	1.24	7.1%	39.9%	2.07	12.0%	36.6%
4	1.05	6.1%	46.0%	1.62	9.4%	46.0%

Table 29. The Exploratory Factor Analysis using PSPP

	<i>Factors</i>			
Behavioral Engagement - Compliance				
(Question 19) I complete my assignments	.61	.07	.21	-.09
(Question 6) I listen very carefully	.48	.06	.10	.19
(Question 11) I pay attention to the things I am supposed to remember	.35	.19	.19	.08
Disengagement				
(Question 21) I just pretend like I'm working	.57	-.08	.03	.10
(Question 12) I let my mind wander	.52	.01	.03	.05
(Question 9) I am 'zoned out,' not really thinking or doing class work	.50	.06	.11	.10
Emotional Engagement				
(Question 15) I feel proud	.07	.68	.00	.04
(Question 20) I feel amused (smile, laugh, have fun)	-.09	.66	.15	.04
(Question 10) I feel happy	.08	.61	-.03	.06
(Question 2) I feel excited	.13	.48	.05	.27
(Question 3) I feel interested	.23	.24	.08	.38
Cognitive Engagement				
(Question 24) If I'm not sure about things, I check my book or use other materials like charts	.11	-.01	.76	.05
(Question 16) I search for information from different places and think about how to put it together	.03	.08	.60	.27
(Question 17) I ask myself some questions as I go along to make sure the work makes sense to me	.12	.05	.56	.15
(Question 13) I judge the quality of my ideas or work during class activities	.07	.20	.45	.03
(Question 23) If I make a mistake, I try to figure out where I went wrong	.23	-.09	.38	.05
(Question 22) I try to figure out the hard parts on my own	.16	-.02	.37	.09
(Question 7) I go back over things I don't understand	.39	.03	.34	.18
(Question 8) I think deeply when I take quizzes in this class	.46	.13	.19	-.05
Behavioral Engagement - Effort class participation				
(Question 5) I actively participate in class discussions	.03	.08	.12	.69
(Question 4) I form new questions in my mind as I join in class activities	.28	-.01	.11	.52
(Question 1) I work with other students and we learn from each other.	.07	.08	.04	.50
(Question 18) I get really involved in class activities	.30	.15	.15	.35
(Question 14) I do not stop working at the end of class	.32	.36	.04	.26

(Note: In the CEI, the questions were not arranged according to the different dimension. In this table, the questions are numbered based on how it was aligned on the CEI. The numbers highlighted in yellow are the questions that were grouped by each factor. The numbers

highlighted in green are the questions that had a higher number and didn't group with the other factors.)

Based on the factor loading of the Classroom Engagement Inventory (CEI) in table 29, it shows that there are 4 items that don't correspond to what the previous validation showed in Wang, Bergin and Bergin's study (2014). Question 3 - I feel interested originally loaded in emotional engagement but loaded in the same factors as behavioral engagement-effort class participation. In addition, two of the cognitive engagement questions did not correspond with the rest of the group: I go back over things I don't understand, and I think deeply when I take quizzes in this class loaded with the questions in behavioral engagement - compliance. The last question that did not load well with the rest of the questions in the group was in the behavioral engagement - effort class participation, I do not stop working at the end of class. This question loaded with emotional engagement questions instead of the behavioral engagement questions.

The emotional questions 15, 20, 10 and 2 aligned within the same factors together ranging from 0.48 to 0.68, which is shown in the 2nd factor in table 29. The grouping of another factor, the behavioral engagement- compliance had a range of 0.35 to 0.61, which all aligned in the 1st factor. For the behavioral engagement-effort class participation factor loading, it can be seen that all the items (questions 5, 4, 1, and 18) loaded together in the 4th factor, except for question 14, which had a .10 difference from .36 (factor 2) to .26 that was in factor 4 along with the rest of the group. As for the cognitive engagement loading, all the items, except for question 7 and 8, loaded into the 3rd factor. Question 7 and 8 both loaded into the 1st factor. The cognitive engagement factor ranges from 0.37 to 0.76. The difference between item 7 and item 8 is that item 7's numbers is a 0.05 difference from the 3rd factor. Item 7's factor 1 is 0.39 and factor 3 is 0.34, which isn't that great a distance from each other. Whereas in question 8, there is a bigger gap where factor 1 that has 0.46 and factor 3 that has 0.19.

There are explanations to why the 3 items can be seen as not 'loading' correctly. Question 3, 'I feel interested' can be misinterpreted in different ways. The participants could think that it has to do with their behavior engagement in class, which is why it loaded under the behavioral engagement - effort class participation. If the participants weren't interested in what was happening during the course, they would have to put forth their interest and participate in what the teacher was doing. Therefore, if their efforts weren't there, they would not be interested. For question 7, it shows more that it has to do with a behavior that the participants should have done and that is why I think that it loaded in the same factor as behavioral engagement compliance. Remember that the score between the factors that it should load with compared to the factors that question 7 actually loaded with was off by only 0.05 points, the 1st factor was 0.39 and the 3rd factor was 0.34. The last item that didn't load accordingly was question 8, 'I think deeply when I take quizzes in this class.' It fell into the 1st factor in table 29 but I think that this question doesn't correspond to any of the participants because the participants are university students and they don't have any quizzes during the semester. They usually have exams but that is usually given at the end of the semester and in this case, the students already completed the questionnaire before they even took their exams.

After doing the factor analysis, the Cronbach's Alpha was performed to show reliability. With all 24 questions, the Cronbach's Alpha was 0.85. Since the five dimensions of engagement were categorized into four factors: emotional, behavioral (effort), both behavioral (compliance) and disengagement, and cognitive engagement (see table 30), the Cronbach's Alpha will be based on these factors. The four factors of the Cronbach's Alpha were: emotional engagement, $\alpha = 0.74$; behavioral engagement – compliance/disengagement, $\alpha = 0.73$; behavioral engagement – effort class participation, $\alpha = 0.65$; cognitive engagement, $\alpha = 0.76$.

Table 30 presents the four dimensions from the CEI of this study. Using PSPP, All the questions were Compared to the original CEI, the 5 dimensions from this study ($n=431$) has a 0.12 to 0.17 point difference. The closest being cognitive engagement with a 0.12 point difference and the highest with a 0.17 point difference in behavioral engagement: effort in class participation.

Table 30. Four dimensions of engagement based on the original CEI

	Wang et al., 2014	431 participants
Emotional engagement	.90	.74
Behavioral engagement – compliance and Disengagement	.82	.73
Behavioral engagement – effort class participation	.82	.65
Cognitive engagement	.88	.76

3.3 CEI Mean Scores

Table 31 presents the three dimensions of engagement from the CEI for this study with 431 participants from the 9 courses. The participants had an option to choose from always (4), almost (3), sometimes (2), almost never (1) and never (0). The four dimensions that focus on engagement are emotional, behavioral – effort, behavioral – compliance and disengagement, and cognitive engagement, which are the four factors that were in table 31. Table 31 demonstrates the 4 dimensions, where the mean for all were above the average 2, where 4 was the highest and 0 being the lowest. Out of the 4 dimensions, the highest were both emotional engagement (2.78 (S.D. 0.59)) and cognitive engagement (2.78 (S.D. 0.54)). There were statistically significant positive relationships between all four engagements. Among the four variables, the following are the statistics that show the positive significance among them: behavioral (effort) and behavioral (compliance), $r = .47$, $p < .001$; Behavioral (effort) and emotional engagement, $r = .46$, $p < .001$; Behavioral (effort) and cognitive

engagement, $r = .43$, $p < .001$. Behavioral (compliance) and emotional, $r = .31$, $p < .001$; Behavioral (compliance) and cognitive, $r = .55$, $p < .001$; Emotional and Cognitive, $r = .28$, $p < .001$.

Table 31. The 3 dimensions of engagement based on the 9 university courses

	Mean	SD
Emotional engagement	2.78	.59
Behavioral engagement - effort	2.58	.56
Behavioral engagement – compliance & Disengagement	2.88	.62
Cognitive engagement	2.78	.54
Total (n=431)	2.71	.42

3.4 Open-ended Questions

In addition to the questionnaire (CEI), students were asked three open-ended questions about the course that they have followed throughout the semester. The following results showed the commonalities found in all nine courses based on the three questions and the highest number of comments from the students from the three instructional approaches: Inquiry-based approaches to learning, collaborative approaches to learning and game-based approaches to instruction.

Figure 46. Open-ended Responses from 9 university courses

Taken from 9 university courses	
School years: 2016-2017, 2017-2018 & 2023-2024	
(n = 431)	
1.	What aspects in particular of this method of learning did you most appreciate? And why?
	(228) Group work/exchange with others
	(109) The teaching methods
	(67) Interactive
	(36) The outcome
	(34) Interesting
	(30) Playful/entertaining
	(26) Real life experience
2.	What aspects in particular of this method of learning did you least appreciate? And why?
	(90) Group work: don't always agree/investment/different work effort
	(61) Difficult to learn
	(60) Not enough time
	(33) Redundant explanations
	(30) Issues with the approaches
	(26) Need feedback/verification from teacher
	(12) A lot of work
	(9) Stressful
3.	What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.)
	(79) Improvement to the approaches
	(38) More feedback
	(37) Choose group members
	(34) Have a set time frame
	(24) Need more structure
	(23) A more adapted room

Note. Numbers shown in the figure indicate how many times students mention the given topic. Student responses to 3 open-ended questions from 9 university courses.

Figure 46 presents three open-ended questions and the collected results from the responses of 431 students from nine university courses. For question 1, the most significant number of responses from the students is how they felt about being in a group and the exchanges they had within the group (n=228). The common points for question 1 were that the students appreciated the group work aspect because the instructional approaches allowed them to exchange, share ideas and knowledge and have different perspectives from their group members. The responses came from students from all nine courses. The second common responses were that the students liked the instructional approach (n=109). They talked about different aspects of the approach or spoke how they liked it in general, for example: you don't get bored, allows you to learn in a different way, doing the content of the course ourselves allows us to master it, new way of learning and concrete teaching to receive important practical knowledge. The responses came from students of eight courses, the one course that did not mention the instructional approach came from the psychology course that had three students. The third common points that were mentioned were how interactive the courses (n=67) were such as active participation from the entire class, interactive do-it-yourself method and interaction between the teacher and our comfort zone. The second question asked what the students least appreciate with the instructional approach. The highest common point was group work (n=90). The group work that they least appreciated was that they often didn't agree or have the same investment with their group members. The second common point was that it was difficult to learn with the instructional approach (n=61) such as, certain notions are too complex and difficult to understand, the working method easily leaves us distracted, difficulty researching complicated subjects, difficult to learn because of the speed of the class, etc. The third least common point was that there wasn't enough time in the class to finish the activities that they needed to do (n=60). For the third question, the highest common point from the students were how the teacher could improve the instructional approach (n=79) by having a little more inspiration from lectures, add a theoretical course to review the important parts, have a half traditional course and half new approach course, want more serious games, more practical work, more interactive courses and more sessions. The second highest comments are that the students would like more feedback (n=38). The third highest comments, the students would like to choose who they want in their work groups (n=37).

3.5 Analyzing the Data

Table 32 focuses on the students' perspectives of their engagement based on the student-centered instructional approaches. It asked students how they felt about their courses to understand if they were engaged with the instructional approach. The mean for the 9 courses with a total of 431 participants, was 2.71 out of 4 (0-never... 4-always) with a standard deviation of .42. Considering that 4 was the highest, you could see that the students' mean was on the positive end of the scale (higher than 2) in all three dimensions. The mean with the highest overall was equally both cognitive and emotional engagement with a score of 2.78 (SD .59 and .54). With 4 being the highest, it's important to note that cognitive engagement had a positive score from all the students. Since emotional and cognitive is not

easily observable, it is necessary to receive their input from the students' themselves (O'Donnell & K., Reschly, 2020), hence the use of the questionnaire.

Following the analysis of student engagement across all nine courses, the results are examined here based on the particular student-centered instructional approaches that were implemented. The nine courses were grouped into three types of approaches: inquiry-based, collaborative-based and game-based instruction. This organization makes it possible to better understand how the different student-centered approaches engage students at the emotional, behavioral, and cognitive levels. For each approach, quantitative results from the CEI are first presented, followed by qualitative insights from students' open-ended responses, before moving to a comprehensive analysis.

The qualitative method focused on what the students had to say about the approaches based on three open-ended questions. From all nine courses, the students appreciated working in groups so that they can exchange with others (n=228). It's important to note that since there are 431 participants, students didn't necessarily need to respond to this particular question, so the possibility of receiving 431 responses on group work would highly be unlikely. Considering 228 students themselves stated that they liked group work was already more than half of the total number of students asked. What was more important was that the students were able to think the same and say that working in groups was important in the learning process. Rowaida Jaber and Eileen Kennedy (2017) and Laurillard (2012) argued that students who share ideas with their peers is 'an effective way of encouraging metacognition' and shows that groupwork is as an important part of learning (p. 218). The second highest response was that the students liked the instructional approach (n=109). Since the research question is based on the instructional

approach and the engagement of students, having this as the second highest response is positive and confirms that the students are into the instructional approach. The third highest response was that the students said that their class was interactive (n=67). Interactive instructional approaches were the main goal of having a student-centered approach. Although group work was the highest most appreciated, the highest least appreciated response was group work (n=90). The reason they stated that they didn't appreciate this was because it was hard for them to agree on a decision, everyone in the group didn't invest as much as the other students, which showed what kind of effort they put in. The need for wanting 'trustworthy social interaction' is vital when it comes to having students work in groups (Jaber and Kennedy, 2017). The concept of trustworthy social interactions means that there was absence of deep connection amongst the group members so that they didn't have a sense of confidence and reassurance. One of the reoccurring responses among the three open-ended questions was group work. As stated previously, group work was both most appreciated and least appreciated in the first and second question, and it appears in the third question as well as being the second highest respond (n=37). The students suggested that they would have liked to choose their group members. This response can also be connected to the previous understanding of the 'trustworthy social interaction' because if the students were to choose their group members, they would most likely choose their friends or people they have worked well in the past.

3.6 Conclusion

This chapter focused on student engagement from the students' point of view across nine university courses that implemented student-centered instructional approaches. Using a mixed-methods design, the results first provided an overall picture of students' emotional, behavioral, and cognitive engagement, before considering how engagement related to different instructional approaches.

The quantitative results from the Classroom Engagement Inventory (CEI) showed that, overall, students reported levels of engagement above the midpoint across all three dimensions. Emotional and cognitive engagement were the strongest dimensions, suggesting that students were not only participating in course activities but were also interested in the course and mentally invested in their learning. These findings underline the importance of student self-reports for capturing aspects of engagement that cannot be fully observed during classroom activities.

The qualitative analysis of the open-ended questions supported and added nuance to the quantitative results. Across the nine courses, students frequently highlighted the value of interactive and participatory learning environments, particularly group work, peer interaction, and opportunities to be actively involved in class. At the same time, students also pointed to challenges, such as difficulties related to group dynamics, limited time, and the need for clearer structure or feedback. These responses illustrate both the benefits and the limits of student-centered approaches when applied in different course contexts.

Taken together, the findings from this chapter provide a baseline understanding of student engagement in student-centered university courses across all nine courses. By presenting an aggregated student perspective, this chapter sets the foundation for the chapters that follow, which examine engagement more closely through specific instructional approaches. The next chapters build on these results by exploring inquiry-based, collaborative-based, and game-based approaches in greater detail.

4. Students' Perspective based on Student-Centered Approaches: Inquiry-based, Collaborative-based and Game-based Approaches

This section examines the inquiry-based instructional approach as it was implemented across four of the nine university courses. Building on the overall student engagement results, the focus here is on understanding how inquiry-based teaching influences student engagement across four course contexts.

In these courses, inquiry-based learning positioned students as active participants in their learning through questioning, problem-solving, and exploration, while the teacher acted as a guide rather than a content transmitter. Although the disciplines varied, the courses shared common inquiry-based characteristics that allowed them to be analyzed together.

Student engagement is examined using the three-point perspective central to this study: student self-reports, classroom observations, and teacher reflections. Quantitative and qualitative student data, observational measures (BERI and ethnographic notes analyzed through the ICAP framework), and teacher interviews are combined to provide a comprehensive view of engagement within inquiry-based environments.

This section highlights how inquiry-based instruction shapes emotional, behavioral, and cognitive engagement and serves as the first approach-specific analysis before moving to collaborative-based and game-based instructional approaches in the following section.

4.1 Inquiry-based Approaches

This section presents the mean scores for the CEI and the responses from the open-ended questions. After the presentation, the analysis reviews the overall data from four case studies.

4.1.1 CEI Mean Scores

Molecular Biology (MB), Cellular Biology (CB), Research Training in Psychology (RTP) and Psychology-Approach to organizational change (group & organizations) (PAO) share the main objective of the instructional approach, inquiry-based approach to instruction. Table 32 presents four courses that have two data sets from two school years (2016-2017 and 2017-2018). Each course has a range of 8 to 75 participants. Three of the courses, Cellular Biology, Research Training in Psychology and Psychology-Approach to organizational change have the highest mean in cognitive engagement. Cellular Biology has a mean of 2.96 (S.D. 0.42), Research Training in Psychology has a mean of 2.74 (S.D. 0.52) and Psychology-Approach to organizational change has 3.07 (S.D. 0.16). Molecular Biology's highest mean is in behavioral engagement with a 2.75 (S.D. 0.49). Although this is the highest mean in this course, the two other engagements are not that far behind with a mean of 2.71 (S.D. 0.55 and 0.49) respectively. That leaves a small gap of 0.04. Cellular Biology (2.88 (S.D. 0.62)) and Research Training in Psychology (2.60 (S.D. 0.55)) have the second highest mean in emotional engagement and the third engagement is behavioral with 2.84 (S.D. 0.49) and 2.54 (S.D. 0.40). Psychology-Approach to organizational change second highest mean is behavioral engagement with 3.05 (S.D. 0.31). All engagement means are all above the average mean of 2.

Table 32. Inquiry-based Approaches to Instructions

	Molecular Biology School years: 2016-2017 & 2017-2018 (<i>n</i> = 58)		Cellular Biology School years: 2016-2017 & 2017-2018 & 2023-2024 (<i>n</i> = 55)		Research Training in Psychology School years: 2016-2017 & 2017-2018 (<i>n</i> = 75)		Psychology-Approach to organizational change (group & organizations) School year: 2017-2018 (<i>n</i> = 8)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Emotional engagement	2.71	.55	2.88	.62	2.60	.50	2.87	.34
Behavioral engagement	2.75	.49	2.84	.49	2.54	.40	3.05	.31
Cognitive engagement	2.71	.49	2.96	.42	2.74	.52	3.07	.16

4.1.2 Open-ended Student Responses

Figure 47 represented the same 3 courses that were presented in table 11 but focuses on the open-ended questions that were asked by the same students that filled out the questionnaire. It is important to see how these courses were measured individually based on the responses of the students.

Molecular Biology School years: 2016-2017 & 2017-2018 (<i>n</i> = 58)	Cellular Biology School years: 2016-2017, 2017-2018 & 2023-2024 (<i>n</i> = 55)
What aspects in particular of this method of learning did you most appreciate? And why? (45) Group work/exchange with others (25) The teaching methods (15) Interactive (9) Interesting (2) Real life experience What aspects in particular of this method of learning did you least appreciate? And why? (28) Group work: don't always agree/investment/different work effort (21) Need feedback/verification from teacher (7) Difficult to learn (7) Issues with the approaches (4) Redundant explanations What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.) (15) Improvement to the approaches (Have moments of real lectures, alternate chapters to learn different things, more diversity) (14) More feedback (12) Group members: More practice together, choose groups, change groups after each session (11) Need more structure and limits for chapters, have a summary sheet, use suitable diagrams (2) A more adapted room (1) Have a set time frame	What aspects in particular of this method of learning did you most appreciate? And why? (38) Group work/exchange with others (13) The outcome (10) The teaching methods (8) Develop new skills (3) Interesting (1) Freedom to do what they want What aspects in particular of this method of learning did you least appreciate? And why? (17) Difficult to learn (10) Group work: don't always agree/investment/different work effort (5) Difficult presentation theme (4) Stress (3) Not enough time (3) Lack of teachers' help (2) Redundant explanations (2) Issues with the approaches (1) Class time: too early (1) A lot of work done outside of class What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.) (10) Want more hours in class (9) More feedback (4) Room not adapted (4) a rubric to guide the presentations (3) Choose own subject

	(2) different levels of group knowledge
Research Training in Psychology School years: 2016-2017 & 2017-2018 (n = 75)	Psychology- Approach to Organizational Change School year: 2017-2018 (n=8)
1. What aspects in particular of this method of learning did you most appreciate? And why? (26) The teaching methods (24) Interactive (24) Playful/entertaining (23) Group work/exchange with others (7) The outcome (2) Real life experience	1. What aspects in particular of this method of learning did you most appreciate? And why? (4) Interactive (3) The teaching methods (3) Real life experience (1) Group work/exchange with others
2. What aspects in particular of this method of learning did you least appreciate? And why? (15) Redundant explanations (13) Difficult to learn (12) Not enough time (8) A lot of work (6) Group work: don't always agree/investment/different work effort (3) Stressful (2) Issues with the approaches (2) Need feedback/verification from teacher	2. What aspects in particular of this method of learning did you least appreciate? And why? (3) A lot of work (3) Not enough time (2) Group work: don't always agree/investment/different work effort (1) Redundant explanations
3. What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.) (13) Improvement to the approaches (More diversified and targeted topics, propose a path to follow using the bibliography, more professional research interventions) (12) Have a set time frame (6) More feedback (3) A more adapted room	3. What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.) (2) Have a set time frame

Figure 47: Open-ended responses from 3 Inquiry-based Approaches to Instruction Courses

The four courses based on inquiry-based approaches presented have common points of feedback from the students from all three questions. Figure 47 displays the four courses and the number of students that commented on those points. For question 1, all four courses had positive comments based on group work, the instructional approach and real-life experiences. Group work (n=107) having the highest response from two of the four courses represents a recurring theme throughout the data. Examples of such comments were “it was a lot of fun exchanging and sharing” and “interesting to exchange and learn from others.” The responses based on the instructional approaches (n=64) were “the ability to have the freedom to correct, creation...” and “teaching method that changes throughout the course: various exercises that allow you to learn different subjects.” For question 2, which asked what the students least appreciated in the course, there were two common points that the four courses share: group work (n=46) and difficult to learn (n=37). Group work had the highest number in Molecular Biology (n=28), second highest number in Cellular Biology (n=10), fifth highest number in Research Training in Psychology (n=6) and none in Psychology-Approach to organizational change.

Some of the comments the students said were “not always fair,” “not the same effort,” “lack of investment” and “hard to make your point of view.” The second common comments from the four courses were it was difficult to learn (n=37). Some of the comments in the Molecular Biology (n=7) course said, “certain notions are sometimes too complex and difficult to understand” and “the working method easily leaves us distracted.” For this course, difficulty learning was the second highest comment for question two. For the Cellular

Biology course, difficulty learning was the first highest comment (n=17). Some of the comments that the students said were having just a presentation makes it difficult to take in the information. The Research Training in Psychology course had a total response of 13, making it the second highest number of responses such as, difficult to rely on other students to research theoretical aspects, researching complicated subjects and difficult to retain information. The Psychology-Approach to organizational change course didn't have as many numbers as the rest: "a lot of work" and "not enough time" were the highest with three counted for both remarks. The third question asked was what would they suggest to make the learning method better. The common remark that the students would like to see improvement from all three courses was that the room was not properly adapted to working in groups (n=9), need more feedback from the teachers (n=29).

4.1.3 Analyzing the Data

The scores for the inquiry-based approaches were all on the positive end of the scale. The four courses showed that there were scores that had the highest in cognitive engagement (2.94 (SD .38) and 2.74 (SD .52)), while the other course had a high score in behavioral engagement (2.75 (SD .49)). Although the score in behavioral engagement was 2.75, the emotional and the cognitive score for that same course was not far from each other with a 2.71 (SD.49 to .55). In this particular approach, the three dimensions of engagement were all relatively close in number ranging from the lowest of 2.54 (SD .40) to the highest score of 2.94 (SD .38). All of them fall on the higher mean of the scale from 0 being the lowest to 4 being the highest.

For the qualitative analysis, the response that emerged from all four courses were that the students appreciated the group work experience. In two of the four courses, group work was the highest response with 45 out of 58 students in one course, 14 out of 31 students and 2 out of 8 in the two other courses. The third course had a significant lower number of 23 out of 75 students compared to the other three courses. As stated previously, the teaching methods had a great importance because it was in the top three of all four courses. The reflection of these responses is closely related to the responses of all of the courses. Although there are responses for the least appreciated aspects of the instructional approaches, the numbers are not as significant based on the number of participants. For two of the courses, the highest numbers were 15 and 11 respectively. The other course had a high of 28 and 21 responses but then dropped to 7 and then 4 responses. It concludes that the responses of the students are geared towards them being appreciative to the teaching methods.

4.1.4 Conclusion

This chapter examined student engagement within inquiry-based instructional approaches across four university courses. By combining quantitative results from the CEI with qualitative student responses, the findings provide a clearer understanding of how inquiry-based learning influences emotional, behavioral, and cognitive engagement in different university courses.

Overall, the quantitative results showed that student engagement scores were consistently on the positive end of the scale across all three dimensions. Cognitive engagement emerged as the strongest dimension in most courses, suggesting that inquiry-based approaches encouraged students to think deeply, reflect, and actively engage with course content. Behavioral and emotional engagement scores were also closely aligned, indicating that students were generally involved in course activities and motivated by the learning process.

The qualitative findings supported these results. Across all inquiry-based courses, students most frequently appreciated group work, the teaching methods, and opportunities for interaction and real-life application. These elements appear to play a central role in supporting engagement within inquiry-based environments. At the same time, students also identified challenges, particularly related to group dynamics, difficulty understanding complex content, limited time, and the need for clearer structure and feedback from instructors. These concerns highlight areas where inquiry-based instruction may require additional scaffolding to support all learners.

Taking all of the above mentioned together, the results suggest that inquiry-based approaches create learning environments that foster strong cognitive engagement while maintaining balanced emotional and behavioral involvement. While students generally responded positively to these approaches, the findings also point to the importance of teacher guidance, feedback, and course structure in maximizing their effectiveness. This chapter provides a detailed view of inquiry-based instruction and sets the stage for the next chapter, which examines student engagement within collaborative-based instructional approaches.

4.2 Collaborative-based Approaches

This section examines student engagement within collaborative-based instructional approaches across four of the nine university courses. Building on the overall engagement results presented in the previous section analysis, the focus here is on understanding how collaborative learning influences students' emotional, behavioral, and cognitive engagement. In these courses, learning was centered on group work, peer interaction, and shared responsibility for tasks, with the teacher facilitating rather than directing the learning process. Although the courses differed in discipline and class size, they shared key collaborative characteristics that allow them to be analyzed together. Using the three-point perspective of this study, this section focuses on student self-reports: questionnaires and open-ended questions to examine engagement within collaborative learning environments.

4.2.1 *CEI Mean Scores for Courses based on Collaborative-based Approaches to Instruction*

Table 33 consists of four courses: Communication and Society (CS), Insolvency and Bankruptcy Business Law (IBB), Law, and Psychology - Organization diagnostics: Prevention and Health (POD). Cognitive engagement having the highest mean from one out of the four courses: CS (2.80; SD .51). The other three courses POD (3.21; SD .62), IBB (3.21; SD .40) and Law (2.89; SD .43) have the highest mean in behavioral engagement. All the scores from the four courses in all three dimensions had a mean above the mid-point score

of 2, which ranged from 2.63 (SD .49) with the lowest in CS in behavioral engagement and 3.31 (SD .51) with the highest in POD with behavioral engagement.

Table 33. Collaborative-based Approaches to Learning

	Communication and Society School years: 2016-2017 & 2017-2018 (n = 101)		Insolvency and Bankruptcy Business Law School year: 2017-2018 (n = 22)		Matrimonial Law School year: 2017-2018 (n = 12)		Psychology-Organization diagnostics: prevention and health School year: 2017-2018 (n = 3)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Emotional engagement	2.75	.54	3.17	.49	2.85	.73	3.00	.53
Behavioral engagement	2.63	.49	3.21	.40	2.89	.43	3.31	.51
Cognitive engagement	2.80	.51	3.02	.54	2.76	.57	3.21	.62

4.2.2 Open-ended Questions

Communication and Society School years: 2016-2017 & 2017-2018 (n = 101) - What aspects in particular of this method of learning did you most appreciate? And why? (69) Group work/exchange with others (15) The teaching methods (14) Real life experience (6) The outcome (3) Interactive (3) Interesting - What aspects in particular of this method of learning did you least appreciate? And why? (34) Not enough time (23) Group work: don't always agree/investment/different work effort (15) Redundant explanations (11) Difficult to learn (4) Issues with the approaches (2) Stressful - What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.) (15) Have a set time frame (14) Work in groups more (14) Improvement to the approaches: lessons before presentations, inform expectations, relevant topics, more content to better approach the projects, more theory (9) A more adapted room (6) Need more structure (4) More feedback

Insolvency and Bankruptcy Business Law School year: 2017-2018 (n = 22) - What aspects in particular of this method of learning did you most appreciate? And why? (17) Group work/exchange with others (12) The teaching methods (2) The outcome (2) Interesting (1) Real life experience - What aspects in particular of this method of learning did you least appreciate? And why? (12) Group work: don't always agree/investment/different work effort (6) Issues with the approaches (3) Not enough time (3) Difficult to learn (1) Redundant explanations - What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.) (5) Group members: smaller groups, change groups often, choose group members (7) Improvement to the approach: more mind-mapping, be autonomous, flexible software, less graded assignments
Law School year: 2017-2018 (n = 12) - What aspects in particular of this method of learning did you most appreciate? And why? (8) Group work/exchange with others (8) Interactive (6) The teaching methods (5) The outcome - What aspects in particular of this method of learning did you least appreciate? And why? (5) Group work: don't always agree/investment/different work effort (4) Difficult to learn (4) Redundant explanations (3) Not enough time (3) Issues with the approaches - What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.) (5) Improvement to the approaches: Real practical cases, concepts too complex, split half innovative and half traditional course (5) A more adapted room (2) Work in groups more (2) Have a set time frame

Psychology- Organization diagnostics: prevention and health
 School year: 2017-2018
 (n = 3)

1. What aspects in particular of this method of learning did you most appreciate? And why?
 (3) Group work/exchange with others
 (2) Interesting
 (2) Real life experience
 (1) The outcome
2. What aspects in particular of this method of learning did you least appreciate? And why?
 (0)
3. What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.)
 (2) Have a set time frame
 (1) More feedback

Figure 48. Open-ended responses from 4 Collaborative-based Approaches

In figure 48, question 1, “what aspect in particular of this method of learning did you most appreciate?” the student responses showed that 4 out of the 4 courses appreciated the group work aspect in which they can exchange with their peers (n= 97). The Community and Society course had 69 responses for group work, which shows that more than half of the students (n= 101) appreciated this approach and Insolvency and Bankruptcy Business Law, 17 out of 22 group work. The same goes for the Law course (8 responses out of 12 students) with 67% feedback and the Psychology–Organizational Diagnostics: Prevention and Health (3 responses based on 3 of the students) with 100% feedback. For question 2, three out of the four courses had common responses: Not enough time in the course to do all that was needed (n=40). One of the courses that was not counted for question 2 was the Psychology-Organization Diagnostics course because there were zero responses to this question. Two other responses that were apparent in the 3 courses were group work: don’t always agree/investment/different work effort and redundant explanations from either the students or from the teacher. For question 3, there was 1 response that was visible in all four courses: Have a set time frame (n=19). Question 3 didn’t have enough responses to make the question significant.

4.2.3 Analyzing the Data

In the collaborative approach, there are four courses that have scores that range from the lowest (2.63 (SD .49)) to the highest (3.31 (SD .51)). The highest dimension scores is from one course with a score of 2.80 (SD .51) in cognitive engagement and the other three highest scores are in behavioral engagement with scores of 2.89 (SD .43), 3.21 (SD .40) and 3.31 (SD .51). One out of the four courses didn’t have any impact in the overall scoring in general

because there were only 3 participants. The main significance to the overall understanding of the scores is based on the Communication and Society course with 101 participants. The two other courses are left with 12 and 22 participants.

For the open-ended questions, the same patterns have emerged with all four courses having group work as a top response from the students and the second response being the teaching method was appreciated by three of the four courses. When it comes to the least appreciated methods there were no responses from one of the four courses. The participants of the other three courses said that they didn't have enough time to do the activities during the sessions, they didn't appreciate the group work, and they also felt that they had redundant explanations. The suggestions that came from these courses all said that they would have liked a set time frame to do each activity.

4.2.4 Conclusion

The findings from this chapter show that the collaborative-based approach was associated with generally high levels of student engagement across the courses examined. Engagement scores were consistently above the midpoint in all three dimensions, with behavioral and cognitive engagement standing out most strongly. This suggests that collaboration encouraged students to participate actively in course activities while remaining mentally involved in the learning process.

Students' written responses further illustrate how collaboration shaped their experience. Many students valued working with peers and exchanging ideas, confirming that interaction played a central role in their engagement. However, collaboration was also described as challenging at times, particularly when students felt rushed, experienced unequal effort within groups, or encountered repetitive explanations. These responses point to the need for clearer structure and time management when implementing collaborative learning.

Overall, this section shows that collaborative-based approaches can strongly support engagement when students are given opportunities to interact meaningfully with one another. At the same time, the findings underline the importance of designing collaborative activities with sufficient guidance and clearly defined expectations. These results contribute to the broader understanding of student-centered instruction and lead into the next section, which examines engagement within game-based instructional approaches.

4.3 Game-based Approach

This chapter focuses on the use of a game-based instructional approach within one university course. Unlike inquiry-based and collaborative-based approaches, which were implemented across multiple courses, game-based learning was applied in a more targeted manner. In this course, game-based activities were used to engage students emotionally, behaviorally and cognitively while reinforcing course content in a more interactive and dynamic way. The learning activities were structured around games designed to support participation, interaction, and content application. Rather than positioning students primarily as researchers or collaborators, the approach emphasized learning through play, competition,

and problem-solving. The analysis in this chapter draws on students' self-reported engagement and qualitative feedback to explore how this instructional design shaped their emotional, behavioral, and cognitive engagement. By examining this approach separately, the chapter highlights both the potential and the limits of game-based instruction within student-centered learning environments.

4.3.1 CEI Mean Score

The last course in the study is a Spanish. This course is categorized as game-based approaches to Instruction, see table 34. The highest mean is in emotional engagement (2.88; S.D. 0.67) and the lowest score is the behavioral engagement (2.55; S.D. 0.53). All 3 dimensions were over a score of 2, which is the average score out of 4.

Table 34. Game-based Approaches to Instruction

	Spanish School year: 2017-2018 (<i>n</i> = 85)	
	Mean	SD
Emotional engagement	2.88	.67
Behavioral engagement	2.55	.53
Cognitive engagement	2.63	.62

From the 9 courses, four courses (Cell Biology (2.94), Research Training in Psychology (2.74), Communication and Society (2.80) and Psychology - Approach to organizational change (3.07)) had the highest scores in cognitive engagement, four courses (Molecular Biology (2.75), Law (2.89), Psychology - Organization diagnostics and Insolvency (3.31) and Bankruptcy Business Law (3.21)) had the highest scores in behavioral engagement and one course (Spanish (2.88)) had the highest score in emotional engagement.

4.3.2 Open-Ended Questions

Spanish
School year: 2017-2018
(n = 85)

1. What aspects in particular of this method of learning did you most appreciate? And why?
(20) Group work/exchange with others
(13) Interesting
(13) Interactive
(9) Playful/entertaining
(5) The teaching methods
(2) The outcome
2. What aspects in particular of this method of learning did you least appreciate? And why?
(7) Issues with the approaches
(6) Difficult to learn
(4) Group work: don't always agree/investment/different work effort
(2) Not enough time
(1) Redundant explanations
3. What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.)
(25) Improvement to the approach (want more serious games, more traditional courses, more tests, Try other approaches like presentations, videos, debates, grammar etc.
(3) Need more structure
(2) No group members, just one big group as a class
(2) More feedback

Figure 49. Open-ended Responses from Game-based Approaches to Instruction

In Figure 49, there is one course (Spanish (n=85)) that have responses from the students based on the game-based approach to instruction. For question 1, the top response were that the students appreciated the group work/exchange with the others in their respected groups (n=20). After, 13 students said the course was interesting and interactive (not necessarily the same students). For question 2, there were seven reoccurring responses to the least appreciated method of learning: issues with the approaches (n=7), difficult to learn (n=6) and groupwork investment/effort (n=4). Since the total number of all the students were 85 students, the significance for question 2 were very low. For question 3, there was 1 set of responses that came up: Improvement to the approach (n=25). The responses from the students from this course asked for more of the instructional approach or different variations of the teaching method.

4.3.3 Analyzing the Data

The last approach (game-base) has one course with high scores in emotional engagement (2.88 (SD .67)) and cognitive engagement (2.63 (SD .62)). This course has high numbers for all three dimensions ranging from 2.55 (SD .53) to 2.88 (SD .67). That means that this course has significant numbers overall because the three dimensions are all over the mean of 2, having 4 as the highest.

The responses from the open-ended questions were similar to the previous approaches but also showed some other aspects that weren't in the other two approaches. The most appreciated were the same: group work, the teaching methods and it's interesting. The least appreciated responses had five similar responses: group work, issues with the approach, not

enough time. They ranged from highest to lowest based on the different responses but still had the same numbers across the three dimensions. For the suggestions, the one response that emerged was the one focusing on improving the approach (want more serious games, more traditional games, and take more test).

Based on what was shown from the questionnaire and the open-ended questions, there were some reoccurring patterns that emerged from the overall courses and within the three approaches given. What can be said is that when quantitative and qualitative methods are used simultaneously, they can complement each other so that it can address the research problem in a more complete picture (Johnson and Turner, 2003).

Although we separated the three approaches, it wasn't necessary because the patterns of group work and the instructional approaches were the highest responses in all three. The positive outcomes from the responses were that it was interactive, fun, interesting, practical way of learning. The negative responses dealt with the need to choose their own group members, have a set time frame, more feedback and improvement to the instructional approaches.

4.3.4 Conclusion

The analysis of the game-based course indicates that this instructional approach supported measurable student engagement across emotional, behavioral, and cognitive dimensions. CEI results show that all three dimensions were above the midpoint, with emotional engagement scoring highest. This suggests that the game-based structure was particularly effective in eliciting interest, enjoyment, and affective involvement, while still maintaining cognitive and behavioral participation.

The qualitative responses help clarify how students experienced this form of instruction. Students most frequently highlighted the interactive nature of the activities and the opportunity to engage with peers through structured games. At the same time, open-ended responses identified specific design-related challenges, including difficulties with the learning approach, uneven group investment, and time constraints. These findings point to the importance of careful instructional design when implementing game-based learning in higher education settings.

From a methodological perspective, the combination of CEI data and open-ended responses provides a coherent view of student engagement in this course. While the quantitative results establish overall engagement levels, the qualitative data specify which elements of the approach were effective and which required refinement. Taken together, the findings demonstrate that game-based instruction can function as a viable student-centered approach, provided that the games are clearly aligned with learning objectives and supported by appropriate structure.

Chapter 13

A Case Study Analyzing Student Engagement from a Three-point Perspective

Reference

This chapter is an adaptation of a published article from *Cogent Education*:

Srichinda, J., Frenay, M., & Mecheri, H. (2026). Analyzing student engagement: a case study of active learning in two biology courses from a three-point perspective. *Cogent Education*, 13(1). <https://doi.org/10.1080/2331186X.2025.2604343>

A Case Study Analyzing Student Engagement from a Three-point Perspective

Over the years, there has been an apparent shift from lecture-based learning environments to student-centered learning environments in higher education (Levesque-Bristol, 2021; Baeten & Simons, 2022). There remains a gap in the research regarding the instructional approaches teachers use and the extent to which students are engaged during these lessons. Both the teacher and the students play essential roles in building the relationship required for an environment conducive to learning (Gehlbach et al., 2023). We will explore this relationship by examining how students engage with the course, interact with the teacher, and participate in classroom activities. There has been a push towards alternative teaching methods in which students are actively engaged in the classroom, active learning being a prominent example. Active learning is generally understood as an overarching instructional approach that engages students in the learning process through structured activities fostering higher-order thinking, student participation, and interaction rather than passive reception (Doolittle et al., 2023). In this study, we will focus on two Biology courses that use active learning as an instructional approach, specifically employing presentation-based learning activities chosen based on the teachers' instructional preferences, to examine its impact on student engagement.

1. Active Learning as an Instructional Approach

Active learning is grounded in constructivist learning philosophies, which positions students to take responsibility for their own learning and to engage in peer sharing assessment; recent work shows that such constructivist peer assessment interventions significantly enhance critical thinking, creative self-efficacy, and learning outcomes in higher education settings (Xu et al., 2024). Teachers are switching their courses from lecturing on information to students taking the role as teacher, where they present their knowledge and understanding to their peers. Teachers use this method as a way of putting the responsibility of learning onto the students. This overarching approach can take many forms, including student-led presentations, peer teaching, group problem-solving, collaborative discussions and any other interactive methods that shift the focus from teacher-centered delivery to student-centered engagement. Active learning creates an environment where students construct knowledge through interaction with their peers and teacher (Chi & Wylie, 2014; Grijpma et al., 2022). 'Being the teacher' allows them to adopt the role of an 'expert' when they talk about their subject, so that they can address relevant questions or comments, which further promotes critical thinking by encouraging them to analyze, apply, and communicate what they have learned in meaningful ways (Kusumoto, 2018). Research has shown that increasing active learning in the classroom enhances student learning (Freeman et al., 2014).

Providing students with an active-learning environment could give them a sense of purpose, which could lead to students' learning (Godsk & Møller, 2025).

Sugeng and Suryani (2018) reported that presentation-based learning activities, where students prepare and conduct presentations, 'actively engage students in the learning process' (p. 178). However, while presentations involve student participation, they are sometimes considered a relatively passive form of active learning compared with more interactive strategies, such as group problem-solving or debates. Still, when students present to their classmates instead of the teacher, they are a part of the active learning process, one in which learning occurs starting from the preparation phase up to the presentation itself. In the preparation phase, students explore all of the information and material that they find by using the internet, books, discussion with teachers and peers, and so forth, so that they can create an interesting and well-structured presentation. Students are often forced to gain skills that help them do research and then organize the information they have acquired, develop further understanding of what they have to present, and encourage interaction with their peers (Almulla, 2023). In addition, one way for students to achieve self-confidence is by having the teacher encourage students to devote more time co-constructing knowledge with their classmates (Chi & Wylie, 2014) and work in groups (Brannen et al., 2021). However, students presenting have also been identified as a least favorite way of learning, as it can negatively impact their perceived learning due to the challenges of group work, preparation, and presenting, as well as the lack of guidance throughout the learning process (Remsberg & Hagar, 2019).

Considering all of these possibilities, it is beneficial to use the active learning approach. Presentationbased learning activities allow students to be actively engaged by processing the information they receive and discussing it with their classmates, thereby demonstrating student engagement.

2. Student Engagement

Active learning approaches have a positive impact on learning as this approach drives students to be engaged in the learning process. Student engagement can be viewed as a direct pathway for student learning (Bronfenbrenner & Morris, 1998; Carini et al., 2006; Xu, 2023). Creating instructional approaches which reinforce student engagement will have an impact on students within their own learning (Koubek & Rodriguez, 2023). In addition to the instructional approach, having the necessary tools and practices is also important to ensure that students have a positive learning experience (Li & Xue, 2023). Student engagement has been defined in many ways, but all definitions refer to the idea that it is related to high-quality learning leading to positive student outcomes that include critical thinking and cognitive development (Zepke, 2015).

For 30-plus years, there have been different variations in what student engagement means (e.g. Finn, 1989; Lin et al., 2023); however, it can now be agreed upon that student engagement is a multidimensional construct (Fredricks et al., 2016). In this study, we define engagement as a three-dimensional construct: emotional, behavioral, and cognitive

engagement (Fredricks et al., 2004) - as further supported by recent empirical studies (Xu, 2023).

Emotional engagement focuses on interest, positive emotions, enjoyment, and enthusiasm in class. Behavioral engagement is shown in observable behaviors, such as when students are paying attention, participating in class (discussion, raising their hands, etc.), following directions and any other noticeable physical or verbal action from students. Cognitive engagement is more difficult to identify, because it refers to students' mental effort (learning process, strategy, focus, and metacognition; Fredricks et al., 2016).

These three dimensions of student engagement have been used in education for decades, with different measures (Wong & Liem, 2022). Some common data collection methods used include student self-reports, experience sampling, interviews, and observations. While student self-report is the most typically used because it is uniquely positioned to collect students' subjective perceptions on their engagement (Fredricks, 2022a), research indicates that relying on any singular method cannot reliably capture the entire, multidimensional construct. Therefore, to provide a comprehensive and reliable evaluation of the full construct, there is a critical need for multiple methods that work together to collect and triangulate the data. Specifically, to address the core difficulty of identifying and measuring the mental effort of cognitive engagement, our study utilized the ICAP framework (Chi & Wylie, 2014) to systematically categorize observable student actions and behaviors.

3. A Framework for Understanding Interactive Approaches in Relations to Student Engagement

The Interactive-Constructive-Active-Passive (ICAP) framework was selected to show how instructional approaches relate to student engagement. This ICAP framework (proposed by Chi & Wylie, 2014) analyzes the link between instructional approaches and how the students are cognitively engaged. In the literature, it has been used to guide experiments by testing different forms of peer instruction (Henderson, 2019) and to investigate student engagement in non-face-to-face activities (video lectures, discussion forums, readings, tutorial materials; Lee et al., 2020). This framework focuses on the different levels of cognitive engagement required by classroom student activities. In doing so, it fills the gap that research has shown regarding the direct link between instructional approaches and students' cognitive engagement (Pintrich et al., 2000).

The ICAP is not only a relevant framework for measuring cognitive engagement, it is also an adaptable framework that can be used when evaluating any kind of instructional approach. In order to understand how a student is cognitively engaged during an activity, we employed systematic classroom observations and used the ICAP Framework as a behavioral coding system. This allowed us to translate a student's overt action into one of the four measurable modes: passive, active, constructive, or interactive. These four modes are used as different levels of cognitive engagement, interactive being the highest and passive being the lowest ($I > C > A > P$). Interactive engagement has to meet two criteria: the people involved must construct knowledge that comes from the individual or socially, they must have an adequate

amount of time taking turns to talk and some form of social action. Constructive engagement is defined as occurring when learners actively build their own understanding (Fredricks, 2022b). There is a fine line between the active and passive mode of engagement. In active engagement, ‘some sort of overt motoric action or physical manipulation is undertaken’ and in passive engagement, no overt behavior besides listening and paying attention is shown (Chi & Wylie, 2014, p. 221), examples shown in Table 1. These examples illustrate how students’ engagement would be classified based on the behaviors shown during certain classroom activities, and can be modified to fit any learning activity.

Our aim for this study was to explore active learning approaches and their impact on student engagement. The analysis of student engagement was performed from a triangulated three-point perspective, gathering data from three distinct sources: students (questionnaire and open-ended questions), teachers (interviews), and a non-participant observer (classroom observations and a framework).

Table 1. Examples of learning activities by mode of engagement.

	Passive <i>receiving</i>	Active <i>manipulating</i>	Constructive <i>generating</i>	Interactive <i>dialoguing</i>
Listening to a lecture	Listening without doing anything else but oriented toward instruction	Repeating or rehearsing; Copying solution steps; Taking verbatim notes	Reflecting out-loud; Drawing concept maps; Asking questions	Defending and arguing a position in dyads or some groups
Reading a text	Reading entire text passages silently/aloud without doing anything else	Underlining or highlighting; Summarizing by copy-and-delete	Self-explaining; Integrating across texts; Taking notes in one's own words	Asking and answering comprehension question with a partner
Observing a video	Watching the video without doing anything else	Manipulating the tape by pausing, playing, fast-forward, rewind	Explaining concepts in the video; Comparing and contrasting to prior knowledge or other materials	Debating with a peer about the justifications; Discussing similarities and differences

Note: From Chi and Wylie (2014, 221).

4. Method

This study employed a mixed-methods design to examine active learning’s impact on student engagement in undergraduate Biology courses. Qualitative data (ethnographic observations and teacher interviews) and quantitative data (student self-report questionnaires) were collected to provide a comprehensive understanding of engagement from multiple perspectives. Data were gathered from two courses across multiple academic years, enabling comparisons across cohorts and instructional contexts. The analysis was guided by the three-dimensional construct of engagement (emotional, behavioral, cognitive; Fredricks et al., 2011) and the ICAP framework (Chi & Wylie, 2014) to systematically assess observable student behaviors and cognitive engagement.

4.1 Participants

Data were collected from two undergraduate Biology courses (Cellular and Molecular) at a French university, involving a total of 131 final-year students across four cohorts. Participants were selected based on their enrollment in the targeted courses and their willingness to participate, constituting a convenience sample. The Cellular Biology course

included two cohorts (academic years: 2016–2017: $n=19$; 2017–2018: $n=12$) taught by two teachers, while the Molecular Biology course included two cohorts (academic years: 2015–2016: $n=67$; 2017–2018: $n=33$) taught by one teacher. Before observing and giving out the questionnaires, the observer explained her PhD research project to the students. She verbally asked them if they would consent to being a part of her study anonymously, to which all of the students agreed. Participants were contingent upon the receipt of informed consent. All participants were anonymous. The observer didn't take any pictures and was never given a list of names of the students.

4.2 Data Collection and Analysis: The 3-Point Perspective

4.2.1 *Observer's Perspective: Observing Student Engagement by Using An Ethnographic Method and Analyzing The Data by Using The ICAP Framework*

The observations focused on student engagement during the two courses and were conducted by a single trained observer using an ethnographic method. The instrument used for observation was an ethnographic method of observation. The collected observation data were then analyzed using Chi and Wylie (2014) ICAP framework. The students were aware of the observer's presence as she informed them of her work and also because she observed the same cohorts in both Biology courses. The choice of using an ethnographic method was done to provide an in-depth description when trying to understand human behavior at the time when it is happening. The observer wrote down everything that happened in chronological order, including student activities (presenting and/or listening, talking with group members, taking notes, working on their computers) and the teachers (answering questions, asking questions, moving from group to group). Each observation lasted the full length of the session (2–3 hours), allowing the observer to capture all relevant behavior as they occurred. Using this narrative as a form of observation, after each session, the observer was able to create a timeline of what students were doing. The ICAP framework was used as a tool to analyze the observations noted when using the ethnographic method. This ethnographic method of observation was used because it gave a clear indication of what exactly the students were doing during class. The framework served as a guide and an overview for understanding levels of cognitive engagement based on the observations done in class. Some examples from the ICAP framework of cognitive engagement in an interactive mode were debating, constant back-and-forth by asking and answering questions, discussing an issue by making constant contributions, and so forth (Chi & Wylie, 2014). Those examples could be seen in the observer's ethnographic notes.

4.2.2 *Students' Perspective: Evaluating Student Engagement by Using The CEI and Open-Ended Questions About The Instruction Approach*

Students' self-reported engagement in class was measured using the Classroom Engagement Inventory (CEI, Wang et al.'s, 2014). It assesses student engagement across

three dimensions: emotional engagement, which refers to students' affective reactions in the classroom, such as interest, enjoyment, and sense of belonging; behavioral engagement, which includes participation in learning activities, effort, and persistence; and cognitive engagement, which involves the investment in learning, use of learning strategies, and self-regulation (Fredricks et al., 2011; Xu, 2023). The students were asked to fill in the CEI and open-ended questions anonymously.

Student engagement was measured using the French-translated Classroom Engagement Inventory (CEI, Wang et al., 2014). The CEI is a 24-question 5-point Likert scale inventory (from 4¼always to 0¼never). The inventory was translated into French using the forward-backward translation method (Mimura & Griffiths, 2008). The French-translated version of the CEI was validated on a sample of 407 participants, students from the same university. Overall, this test has a Cronbach's alpha of 0.73 for all three factors. In Wang et al.'s (2014) original study, the CEI reliabilities ranged from 0.82 to 0.92 over all engagement factors. Table 2 shows Cronbach's alpha for both the original CEI and for the French translated version, for each dimension of engagement. This comparison confirms the psychometric soundness of the French-translated CEI, validating its reliability for measuring student engagement within the context of the present study.

Table 2. Validity (cronbach's alpha) for the three dimensions of engagement from the original CEI and the French-translated version.

	Wang et al. (2014)	Sample of 407 participants
Emotional engagement	0.90	0.73
Behavioral engagement	0.82	0.59
Cognitive engagement	0.88	0.75

On the paper version of the French-translated CEI, participants were presented with three open-ended questions asking about their opinions about the active learning approach. These questions were: What aspects of the teaching method did you appreciate and why? What particular aspects of the teaching method did you appreciate the least and why? And what other suggestions would you give to better the teaching method (activity, environment, content, etc.)? These open-ended questions were used as a supplement to the questionnaire itself. Having students' spontaneous comments about the teaching method allowed us to see if the questionnaire was reliable, as well as if the comments were consistent based on the observations from the outsider's perspective and from the students' point of view. To analyze the students' responses, the researcher identified themes that emerged and counted the number of times the students responded concerning those themes.

4.2.3 Teachers' Perspective: Explanations of Active Learning Approach

To understand the process teachers go through when choosing an instructional approach and how they believe that approach helps students engagement during the course, semi-structured interviews were conducted with the teachers. Cellular Biology was held twice, once for each cohort, and Molecular Biology was held once, for the first cohort. Interview questions were: why did you decide to change from a lecture-based classroom to a student-centered classroom? How long have you been teaching this approach? And, how did you

learn about this type of student engaged learning? What were the adjustments you have made since you started using this approach? And did it make a difference with student outcomes? The interviews were conducted informally to understand teachers' motivations, perceptions of students, and reasoning behind adopting the active learning approach. The teacher interviews were conducted in English, the shared language between the researcher and the teachers. Given the teachers' high English proficiency, this approach ensured clear communication and bypassed the need for post-interview translation, thereby protecting data integrity.

4.3 Research Procedure

This study will follow two Biology courses that use active learning as a way to engage students.

Course 1: Cellular biology. There was a total of 18 hours in the course, per cohort, that focused on three parts, and for each part, there was a grade attributed. These three parts were: (1) working in the laboratory (6 hours in 2 sessions), where students conducted experiments on plants and animals; (2) working in groups of 2 to 3 students on assigned topics (6 hours in 2 sessions) to prepare their presentations and the reading material (a maximum of two pages) for the other students; and (3) interactive student-led presentations (6 hours in 2 sessions), which lasted about 30 minutes per group. The total grade consisted of analysing results in the laboratory (20%), working in groups to provide reading material based on the subjects in their presentations to their classmates (20% participation and 20% reading material), the presentations (20%), and the final exam, which was based on the subjects of the presentations (20%).

Course 2: Molecular biology. For this course, there are 24 hours of classroom time for each cohort, which is then divided into 12 sessions of 2 hours. There are three parts to this course: (1) creation of the chapters (8 sessions of 2 hours), where working groups of 5 to 6 students in each group write a 'chapter' based on an assigned topic for the reading material for their classmates; (2) rotating Tables (8 sessions of 2 hours), which involve groups of students working together to solve problems by way of drawings and then sharing their answers with the rest of the class; and (3) creation of the exam (8 sessions of 2 hours), where the students generate a range of exam questions (both easy and difficult). The two assessments given to the students are a midterm exam (30%), which consists of points that the teacher gives to each student based on their individual and group work effort, and a final exam (70%), which is based on the content produced during the three different parts of the course.

The data collected for the two courses included teacher interviews, observations, and a questionnaire. Interviews were analyzed thematically, observations were coded using the ICAP framework (Chi & Wylie, 2014), and questionnaire responses were analyzed quantitatively and qualitatively to assess emotional, behavioral, and cognitive engagement. The Cellular Biology teacher was interviewed just before the start of both school years (January 2017 and January 2018), while the Molecular Biology teacher was interviewed

before the start of cohort 1 (January 2016). The ethnographic method was employed twice for the Cellular Biology course (during the last session of both cohorts) and 18 times for the Molecular Biology course (11 sessions with cohort 1 and 7 sessions with cohort 2). The observer was not able to attend all the course sessions and participated based on availability. The CEI was administered to all cohorts during the final 15 minutes of the last session of the course.

5. Results

5.1 Observer's Perspective: Observing Student Engagement by Using An Ethnographic Method to Produce a Timeline Analysis and The ICAP Framework

We provide the two timelines for the Cellular Biology course and a selection of four representative timelines from the 18 collected for the Molecular Biology course.

5.1.1 The Timeline Analysis: Cellular Biology

Looking at the ethnographic timeline analysis of active learning sessions shown in Figure 1 and 2, overall, students were more 'engaged' during the lesson than 'disengaged'. Figure 1 shows three times when students were disengaged (i.e. on their phone, talking when not appropriate, and one student left). Figure 2 shows the same kind of timeline analysis for the ethnographic observation for cohort 2. Twelve incidents were reported in which students were disengaged over a period of 3 hours. Out of the 12 incidents of disengagement, a few students repeatedly disengaged themselves by talking to others ($n=3$) or interacting on their phones ($n=3$), while other students talked once ($n=4$) or used their phones once ($n=1$).

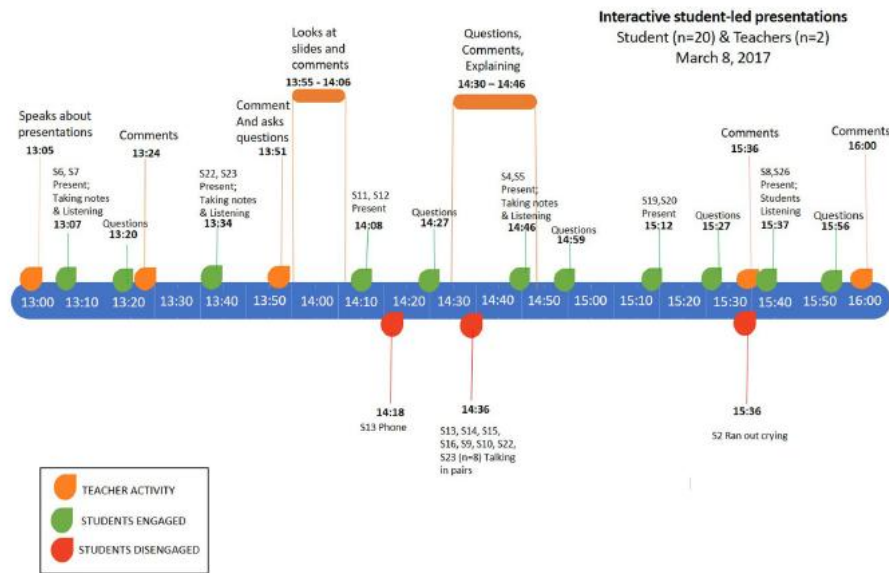


Figure 1. Cellular Biology - Cohort 1: Timeline analysis of an observation of an active learning session (8 March 2017).

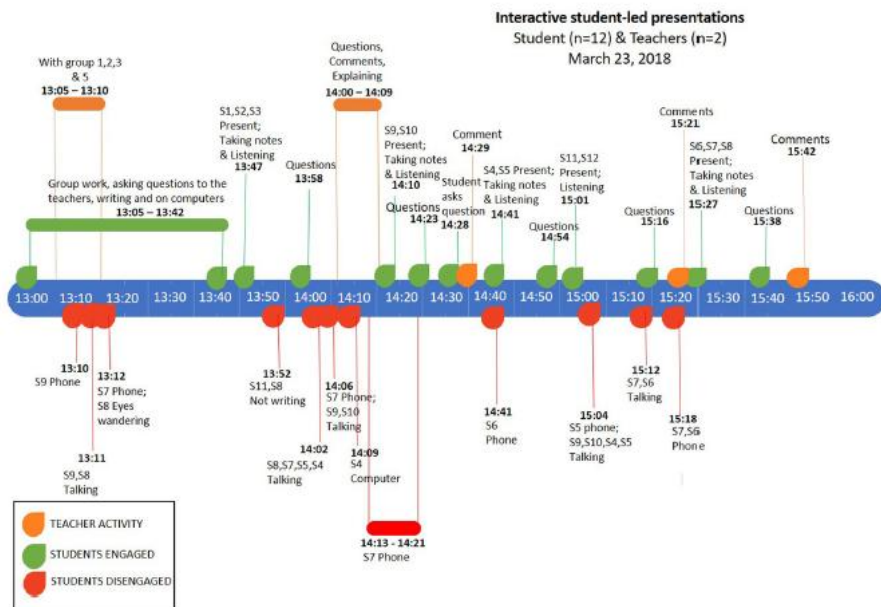


Figure 2. Cellular Biology - Cohort 2: Timeline analysis of an active learning session (23 March 2018).

5.1.2 The Timeline Analysis: Molecular Biology

The timeline analysis for the Molecular Biology course are shown in Figures 3 and 4. Figure 3 represents cohort 1. Both timelines show that the students are very active during the two sessions. The total number of students disengaged are 10 students. Student 9 (S9) was continually unfocused (using a phone, head on the desk) during the 27 January session. In the 22 March session, six students were disengaged because they were on their phones (less than two minute).

Figure 4 presents two timeline analysis of cohort 2. With a total of 33 students, 18 students were disengaged on 16 January and 8 students were disengaged on 14 March. During the 16 January session, all of the students that were disengaged were on the phone or on social media, where they were on for less than a minute long. Some students of those students were disengaged two to three times throughout the session. During the 14 March session, there were 8 students that were on their phone or on social media. Some of the students were on their phones (less than a minute) more than once: S1 (n=3), S25 (n=4) and S2 (n=2).

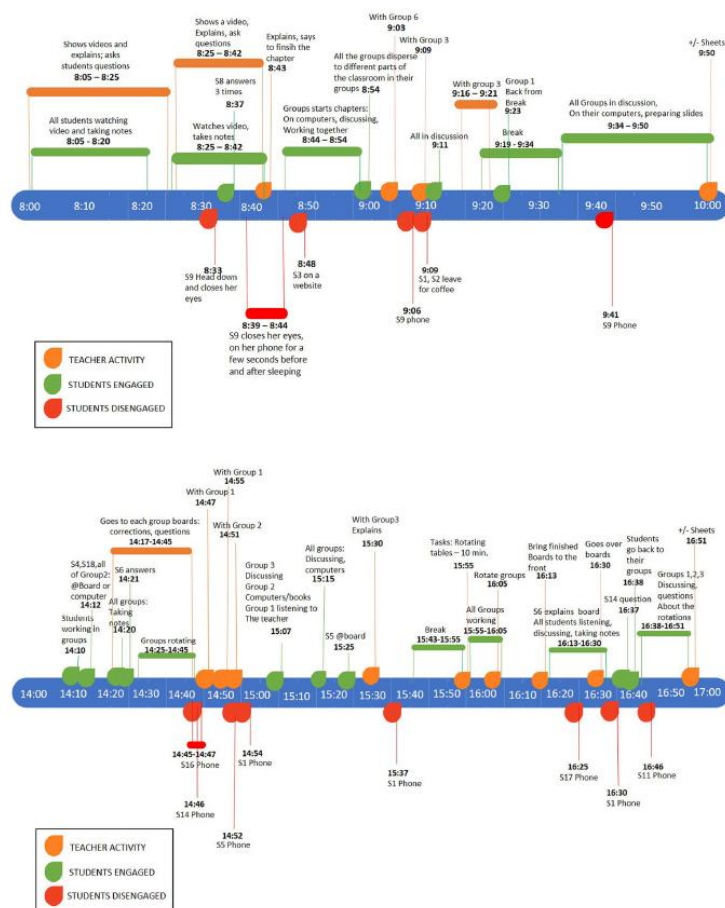


Figure 3. Molecular Biology - Cohort 1: Timeline analysis of an observation of an active learning session (27 January 2016 & 22 March 2016).

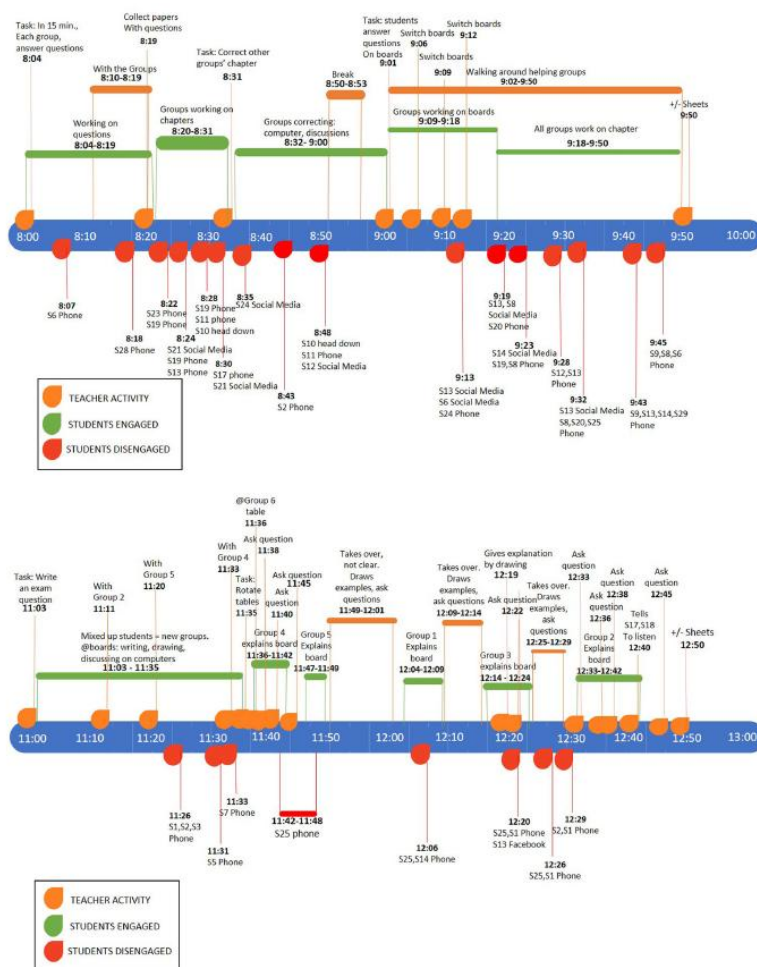


Figure 4. Molecular Biology - Cohort 2: Timeline analysis of an observation of an active learning session (26 January 2018 & 14 March 2018).

5.1.3 Modes of Engagement: The ICAP Framework

The ICAP framework was used as a reference for understanding if students' engagement was passive, active, constructive or interactive. Based on the observations from both the Cellular and Molecular Biology courses and guided by the ICAP framework, we constructed a table illustrating the different modes of engagement during various active learning approaches in class. Table 3 presents five active learning examples derived from our observation data, with some moments illustrated through the ethnographic observations conducted in this study, along with the different modes of student engagement during these activities.

Table 3 outlines five main activities: creation of chapters, rotating tables, creation of the exam, students presenting and students listening. Some activities apply to both the Cellular and Molecular Biology courses, while others are more specific to one. The Molecular

Biology course includes all five activities, while the Cellular Biology course uses only creation of the chapter, students presenting and students listening. For example, during chapter creation in both courses, students demonstrated constructive engagement by reflecting, monitoring, and explaining their understanding of the material, while also being interactive by asking questions to promote discussion. Similarly, in both courses, students presenting were in a constructive mode because self-explaining was necessary to understand what they had learned and convey that knowledge to their peers (Chi & Wylie, 2014; Kusumoto, 2018). They explained the material in their own words (constructive) rather than simply relying on the teacher's notes (passive).

In the Cellular and Molecular Biology courses, students listening to presentations shifted between active and interactive modes. While taking notes, some students engaged actively by copying what they heard, while others demonstrated constructive engagement by reformulating the information in their own words. Presenters often incorporated interactive activities, such as asking questions to test their audience's comprehension. This encouraged interactive engagement for the presenters, who deepened their understanding through peer interaction, and constructive engagement for the audience, who generated and answered questions based on what they heard.

The ICAP framework's flexibility enables students to shift between different modes or remain in one mode during a session. For instance, students can be passive, simply listening, or become constructive by reflecting, self-explaining, and asking 'why'. Interactive engagement combines constructive behaviors with dialogue, such as promoting discussions, expressing new ideas, or collaborating within groups.

Table 3. ICAP mode of engagement—active learning.

	Passive	Active	Constructive	Interactive
Creation of the chapters	Copy-paste information found, watch videos	Write information in their own words, ask for more clarification, verify if information is correct	Reflect, monitor and explain one's understanding of the subject, ask questions to compare and contrast information, generalizing the information obtained	Help group members, promote discussion with group members and teacher, create organizational tools to explain information
Rotating tables	Listen to what others are saying, closely observe what is written, watch videos, take notes	Write on boards, ask for clarification, take notes in their own words, read what is written on the boards and question it without saying it out loud	Explain why their response is correct, expressing concerns based on others' responses, write on board to promote discussion, comparing and contrasting what is written on the boards	Promote discussion with others and teacher (verbally), help peers in understanding the subject, expressing new ideas that emerged from the discussions, incorporate feedback and responses from the group
Creation of the exam	Listen to group, write a question (copy-paste), take notes	Write a question in their own words, take notes in their own words, ask question for clarification	Explain why their question should be used, connecting, comparing and contrasting which is a good question,	Ask questions to promote discussion for their question, incorporate feedback and responses to create a new question, encourage others to write new questions
Student presenting	Using notes that the teacher gave them	Copy-and-paste from teacher notes or information is correct	Self-explaining and reiterating to their peers	Creating questions/ discussion for their peers
Student Listening	Sitting and not taking notes	Copy-and-paste the notes	Writing notes in their own words/way; self-explaining the presentation	Collaborative note-taking in innovative ways

Note: This table demonstrates the use of the ICAP framework to categorize students' learning activities.

5.2 Students' Perspective: Evaluating Student Engagement Using the CEI and Open-Ended Questions on The Instructional Approach

The results for the three-dimensional construct of student engagement were measured quantitatively using the CEI and qualitatively using responses to an open-ended questionnaire about the instructional approach.

5.2.1 Quality of The Engagement: Emotional, Behavioral and Cognitive from The CEI

Using the CEI in the Cellular and Molecular Biology courses, the students (N=131) were engaged in their course. The results presented in Table 4 show that students were emotionally (Mean = 2.72 out of 4; SD = 0.56), behaviorally (Mean = 2.72 out of 4; SD = 0.48) and cognitively (Mean = 2.78 out of 4; SD = 0.47) engaged in their course. On the scale used, 0 was the lowest possible value and 4 the highest. There were statistically significant positive relationships between behavioral and emotional engagement, $r = 0.43$, $p = 0.000$ and behavioral and cognitive engagement, $r = 0.54$, $p = .000$. The relationship between emotional and cognitive engagement was significantly positive, $r = 0.28$, $p = 0.008$, but the strength is relatively weak. The highest average was for cognitive engagement, showing that the students were engaged in learning during the active learning approaches.

Table 4 also shows the averages for both courses separately, based on the average score for all items addressing each dimension, which shows that the participants in each course were engaged. These results reinforce the appropriateness of the use of active learning as a way to engage students, with mean scores on all three engagement components on the positive end of the scale (above 2.5).

In addition to the questionnaire, the students also responded to 3 open-ended questions. The analysis of their responses highlighted the students' views about active learning and its links to engagement. Figure 5 shows that the students in both courses found it interesting to exchange ideas and learn from their classmates in an interactive way (47 mentions). Students were also interested in this particular approach because they were able to see the outcome from what they produced and their peers' products (11 mentions) and the teaching method itself (25 mentions). For both courses, they also found it difficult to learn (18 mentions) and work with students who were not as motivated as they were in their groups (35 mentions). In both cohorts, as far as suggestions regarding the instructional approach, students felt that they would like more feedback from their teachers (19 mentions) and also have the choice to choose their group members (13 mentions).

Three obvious differences seen between the two courses were that the students in Molecular Biology wanted more feedback from the teacher (21 mentions) and suggested that there needed to be improvement in the instructional approach (15 mentions) and to have more structure when creating the chapters (11 mentions).

Cellular Biology School years: 2016-2017 & 2017-2018 (<i>n</i> = 31)	
1. What aspects in particular of this method of learning did you most appreciate? And why?	(20) Group work/exchange with others (11) The outcome (6) Develop new skills
2. What aspects in particular of this method of learning did you least appreciate? And why?	(11) Difficult to learn (7) Group work: don't always agree/investment/different work effort (3) Stress (1) Difficult presentation theme (1) A lot of work done outside of class
3. What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.)	(5) More feedback (4) Room not adapted (2) Different levels of group knowledge
Molecular Biology School years: 2016-2017 & 2017-2018 (<i>n</i> = 100)	
1. What aspects in particular of this method of learning did you most appreciate? And why?	(45) Group work/exchange with others (25) The teaching methods (9) Interesting (2) Real life experience
2. What aspects in particular of this method of learning did you least appreciate? And why?	(28) Group work: don't always agree/investment/different work effort (21) Need feedback/verification from teacher (7) Difficult to learn (7) Issues with the approaches (4) Redundant explanations
3. What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.)	(15) Improvement to the approaches (Have moments of real lectures, alternate chapters to learn different things, more diversity) (14) More feedback (12) Group members: More practice together, choose groups, change groups after each session (11) Need more structure and limits for chapters, have a summary sheet, use suitable diagrams (2) A more adapted room (1) Have a set time frame

Figure 5. Student responses to the open-ended questions from both cohorts (Cellular, *n* = 31, Molecular Biology, *n* = 100) concerning student engagement and active learning.
Note: Numbers shown in the figure indicate how many times students mentioned the given topic.

5.3 Teachers' Perspective: Active Learning

Cellular Biology

The important information from the semi-structured interview with one of the team of teachers was the fact that the teacher wanted to change her approach to teaching. Giving a lecture was not enriching and her students responded negatively to her old approach. For the first interview, in 2017, when asked what her objective was after changing her lecture-based approach to a new approach, she said that she wanted the students to have 'the ability to understand the texts that they read and to be able to extract main concepts in the text'. The teacher had been going back and forth about changing the layout of the course since 2013, but had not fully committed to the change. Having taught this course for many years, she was able to sit back and analyze what was needed to fulfill the goals and expectations of the course. After understanding what was required, the teacher started the 'design' process. She decided that four sessions (two sessions for group work and two sessions for students presentations) was the amount of time needed.

She also agreed that having students interact while giving their presentation was important for engagement. She did not want the audience to sit and listen passively. For the past few years, she had tried out different approaches. She tried having students present different topics to the rest of the class and found that a lot of the students only focused on their own presentations and not so much on those of their classmates. Since 2016, the two teachers had found that an interactive student-led presentation approach was a good fit for both the teachers and students.

What did an interactive student-led presentation mean for them? It meant that a group of students (usually 2–3) would present their work to the other students as if they were the teacher(s) of the class. The criterion making it interactive and engaging that the students presenting must have audience participation. They usually did that by leading with discussion questions, having a question-and-answer session at the end or asking the students in the audience to give examples or reiterate what was presented. Many of the students' responses to the open-ended questions were positive and addressed the concerns the teachers had.

Molecular biology

The semi-structured interview, conducted in January 2016, sought to understand why the teacher wanted to change their course from a lecture-based format to an active learning approach. The teacher decided to make this change in 2012, influenced by the Codesign methodology (Binder et al., 2008), which brings groups of people together to co-create ideas and concepts while working toward a common goal. This concept became the basis for his new course. He wanted students to actively participate during class and transition from the role of student to teacher. Having students take on the role of teacher gives them greater responsibility for their own learning.

It wasn't until 2014, when the teacher finalized his course to what it is today. He decided that he wanted his students to work on three important tasks that the teacher would typically handle and have the students take charge instead. That is when he created three active tasks:

students creating chapters for the class to use as a study guide, students teaching other students what they know about certain topics, and students creating the exam questions for the final exam. These tasks allow the students to be interactive in class and engaged in the learning process. The teacher believes that, in order to learn, one must teach.

6. Discussion

This study found that active learning was associated with students' behavioral and cognitive engagement by use of the three-point perspective. Although university courses can be taught in lecture-based environments in order to present content to a large number of students, lectures promote mostly passive and surface learning (Deslauriers et al., 2019; Freeman et al., 2017). Unfortunately, students who sit inactive listening to lectures have difficulty paying attention. In this study, the data collected suggest that students were engaged when active learning was being used in two Biology courses. These results also support the idea that using multiple instruments (qualitative and quantitative) capturing different points of view (the three-point perspective) and an analytical tool (the ICAP framework) all together as a whole, helped researchers see the impact active learning has on student engagement. For this reason, the researchers forward the following two emerging discussion points:

6.1 Using the 3-Point Perspective for Data Collection and Analysis

The findings in the present study suggest that the three-point perspective is useful in measuring how the active learning engaged students in two Biology courses. The students, teacher and observer had positive common perspectives on both the instructional approach and the learning experience in the classroom. According to Arthurs and Kreager (2017), an active learning environment contributes to a more positive learning environment. Likewise, teacher interviews and classroom observations supported what the students had written in the open-ended questions, which confirmed that the students were engaged and that using this type of observational analysis is beneficial (Hendry et al., 2014). These results support the initial hypothesis that when students are engaged in the instruction, they are motivated to learn (Deslauriers et al., 2019). Overall, the results from this study suggest that using three different perspectives as a triangulation method works when intertwined together to form one conceptual analysis, because there was mutual reinforcement of everything the students, teacher and observer said about what they observed. These results can therefore help other teachers who want to change their approach to teaching, so that they can be confident in moving to a more active learning environment (Baeten & Simons, 2022).

Previous research has used active learning as a teaching and learning approach, but there has not been a direct link with the three-dimensional construct of student engagement (Aguilera et al., 2017). For that reason, using more than one instrument helped create better support both quantitatively and qualitatively when analyzing student engagement. By observing what happens in the classroom, the observer can understand and measure how

active learning has overall value for the students' engagement. Based on developments in measurement of teaching, having more than one type of measurement when evaluating teaching can be valuable (DeMonbrun et al., 2017). So, having used several instruments in this study to capture three different points of view reinforced and created a stronger measurement apparatus as a whole. In addition, using a qualitative (ethnographic) method for observations had added value for the analysis of student behavior.

6.2 Analyzing Cognitive Engagement through The ICAP Framework

The aim of using Chi and Wylie (2014) ICAP framework was twofold: observing behavior that indicates cognitive engagement and extending the research of Chi and Wylie. A number of strengths of this framework can be identified. First, the ICAP framework gives examples of what different levels of cognitive engagement look like based on observing behavioral engagement. Since research suggests that cognitive engagement is often difficult to assess (Fredricks et al., 2016; Xu, 2023), it was important to be able to use other instruments that could help measure cognitive engagement. Second, the ICAP framework shows that there is an apparent relationship between behavior and cognition (Wiggins et al., 2017). The ICAP framework has added value as an analytical tool when using the three-point perspective. The ethnographic method showed that the students mostly used constructive and interactive modes of engagement. Visually observing students while they are cognitively engaged is a more concrete way of understanding their willingness to exert effort and master the necessary skills than by using other forms of assessment (Huang et al., 2019). Third, this project redefined what the ICAP had to offer, in that the original examples indirectly led us to come up with new examples. Above all, we observed that students were constructive and interactively engaged in the learning process. These findings show that active learning promotes higher-order cognitive engagement and that combining multiple perspectives and instruments provides a more complete understanding of student engagement. This study contributes empirical evidence that triangulating observation, teacher input, and student self-reports can better capture the impact of active learning in higher education.

6.3 Limitations

Although the data coming from the multiple instruments showed that the students in both courses were behaviorally and cognitively engaged, some limitations should be addressed. First, the years in which the data was collected were before the COVID-19 pandemic. The timeframe of these courses, whether before or after the pandemic, is not a significant variable because many factors remained unchanged, including the student profile, course content, instructors, assessments, and active learning approaches. Secondly, the observer did not attend all the sessions of both Biology courses. Attending more sessions might have had more weight on what was observed, and could have showed possible similarities and/or differences within each course. Finally, there were four questions on the CEI that caused the validity of the questionnaire to be low compared to the original, due to two factors (grade level and translation). The original CEI was given to American high school students, while in this

project the respondents were third year French university students. Because of that, one question was, 'I think deeply when I take quizzes in this class' (cognitive engagement), which doesn't work with these university students since they did not take any quizzes during the course. When the questionnaire was given to the students, they had not taken any quizzes or tests. Their marks were based on the presentation, reading material, laboratory analysis, participation and the final exam, and were received after the courses was over. Although the translation process was done using the back-translation method, three questions were lost in translation. In French, 'I feel interested' (emotional) is not something students would say about a course. Students would more likely say what they felt they were interested in specifically. 'I do not stop working at the end of class' (behavioral) and 'I go back over the things I don't understand' (cognitive) were translated in a negative rather than a positive sense. The first sounded as if students were so interested in the lesson that they lost track of time and the second sounded as if looking back over their work was something that should not be done, as if they were doing something bad.

7. Conclusion and Implications

Recent research on active learning has provided understanding of the benefits of instructional approaches in higher education. This paper's findings suggest that the approach drives a new and interesting learning experience for students and the application of the three-point perspective confirms that using more instruments helps us to understand the three dimensions of engagement, with a focus on how to observe cognitive engagement. The contribution of this study lies in showing that combining the three-point perspective with the ICAP framework provides a practical and reliable way to capture student engagement in real classroom contexts. We can further this project in future studies by adding another supporting instrument to further analyze emotional engagement. From an applied perspective, the results have implications for instructors in higher education who are seeking ways to strengthen student participation and learning outcomes by implementing active learning approaches. Finally, the evidence found in this study indicates that investigations of active learning approaches that use multiple ways, the three-point perspective, to evaluate student engagement will help further research when it comes to analyzing approaches to engaging students.

Chapter 14

General Discussion and Conclusion

General Discussion and Conclusion

The purpose of this doctoral research was to examine how student-centered approaches to instruction influence student engagement in higher education. Guided by the central research question: *How can student-centered approaches to instruction impact student engagement in higher education?* Rather than addressing whether these student-centered approaches increase student engagement, the findings in this study point to the conditions under which engagement emerges and how it is shaped by pedagogical design and student agency.

This study investigated three pedagogical approaches: inquiry-based learning, collaborative learning, and game-based learning across nine undergraduate and graduate courses at the Université Catholique de Lille. Across these courses, the results indicate that while student-centered approaches are generally associated with higher levels of engagement, this relationship is not a guarantee, and it varies from case to case. Instead, the levels of engagement varied depending on how these approaches were implemented and the roles students were invited to take as active agents in the learning process.

Student engagement was conceptualized as a multidimensional construct comprising of behavioral, emotional, and cognitive engagement (Fredricks, Blumenfeld, & Paris, 2004). However, the findings suggest that these dimensions do not develop in parallel; rather, they interact in complex and sometimes uneven ways. In several cases, high levels of behavioral participation did not necessarily translate into deep cognitive engagement. By focusing on the limits of observable activity, it shows that active students are not always actually learning. These patterns also suggest that engagement is closely linked to how students apply agency within learning activities, rather than participating alone.

To capture the complexity of engagement, the thesis adopted a triangulated perspective, integrating insights from students, teachers, and an external observer. This approach makes it possible to move beyond single perspectives. The findings suggest that behavioral, emotional, and cognitive engagement must work together across the pedagogical continuum, where there is a range of student agency. It is necessary to have alignment across the three dimensions when understanding how engagement is experienced, enacted and perceived across all actors, while also considering the role of student agency.

Overall, the results show that while student-centered approaches are generally associated with higher levels of engagement, this is not guaranteed. These findings challenge the assumption that such approaches automatically produce engagement. Instead, they suggest that engagement is a dynamic and context-dependent process. It depends on the interaction between pedagogical design, student agency, and the alignment of behavioral, emotional, and cognitive dimensions. From this perspective, the effectiveness of these approaches depends less on their label (inquiry-based, collaborative, or game-based) and more on how they are enacted and scaffolded in practice.

To interpret these findings, this discussion is organized into five parts. First, it situates the results within a socio-constructivist framework, focusing on student agency and the idea of a pedagogical continuum. Second, it examines the three dimensions of engagement and how they relate to one another. Third, it analyzes how these dynamics appear across the nine courses with attention to differences between inquiry-based, collaborative, and game-based approaches. Fourth, it considers the perspectives of teachers, students, and observers as a way to triangulate and better understand engagement. Finally, it outlines the main implications and recommendations, including the need to scaffold pedagogical continuum, reconsider how success is defined, and identify directions for future research.

1. The Philosophical Foundation

The purpose of this section is to better understand the ‘vision’ of this thesis as a whole, and also the philosophy of teaching. The first is based on a socio-constructivist vision in education. It focuses on the student as a co-constructor of information and as a consumer of information. The second concerns student agency, where students take ownership of their learning process. The third talks about the pedagogical continuum. By doing so, the focus will be on the vision of learning from a socio-constructivist point of view, the importance of having student agency in higher education, and how the pedagogical continuum is used when measuring the shift of agency.

1.1 A Socio-Constructivist Vision of learning

At the heart of this thesis lies a particular vision of what learning is and what it is for. Rather than treating knowledge as something that exists independently and is simply transferred from teacher to student, this study is grounded in the belief that knowledge is something people build together, through dialogue, through shared experience, and through the friction of working out ideas with others. This is, in essence, the socio-constructivist position, and it shapes every methodological and analytical choice made in this research.

The intellectual roots of this vision are well established. Vygotsky (1978) argued that all higher cognitive functions appear first between people before they are internalized individually, making social interaction not a supplement to learning but its very engine. Dewey (1938) pushed further, insisting that meaningful learning only occurs when students are active participants in their own education, which means that they are engaged with real problems, real peers, and real consequences. Bruffee (1999) extended these ideas into higher education specifically, describing knowledge as a social artifact: something that is negotiated and constructed within communities rather than packaged and delivered by an authority.

What unites these thinkers is a fundamental challenge to the transmission model of teaching, which is the idea that a teacher's job is to fill students with content. In contrast, the socio-constructivist vision repositions the classroom as a space where knowledge is not delivered but co-constructed, not consumed but created. Recent scholarship confirms that this is not merely a philosophical preference but a pedagogically effective one. Systematic reviews of constructivist approaches in higher education consistently find that they shift

students from passive recipients of information to active builders of understanding, with measurable gains in engagement and learning outcomes (Arega & Hunde, 2025; Vespone, 2023; Dang & Nguyen, 2023).

This vision has direct implications for how the nine courses in this study were designed and observed. Each course, in its own way, attempted to move students away from the role of audience and toward the role of co-author of their learning, their knowledge, and in some cases, their classroom itself. Whether that shift was successful, and under what conditions, is precisely what this thesis sets out to examine.

1.2 Student Agency

If socio-constructivism tells us how knowledge is built, then student agency tells us who builds it and more importantly, who we are asking to build it every time we walk into a classroom.

The central question driving this thesis is whether higher education is designed to fill students with content or to develop people who know how to think, question, and take ownership of their own learning. The answer has been to develop students to be autonomous and in charge of their learning. And yet, so much of what happens in universities still looks like professors filling students with content. Students sit, listen, write down what they are told, and reproduce it on an exam. We call that education. The literature reviewed in Chapter 1 challenges whether this constitutes meaningful learning.

Dewey (1938) understood this long before most. He argued that meaningful learning does not happen to students, it happens with them, through active engagement with real problems and real decisions. Freire (1970) was even more direct. He called the traditional model of teaching the banking model, where the teacher makes deposits of knowledge into students who are expected to store and return them on demand. What Freire wanted instead was education as a practice of freedom, where students are not passive receivers but co-creators of the knowledge they are building. Neither Dewey nor Freire used the term student agency explicitly, but they were describing exactly that: the difference between a student who is acted upon and a student who acts.

Bandura (2001) gave us the psychological language to understand how agency actually works. Through his Social Cognitive Theory, he identified four capacities that define an agentic person: intentionality, forethought, self-regulation, and self-reflectiveness. That is the kind of student this thesis aims to support, not someone who adapts to whatever is in front of them, but someone who brings their own thinking, their own questions, and their own agency. That is the kind of student wanted in this thesis. Not someone who adapts to whatever is in front of them, but someone who brings their own thinking, their own questions, and their own agency to the table.

In the context of higher education, Jääskelä et al. (2017) showed us that student agency is not a fixed personality trait, some students do not simply arrive more agentic than others. It is something that is activated or suppressed depending on how a course is designed and

how much genuine space students are given to contribute. Across the nine courses observed at the Université Catholique de Lille, this became one of the most consistent patterns. In courses where students were given real responsibility to investigate, to argue, to teach each other, something shifted. They stopped waiting to be told what to think. In courses where the structure was stricter and the teacher remained the primary authority, that shift was harder to see, even when students were technically "active." As Klemenčič (2023) reminds us, agency in higher education is ultimately about preparing students to become reflexive, self-directed participants, not just in their studies, but in their professional and civic lives beyond the university walls.

That is the vision behind this thesis. The nine courses examined here were not simply trying to make learning more enjoyable. They were, in different ways and to different degrees, trying to grow that capacity in their students, to move them from compliance toward autonomy, from being an audience to becoming an author of their own learning. How far that shift happened, under what conditions, and what got in the way, is what the rest of this study sets out to answer.

1.3 The Pedagogical Continuum

One of the most persistent misunderstandings in discussions about pedagogy is the assumption that student-centered teaching is a binary condition, something an instructor either does or does not do. In practice, however, the reality of the classroom is far more nuanced. Teaching and learning do not operate as opposites but as positions along a spectrum, shaped by the degree of agency that is designed into the learning experience and the degree of intellectual authority that students are genuinely invited to exercise. This study proposes that understanding student-centered approaches through the lens of a pedagogical continuum, rather than as a fixed category, is both theoretically more accurate and practically more useful for educators seeking to develop agentic learners in higher education.

Central to this study is the idea of a pedagogical continuum, a spectrum that runs from fully teacher-centered learning at one end to fully student-centered learning at the other, with an infinite number of positions in between. O'Neill and McMahon (2005) were among the first to articulate this clearly in the context of higher education, arguing that student-centered and teacher-centered learning should not be understood as opposites but as two ends of a continuum, with most real classroom situations falling somewhere in the middle. That is exactly what the data across the nine courses in this study reveal. Not a collection of student-centered classrooms on one side and teacher-centered classrooms on the other, but nine different points along a scale, each representing a different degree of agency, a different balance of structure and freedom, a different answer to the question: *who is doing the intellectual work here?*

What moves a course along that continuum is not the label it carries (inquiry-based, collaborative, game-based) but the degree of agency it genuinely demands from students. And this is where the concept connects directly back to the previous section. As Klemenčič (2017) reminds us, student agency is not a fixed trait but something that is activated or

suppressed by the learning environment. The pedagogical continuum is essentially a map of how much activation is being asked of students at any given moment. At the teacher-centered end, the teacher holds most of the intellectual authority, setting the questions, providing the frameworks, evaluating the answers. At the student-centered end, students carry that authority themselves by generating their own questions, constructing their own frameworks, and evaluating each other's thinking.

But, and this is a critical point, moving toward the student-centered end of the continuum is not automatically better. Kirschner et al., (2006) warned us that minimally guided instruction can actually overwhelm students, particularly those who do not yet have the prior knowledge or cognitive resources to navigate open-ended tasks independently. This is not an argument against student-centered learning, it is an argument for scaffolding it carefully. Hmelo-Silver, Duncan, and Chinn (2007) responded to Kirschner et al. directly, showing that guided inquiry, where structure and freedom are deliberately balanced, produces strong learning outcomes precisely because it supports students in building agency incrementally rather than throwing them into the deep end.

This tension between guidance and autonomy is not a problem to be solved, it is the very dynamic that the pedagogical continuum is designed to navigate. Chi and Wylie's (2014) ICAP framework offers a parallel view from the cognitive side: students move from passive to active to constructive to interactive engagement as they are given progressively more responsibility for their own learning. The pedagogical continuum and the ICAP framework are, in this sense, two lenses on the same reality, one describing what the teacher is designing, the other describing what the student is doing as a result.

What this means in practice is that the nine courses in this study are not simply examples of student-centered teaching. There are nine different experiments in positioning students at different points along the continuum, giving them different amounts of agency, different levels of scaffolding, and different invitations to move from passive to interactive engagement. Some courses positioned students as investigators. Others as collaborators. One as players in a carefully designed game. What they shared was an intention to shift the locus of intellectual authority, however partially, however carefully, from the teacher toward the student. How far that shift went, and what happened when it did, is what the rest of this thesis examines.

Having established the philosophical foundation of this study, the socio-constructivist vision of learning, the centrality of student agency, and the pedagogical continuum as the model through which agency is measured, it is now possible to turn to the empirical findings themselves. The discussion now turns to a question that sits at the heart of this research: how do the three dimensions of engagement (behavioral, emotional, and cognitive) actually relate to one another and is one more important than the others?

2. The Engagement Dimensions

This section is about the links and relationships the three dimensions (behavioral, emotional and cognitive) of engagement have on each other. It will discuss each engagement

based on its hierarchical relationship and theoretical integration. The discussion will be centered around how the three engagement dimensions relate and if one is “more important” than the other.

2.1 The Hierarchical Relationship

At the outset of this study, the assumption, consistent with much of the existing literature, was that the three dimensions of engagement would develop more or less in parallel. If a student was behaviorally engaged, they would likely also be emotionally and cognitively engaged. The findings across the nine courses proved more complicated, and more revealing, than that initial assumption. The dimensions do not move together automatically. They have a relationship, but it is a hierarchical one, where each dimension plays a distinct role and depends on the one beneath it to function properly.

Think of it as a three-part system. Behavioral engagement is the gateway, the necessary condition without which nothing else can happen. A student who is not present, not participating, not contributing to the activity simply cannot access the social construction of knowledge that sits at the heart of a socio-constructivist classroom. The BERI data and ethnographic observations across the nine courses confirmed this consistently: when behavioral engagement was low, when students were off-task, disengaged from group work, or physically present but mentally absent, the quality of interaction dropped immediately and the potential for deeper learning collapsed. Lane and Harris (2015) were right to identify behavioral engagement as the baseline indicator of classroom functioning. But it is only the baseline. A student can be on-task, note-taking, and technically compliant without ever reaching the kind of thinking that actually transforms understanding.

This is where emotional engagement enters, and where the data suggest the most important and most underappreciated dynamic of this study lies. Emotional engagement is not simply about whether students enjoy a class. It is, in the language of Vygotsky (1978), what allows a student to enter the Zone of Proximal Development that productive space of challenge where real learning happens. But entering that space requires something that is easy to overlook: it requires a willingness to take a social risk. To offer an idea that might be wrong. To disagree with a peer. To admit confusion in front of others. And students will only take that risk if they feel safe enough to do so.

Edmondson (1999) called this psychological safety, the shared belief within a group that it is safe to take interpersonal risks without fear of humiliation or punishment. Her research showed that psychological safety is not a soft, peripheral concern but a direct predictor of learning behavior in teams. The findings of this thesis support this strongly. The game-based Spanish course produced the highest emotional engagement mean across all nine courses ($M = 2.88$, $SD = .67$) and the ethnographic data from the same course showed correspondingly high levels of voluntary participation, spontaneous peer interaction, and student-initiated knowledge building. Students themselves confirmed this in their open-ended responses, with the most appreciated aspects being group work and the interactive, playful nature of the activities. In courses where emotional engagement was lower, students tended to stay within

safe, predictable responses, rarely venturing beyond the active level of the ICAP framework. As Pekrun and Linnenbrink-Garcia (2012) have shown, positive emotional experiences in learning environments play a critical role in sustaining the effort and persistence that deeper engagement requires. Crucially, the CEI data confirmed a statistically significant positive relationship between emotional and cognitive engagement across all nine courses ($r = .28$, $p < .001$), a modest but meaningful correlation that suggests these two dimensions do not develop independently.

And it is precisely that deeper engagement, cognitive engagement, that represents the destination of this entire system. Using the ICAP framework (Chi & Wylie, 2014), this study tracked whether students were operating at the passive, active, constructive, or interactive level of cognitive engagement across the nine courses. The findings were consistent: the highest ICAP levels, constructive and interactive, appeared in courses where behavioral and emotional engagement were both present and aligned. Cognitive engagement was jointly the highest dimension overall alongside emotional engagement ($M = 2.78$, $SD = .54$), and it was strongest in courses where students were given genuine intellectual responsibility, to formulate questions, argue positions, and build knowledge with peers. In the Psychology-Approach to Organizational Change course, for example, cognitive engagement reached a mean of 3.07 ($SD = .16$), the highest cognitive score across all nine courses, in a course that also produced strong behavioral engagement ($M = 3.05$, $SD = .31$). When students were doing things and feeling safe, they thought more deeply. When one of the two foundational dimensions was missing, cognitive engagement rarely climbed above the active level students were doing things, but not truly thinking together.

The question of whether one dimension is more important than the others does not have a simple answer, and that is precisely the point. Cognitively, yes, cognitive engagement is the educational goal, the reason we design courses, the outcome we are ultimately trying to produce. But structurally, no single dimension is more important than another, because each one depends on the previous. Behavioral engagement without emotional engagement produces compliance, not learning. Emotional engagement without behavioral engagement produces enthusiasm without direction. And cognitive engagement without both is simply not possible, at least not at the level of constructive and interactive thinking that socio-constructivism demands. They are, as Fredricks, Blumenfeld, and Paris (2004) originally argued, genuinely multidimensional and this study adds to that argument by showing that they are not just multiple dimensions but a sequential, interdependent system in which each layer makes the next one possible.

2.2 Theoretical Integration

If the previous section established that behavioral, emotional, and cognitive engagement form a hierarchical system, then the question this section sets out to answer is: what is the force that moves a student through that hierarchy? What actually drives a student from passive to active, from active to constructive, from constructive to interactive? The argument this thesis makes is that the answer is agency, not engagement itself, but the degree to which

students are genuinely invited, and genuinely able, to act as agents within their own learning process.

This is where the two central theoretical frameworks of this study converge. The pedagogical continuum and the three dimensions of engagement are not parallel frameworks that happen to coexist in the same study. They describe the same educational reality from two different vantage points. The pedagogical continuum describes what the teacher is designing: how much agency is embedded in the learning environment, how much intellectual authority is being transferred from teacher to student, how far along the scale from compliance to autonomy the course is positioned. The engagement dimensions describe what the student is experiencing as a result: whether they are participating, whether they feel safe, whether they are thinking deeply. Agency is the connecting thread between the two. It is what the continuum measures at the level of design, and it is what produces engagement at the level of the student.

Reeve (2013) gave us the precise language for this connection through his concept of agentic engagement, the degree to which students actively contribute to and shape the quality of their own instruction. What makes Reeve's framework so important here is his insistence that agentially engaged students do not simply respond to what is placed in front of them: they invest in it personally, they ask for what they need, they push the learning experience in directions that are meaningful to them. This is exactly the kind of student behavior that appeared most consistently in the courses in this study where engagement was highest. In courses where students were given genuine intellectual responsibility: to formulate questions, defend positions, build knowledge with peers, something shifted in how they related to their own learning. They stopped being an audience and started being participants in the fullest sense of the word.

Kahu and Nelson (2017) described this dynamic precisely when they argued that student engagement is not simply a product of individual motivation but of the interface between the student and the educational environment, which is shaped by the structural conditions the institution and the teacher create. From this perspective, engagement is never just something students bring to a course. It is something that is co-produced between the design of the learning experience (teacher) and the agency of the student. The pedagogical continuum is, in this sense, a map of that interface, a way of understanding how much the design is doing to activate agency, and how much it is leaving to the student to generate independently.

This also clarifies something important about the relationship between the engagement dimensions themselves. Connell and Wellborn (1991) argued that students' sense of competence, autonomy, and relatedness (the three basic psychological needs) are the motivational foundations of engagement. When a course design supports these needs, students invest behaviorally, emotionally, and cognitively. When it does not, even students who are technically compliant will show signs of disengagement at the deeper levels. This maps directly onto what the CEI data revealed in this study. The correlations between engagement dimensions were all statistically significant and positive, but they were not equal. The weakest link in the system was between emotional and cognitive engagement (r

= .28, $p < .001$), which tells us something important: positive feelings about a course do not automatically translate into deeper thinking. The emotional fuel needs to be directed toward cognitive work by the pedagogical design itself. Feeling good in a classroom is not enough, students need to be given something genuinely challenging to do with that positive energy.

This is where the ICAP framework becomes the most precise analytical tool this study has. Chi and Wylie (2014) showed that constructive and interactive engagement, the two highest levels of the framework, only emerge when students are generating new outputs that go beyond the information given, or when they are building understanding together through genuine dialogue and mutual challenge. Menekse et al. (2013) confirmed this empirically, showing that differentiated learning activities that push students toward constructive behaviors produce measurably better outcomes than activities that keep students at the active level. Both of these processes, constructing and interacting, require agency. A student cannot reach the constructive level by being passive or compliant: they have to produce something, argue something, explain something in their own words. A student cannot reach the interactive level without the psychological safety to disagree, challenge, and be challenged, without. In Edmondson's (1999) terms, the shared belief that the group is safe for interpersonal risk-taking. The ICAP levels are therefore not just a taxonomy of cognitive behaviors. They are a taxonomy of what agency looks like in practice at four different levels of intensity and depth.

What emerges from this theoretical integration is a coherent model for understanding engagement in student-centered higher education. Agency, activated by pedagogical design and sustained by emotional safety, is what moves students along the engagement hierarchy. Behavioral engagement provides the platform. Emotional engagement provides the fuel. Cognitive engagement is the destination. And the pedagogical continuum is the road that connects them. When these elements are aligned, when the design genuinely invites agency, when the emotional climate makes risk-taking safe, and when the cognitive demands push students beyond the active level then engagement becomes something more than participation. It becomes the active co-construction of knowledge that socio-constructivism has always argued is the highest form of learning. As Pekrun and Linnenbrink-Garcia (2012) remind us, the emotional dimension of this process is not peripheral, it is the condition that makes sustained cognitive effort possible in the first place.

This thesis does not claim that student-centered approaches automatically produce this alignment. The data in this study show clearly that they do not, that engagement varied considerably across the nine courses even within the same pedagogical category, and that the presence of a student-centered label was no guarantee of genuine student agency. What the model does claim is that when alignment occurs, when design, safety, and cognitive demand work together, the results are visible, measurable, and deeply consistent with what the best of socio-constructivist theory predicts. The nine courses in this study are nine different experiments in achieving that alignment. Some succeeded more than others. Understanding why is the task of the sections that follow.

3. Analysis of the Nine courses

Since the philosophical foundation and the theoretical framework have been established, this section presents the evidence from the three student-centered approaches. The purpose of this section is to show how successful or not successful the grouped courses (inquiry-based, collaborative-based and game-based) engaged students across the three dimensions of engagement. Each approach is examined in terms of the type of agency it activated, how engagement was distributed across the behavioral, emotional and cognitive dimensions, what the ICAP data reveal about the depth of cognitive engagement reached, and what new research directions emerge from the findings.

3.1 Inquiry-Based Approaches

The four inquiry-based courses (Molecular Biology, Cellular Biology, Research Training in Psychology, and Psychology-Approach to Organizational Change) positioned students as investigators rather than passive recipients. By formulating questions, testing ideas, and analyzing evidence, students exercised epistemic agency: the capacity to act as genuine knowers within a discipline (Hmelo-Silver et al., 2007).

CEI data confirms this positioning significantly impacted engagement. Cognitive engagement was the highest dimension in three of the four courses: Cellular Biology ($M = 2.96$, $SD = .42$), Research Training in Psychology ($M = 2.74$, $SD = .52$), and Psychology-Approach to Organizational Change ($M = 3.07$, $SD = .16$). This latter score represents the highest cognitive engagement mean across all nine courses, suggesting that providing students with intellectual responsibility drives cognitive investment. These results are consistent with Justice et al., (2007) finding that inquiry-based learning fosters disciplinary thinking and deep cognitive investment over passive accumulation. Molecular Biology was the sole exception, where behavioral engagement was marginally higher ($M = 2.75$, $SD = .49$), though the narrow 0.04 gap suggests a balanced engagement profile.

The timeline analysis and BERI data revealed a distinct pattern: students consistently worked beyond the active level of the ICAP framework (Chi & Wylie, 2014), reaching constructive and interactive modes. Menekse et al. (2013) found that such constructive behaviors yield stronger learning outcomes than "active" level activities. This shift from active to constructive engagement within the ICAP framework was most visible during student-led presentations. Here, presenters operated in constructive mode, using self-explanation to transmit knowledge they built, which Chi and Wylie (2014) identify as a defining feature of constructive engagement, while audience members shifted between active and constructive modes depending on their depth of engagement. In the Research Training in Psychology final session, the April 2016 observation recorded zero disengagement across two hours, a behavioral confirmation that when inquiry-based approaches is structurally embedded in the assessment design, students sustain constructive and interactive ICAP engagement without external prompting.

Open-ended responses confirmed this pattern. Group work and peer exchange were the most appreciated aspects ($n = 110$), echoing Jaber and Kennedy's (2017) argument that

sharing ideas fosters metacognition. The second most appreciated factor was the teaching method ($n = 61$); students noted that inquiry allowed them to master content by "doing," aligning with Justice et al.'s (2007) view that inquiry develops disciplinary thinking over mere accumulation.

A key finding across the four inquiry-based courses is that inquiry-based learning did not produce high engagement automatically. The most consistent challenge was the need for scaffolding. "Difficult to learn" was a frequent negative response ($n = 37$), and the need for teacher feedback appeared repeatedly, particularly in Molecular Biology ($n = 21$) and Cellular Biology ($n = 9$). This pattern is confirmed by Kirschner et al. (2006), who demonstrated that minimally guided instruction produces cognitive overload when students lack the prior knowledge to navigate open-ended tasks independently. The contrast between Molecular Biology, where feedback requests were highest ($n = 21$) and behavioral engagement dominated over cognitive, and Psychology-Approach to Organizational Change, where cognitive engagement reached the study's highest mean ($M = 3.07$) with Master Year 2 students, confirms that academic maturity and scaffolding quality directly shape the ICAP level students can reach. Hmelo-Silver et al. (2007) support this finding, showing that guided inquiry produces strong outcomes precisely because it calibrates structure to students' developing capacity for independent inquiry.

These findings confirm that in inquiry-based learning, the teacher's role shifts toward that of a more knowledgeable other (Vygotsky, 1978) who scaffolds the Zone of Proximal Development, creating the conditions for students to move from active to constructive and interactive ICAP engagement rather than simply keeping them on task (Fredricks et al., 2004). As Jääskelä et al. (2017) demonstrated, student agency is not a fixed capacity; it is activated or suppressed by the quality of the learning environment. This raises a central research direction for future inquiry: to what extent does academic level (Bachelor versus Master) affect the relationship between scaffolding design and the ICAP level students can reach in inquiry-based learning? The data in this study suggest a consistent pattern, but a study that directly compares this variable would help make more precise instructional recommendations.

3.2 Collaborative-Based Approaches

While inquiry-based learning demands students think like investigators, collaborative-based learning requires them to "think with others." The four collaborative courses (Communication and Society, Insolvency and Bankruptcy Business Law, Law, and Psychology-Organization Diagnostics) positioned students as negotiators of meaning. Here, knowledge is constructed collectively through dialogue and mutual challenge, fostering social agency: the capacity to take ownership of a shared intellectual process (Dillenbourg, 1999; Vygotsky, 1978).

CEI data reveal a distinct pattern: unlike inquiry courses where cognitive engagement dominated, collaborative courses showed the strongest scores in behavioral engagement. Psychology-Organization Diagnostics reached the highest behavioral mean in the study (M

= 3.31, SD = .51), followed by Insolvency and Bankruptcy Business Law (M = 3.21, SD = .40) and Law (M = 2.89, SD = .43). This pattern confirms Johnson and Johnson's (2009) principle of social interdependence: when students are placed in structured groups with shared accountability, behavioral engagement is activated as the immediate response to collaborative design. Communication and Society, the largest course (n=101), peaked in cognitive engagement (M = 2.80, SD = .51), confirming Bruffee's (1999) argument that when collaborative tasks are well-designed, knowledge negotiation within a community can reach the constructive and interactive levels of the ICAP framework (Chi & Wylie, 2014) even at scale.

ICAP analysis confirms that active and interactive modes were most frequent; students consistently negotiated positions and co-constructed responses. The interactive ICAP mode, designed by Chi and Wylie (2014) as the co-construction of understanding through dialogue and mutual challenge, was most consistently observed in Psychology-Organization Diagnostics, where the debate format produced 100% BERI engagement for over an hour and only two disengagement incidents across nearly two hours of continuous student discussion. This represents the fullest expression of social agency in the dataset. Students validated this in open-ended responses, citing group work as the most appreciated aspect (n = 81). Notably, 67% of Law students and over two-thirds of Communication and Society participants valued this peer exchange. Jaber and Kennedy (2017) argue that such interaction develops the metacognitive capacity to view one's thinking through another's understanding, the interactive level of ICAP in practice.

The data also confirm a well-documented challenge in collaborative learning: uneven investment, or social loafing (Rajaguru et al., 2020). Ninety students cited group work as what they least appreciated, and 37 requested the ability to choose their own group members, a response Jaber and Kennedy (2017) connect directly to the need for trustworthy social interaction as a prerequisite for genuine collaborative agency. Edmondson (1999) demonstrated that without psychological safety, the shared belief that interpersonal risk-taking is safe, students retreat to self-protection rather than co-construction. This is confirmed in the ICAP data: in sessions where social loafing was observed, students remained at the active level rather than progressing to the interactive mode.

Time constraints were also a confirmed structural challenge: "not enough time" was the most common negative response in three of the four courses (n = 40). Dillenbourg (1999) argues that collaborative learning inherently requires more time because students perform the intellectual labor themselves. When time is insufficient, the data show that engagement reverts from the interactive to the active ICAP level, students continue to participate but cease to co-construct. This is not a critique of collaborative learning as an approach; it is a design constraint that must be accounted for in course planning.

Taken together, these findings confirm that collaborative-based approaches reliably activate behavioral engagement and, when conditions align (sufficient time, psychological safety, and structured interdependence) drive students to the interactive ICAP level through genuine co-construction. The contrast between the Psychology-Organization Diagnostics

debate sessions (100% BERI, interactive ICAP) and the Communication and Society transition moment (40-student mass disengagement) confirms that the same collaborative design can produce radically different engagement outcomes depending on the quality of activity structure (Klemenčič, 2017; Jääskelä et al., 2017). This raises a clear direction for future research: what is the relative effect of group composition (teacher-assigned versus student-chosen) on the quality of interactive engagement in collaborative higher education courses? The 37 students who requested choice of group members suggest that perceived social trust may be as important a design variable as a task structure itself.

3.3 Game-Based Approaches

The game-based Spanish course occupies a unique position in this study. Though a single case, it produced some of the most revealing data regarding the link between emotional engagement and cognitive depth. This approach activated experiential agency: the invitation to learn through playing and risk-taking in a low-stakes environment where mistakes are structural components of the activity.

To address a profile of "silent compliance," the instructor restructured sessions into two parts: a teacher-directed input phase (grammar/vocabulary) followed by a student-directed game phase. This design provides enough structure to enable agency without eliminating it (Kirschner et al., 2006). CEI data confirm this significantly boosted emotional engagement; the Spanish course recorded the highest emotional mean in the study ($M = 2.88$, $SD = .67$). Plass et al. (2015) argue that such affective states, curiosity and challenge, activate deeper cognitive processing. The game structure functioned as what Edmondson (1999) describes as a psychological safety mechanism: by lowering the social stakes of making mistakes, it made the risk of speaking Spanish in front of peers manageable rather than humiliating, a condition directly linked to the highest emotional engagement mean in the dataset.

BERI data from the November 20 Parcheesi session provide the strongest behavioral evidence. During a 25-minute game, engagement never dropped below 76%, representing the highest "engagement floor" in the dataset. The 24-percentage-point range was remarkably tight compared to other courses. The game structure virtually eliminated transition problems; because the activity was self-sustaining, there were no "dead moments" for disengagement to fill.

Ethnographic observations of Cohort 2 revealed that game design matters. The Dixit and Mime sessions produced the most inclusive participation and fewest disengagement incidents ($n=6$ over 22 minutes), whereas the historical card game allowed for more passivity. Gee (2003) argues that games generate what he calls 'pleasantly frustrating' challenges, tasks that are difficult enough to sustain effort but structured enough to prevent failure, and the BERI data confirm this: games requiring continuous, simultaneous participation produced the tightest behavioral engagement bands in the entire study. Games that allowed turn-taking or passive observation, such as the historical card game, produced notably more disengagement incidents, confirming that game design type directly mediates behavioral engagement level.

ICAP analysis reveals the underlying cognitive mechanism. Students moved predominantly between the active mode (speaking short phrases) and the interactive mode (co-constructing knowledge through dialogue and reasoning). Crucially, this interactive engagement was driven by the internal logic of the game, students interacted because they needed to play, not because they were instructed to. Furthermore, the constructive ICAP level of ICAP was reached as students applied the linguistic foundations from the input phase to the game, generating new output (spoken Spanish) that went beyond the information given in the first part of the session (Chi & Wylie, 2014). This active-to-constructive-to-interactive progression within a single session represents the clearest full ICAP pathway observed across all nine courses.

Finally, the instructor noted that smaller classes (≤ 15 students) produced better results, aligning with the study's broader pattern where smaller cohorts (e.g., Psychology-Organization Diagnostics) sustained higher interactive engagement. In these settings, social risk is lower and interdependence is more manageable (Edmondson, 1999; Johnson & Johnson, 2009).

The Spanish course serves as a proof of concept for the hierarchical engagement model. It activated emotional engagement first, which fueled the sustained behavioral engagement seen in the BERI data. This, in turn, drove students toward the interactive level of the ICAP framework. The alignment of the highest emotional mean, the tightest BERI band, and a clear ICAP pathway confirms that experiential agency produces measurable, multilevel engagement outcomes consistent with the socio-constructivist model of co-constructed learning (Vygotsky, 1978; Bruffee, 1999). However, because game-based learning is represented by a single course in this study, the generalizability of these findings across disciplines remains an open question. Future research should examine whether the emotional-to-cognitive ICAP pathway observed in this Spanish course replicates in non-language disciplines, and whether simultaneous-participation game designs systematically produce higher ICAP levels than sequential or turn-based formats. The contrast between the Dixit/Mime sessions and the historical card game in this study provides a preliminary empirical basis for this hypothesis.

The evidence from across the nine courses raises a methodological question that the three-point perspective is uniquely positioned to answer: how do the student, teacher, and observer data converge and diverge when examining the same engagement phenomena? This question is central to understanding what no single perspective can capture alone, and it is the focus of the following section. Crucially, Chapter 13 demonstrates this convergence with real, published data, providing the concrete empirical grounding necessary to show what a full three-point triangulation looks like in practice. Without Chapter 13, the three-point perspective remains a methodological claim; with it, it becomes an empirically demonstrated reality.

4. The Three-Point Perspective

One of the defining methodological choices of this study was the decision to examine engagement through three simultaneous perspectives: the teacher, the students, and the observer. Schoonenboom and Johnson (2017) identified five purposes for combining methods in mixed-methods research: triangulation, complementarity, development, initiation, and expansion. This study's three-point perspective serves all five simultaneously: the student data triangulate the observational data, the teacher interviews complement both by adding intentional depth, the observer data develop the student data by adding behavioral specificity, the moments of divergence between perspectives initiate new questions about the nature of engagement, and together the three perspectives expand the study's reach into dimensions no single method could capture alone. This section draws on all three perspectives to tell the story of what actually happened when the philosophical vision of 11.1 met the real conditions of nine university classrooms.

4.1 The Teachers' Perspective

Across all nine courses, what united the teachers was not a shared technique but a shared vision: that their role was not to transmit content but to create the conditions under which students could construct it. Each teacher had arrived at this vision through a different path: the Molecular Biology teacher through Codesign workshops, the Research Training in Psychology teacher through failing grades, the Marital Law teacher through empty classrooms, the Insolvency and Bankruptcy Law teacher through students who could not think through legal complexity independently, the Spanish teacher through silent classrooms; but the destination was the same. They had each made the shift from teacher as lecturer to what this study calls the teacher as architect of agency (Klemenčič, 2017; Vygotsky, 1978).

Several teachers found support for this shift through the Laboratoire d'Innovation Pédagogique (LIP) at the Université Catholique de Lille, a community of practice where teachers shared innovative approaches, exchanged experiences, and supported each other through the discomfort of changing established practice. This institutional context matters because it shows that pedagogical transformation in this study was not individual but collective, supported by structures that made experimentation feel safe (Kahu & Nelson, 2017).

What the teacher interviews contribute to the three-point perspective, in Schoonenboom and Johnson's (2017) terms, their complementarity function is the intentional layer that the student and observer data alone cannot provide. Knowing that the Insolvency and Bankruptcy Law teacher used mind-mapping specifically to observe her students' thought processes explains the deliberate teacher circulation visible in every timeline. Knowing that the Communication and Society teacher had already tried and abandoned a previous version of her course explains the sophistication of the collaborative writing design. The teacher perspective transforms a description of classroom behavior into an understanding of pedagogical design and in doing so, it shows that the engagement patterns observed across

the nine courses were not accidental. They were the product of teachers who had thought carefully about what they were building, and why.

4.2 The Students' Perspective

The CEI data show that 431 students across nine courses reported engagement above the midpoint in all three dimensions: emotional ($M = 2.78$), behavioral effort ($M = 2.58$), and cognitive ($M = 2.78$) with statistically significant positive correlations between all dimensions. In Schoonenboom and Johnson's (2017) framework, these data serve as a triangulation function, seeking convergence with the observational evidence from a different methodological angle. When the CEI shows the highest emotional engagement in the game-based Spanish course ($M = 2.88$) and the BERI simultaneously records the highest sustained engagement floor in the dataset, the two sources corroborate each other in a way that neither could achieve alone.

The open-ended responses add the human dimension to those numbers. More than half of all students ($n = 228$) named group work and peer exchange as the aspect they most appreciated, describing experiences of exchanging ideas, learning from different perspectives, and feeling that they were genuinely doing something rather than passively receiving it. As Jaber and Kennedy (2017) argued, this kind of peer exchange is cognitively transformative, explaining an idea to someone else is one of the most powerful ways to deepen one's own understanding of it.

But the divergence in the data is equally important. Ninety students named group work as what they least appreciated. Sixty-one found the approach difficult to learn. Twenty-four asked for more structure. This divergence between students who thrived in student-centered environments and those who struggled is where Schoonenboom and Johnson's (2017) initiation function operates most powerfully. It does not simply add nuance to the findings; it initiates the most important question this study raises: under what conditions, and for which students, does the invitation to agency activate engagement rather than anxiety? The answer, as Bandura (2001) argued, lies in the gradual development of agentic capacity, the self-regulatory skills that make genuine autonomy possible. Students who have been shaped by years of passive instruction need scaffolding, time, and psychological safety to become confident co-constructors of knowledge. The student data makes that need visible more honestly than any theoretical framework alone could.

4.3 The Observer's Perspective

The teacher described the vision. The student described the experience. The observer recorded what actually happened in the space between them and in real time, at specific moments, with specific students and specific teachers. This is the expansion function in Schoonenboom and Johnson's (2017) framework: extending the study's reach into behavioral dimensions that neither self-report nor interview could capture.

Several moments across the nine courses stand out as powerful confirmations of the engagement model. The final Research Training in Psychology session on April 27, 2016,

had zero disengagement across two hours with 32 students evaluating each other's videos showed what full epistemic agency looks like behaviorally. The Psychology-Organization Diagnostics debate sessions had 100% BERI engagement for over an hour, two disengagement incidents across nearly two hours of continuous student discussion showed what full social agency looks like. The Insolvency and Bankruptcy Law had a zero-disengagement mind-mapping session with 29 students showed that sustained collaborative agency is achievable even at scale, when the design builds genuine interdependence and the teacher scaffolds without dominating (Johnson & Johnson, 2009; Edmondson, 1999).

But the observer also recorded when alignment broke down and these moments are equally important. The 40-student mass disengagement during a transition in the Communication and Society presentation session showed that even a well-designed course collapses behaviorally when the activity structure creates dead time. The 30 minutes of technical failure in Research Training in Psychology produced sustained phone use that disappeared the moment the activity resumed. As Laurillard (2012) and Reeve (2013) both argued, agency is not a fixed state but a response to conditions, and those conditions are fragile.

Placed together, the three perspectives do not produce a single clean narrative. They produce something more honest: a picture of student-centered learning as a design challenge rather than a solution, one that succeeds brilliantly when designing, scaffolding, and emotional safety align, and that fails quietly when any one of those conditions is absent. The teacher's vision, the student's experience, and the observer's record all point to the same conclusion: engagement is not something students have or do not have. It is something that emerges or does not from the quality of what the pedagogical design makes possible.

5. Implications and recommendations

The findings of this study emerged from nine real courses at the Université Catholique de Lille, taught by nine real teachers working within the constraints of real institutional structures. The purpose of this section is therefore not simply to draw theoretical conclusions, but it is to translate those conclusions into practical guidance for teachers, course designers, and institutions that want to move toward more student-centered approaches. Two recommendations emerge most directly from the data: the first concerns how to introduce student agency, and the second concerns how to measure whether it has been achieved.

5.1 Scaffolding the Continuum

The most consistent finding across all nine courses is that student-centered approaches work not simply by being introduced, but when they are scaffolded carefully and calibrated to the academic maturity of the students experiencing them.

The year-level data reveal a pattern too consistent to ignore. The three Master Year 2 courses produced the strongest engagement profiles in the entire study — the highest cognitive mean (Psychology-Approach to Organizational Change, $M = 3.07$), the longest

sustained 100% BERI period (Psychology-Organization Diagnostics), and the only zero-disengagement session with a large group (Insolvency and Bankruptcy Law, $n = 29$). The Bachelor Year 3 courses showed the most variable profiles — Communication and Society recorded the lowest BERI point in the dataset (~38%), and Molecular Biology showed the most frequent disengagement incidents across its timelines. Master Year 1 courses fell in between.

This does not mean student-centered approaches are inappropriate for Bachelor students. The Spanish course (taught to Bachelor Year 1 students) produced the highest emotional engagement mean in the study. But it was also the most carefully scaffolded: every session began with a structured teacher-led input phase before releasing control to students for the game. The game did not replace structure, it followed it. This is the pedagogical continuum in its most deliberate form.

The practical recommendation is straightforward: teachers should not jump to the student-directed end of the continuum simply because the literature endorses it. They should ask where their students currently are, how much experience they have of intellectual ownership, how developed their self-regulatory capacity is, and design accordingly (Kirschner et al., 2006; Hmelo-Silver et al., 2007). The question is never whether to give students agency. It is how much, when, and with what support.

The LIP community at the Université Catholique de Lille is itself a model of institutional scaffolding for this kind of change. Just as students need scaffolding to develop agency, teachers need institutional support to develop the confidence to design for it, and investing in such communities of practice is a structural requirement for any institution serious about moving its teaching culture along the continuum (Kahu & Nelson, 2017).

5.2 Redefining Success

The deeper implication of this study is a challenge to what higher education chooses to measure. Teaching quality is typically evaluated through satisfaction surveys, grade distributions, and completion rates, none of which captures whether students are actually thinking together. A student can score highly on a satisfaction survey while having been cognitively passive throughout the course. Passing an exam is not evidence of co-construction. These are measures of compliance, not engagement.

This study proposes that the interactive level of the ICAP framework (when students are building on each other's ideas, challenging reasoning, and co-constructing understanding) should be treated as a key indicator of teaching quality (Chi & Wylie, 2014; Vygotsky, 1978; Bruffee, 1999). Two moments in this study show what that looks like in practice: the Insolvency and Bankruptcy Law teacher using mind-mapping to observe students' thinking before they reached conclusions, and the Research Training in Psychology final session where zero disengagement was recorded because the assessment structurally required interactive engagement, not optionally.

Redefining success also means redefining good teaching, not as the clearest lecture or the highest pass rate, but as the ability to move back and forth along the continuum responsively, adjusting scaffolding and agency based on what students need at any given moment. The Molecular Biology teacher who spent three months designing his course and continued refining it for years using student feedback, and the Spanish teacher who observed which games sustained engagement and adjusted accordingly, are both models of this.

For the Université Catholique de Lille specifically, the LIP community could be extended to include shared frameworks for evaluating interactive engagement, giving teachers the tools to observe what engagement actually looks like in their own classrooms, and shifting institutional culture from measuring compliance to measuring co-construction.

6. Limitations

No study is complete without an honest accounting of what it could not do and this one is no exception. The findings presented across this discussion chapter are significant, but they are also bounded by real constraints that anybody should understand clearly. This section acknowledges those constraints before closing with the argument this study is ultimately making.

6.1 Contextual Limitations

This study took place entirely at one university, the Université Catholique de Lille, across nine courses in five different subject areas. Because all the data comes from one institution, the findings reflect what worked, and what did not, in that particular environment. Other universities have different cultures, different levels of support for teachers who want to change their approach, and different types of students. What produced strong engagement here may not produce the same results somewhere else. The findings are therefore best understood as a detailed and honest account of what happened in these specific courses, not as a blueprint that will automatically work everywhere.

The number of students also varied considerably from one course to another, from just 3 students in one psychology course to 101 in the communication course. Smaller courses gave rich, detailed insight into how individual students engaged, but with so few people involved, it is harder to draw broad conclusions. Larger courses offer more statistical weight but less individual detail. Both types of data are valuable, but they need to be read with those differences in mind.

6.2 Methodological Reflection

Across all nine courses, four recurring methodological limitations emerge when the individual course studies are read together as a whole.

The most consistent was incomplete observation coverage. In every course without exception, the observer was unable to attend all sessions due to scheduling conflicts and other professional responsibilities. The behavioral data, both BERI and ethnographic timelines

therefore represent a partial rather than complete picture of each course's engagement arc. More systematic coverage would have produced stronger longitudinal evidence.

The second was inconsistent use of the BERI. In Cellular Biology, the observer switched from BERI to the ethnographic methodology mid-study when the BERI proved insufficient for capturing the complexity of interactive presentations. In Molecular Biology it was used only twice; in Research Training in Psychology only once in the first year; in Psychology-Approach to Organizational Change only once with cohort 1. Most significantly, Marital Law was the only course in the study with no ethnographic timeline data at all, behavioral data from BERI alone, which means it is the least richly documented course in the observational dataset. This inconsistency limits direct cross-course comparison on identical methodological terms, though it also reflects an observer who made pragmatic, honest adjustments as she learned which instruments suited which activity types.

The third was limited teacher interview coverage. In several courses, including Cellular Biology, Molecular Biology, and Psychology-Approach to Organizational Change, teachers were interviewed only once, in the first year of observation. This produced a snapshot rather than a longitudinal account of pedagogical development, which is a significant gap given that several teachers described their approaches as evolving experiments refined over multiple years.

The fourth was course-specific observation gaps. In Communication and Society, the observer could only see half the class during collaborative writing sessions because students were split across separate rooms. In the Spanish course, the use of different games across sessions (Parcheesi, a historical card game, Dixit, and mime) made it impossible to isolate the engagement effect of any specific game design. In Psychology-Organization Diagnostics, the role play element mentioned by the teacher was not anticipated at the study's outset and therefore had no measurement instrument assigned to it.

Two deeper methodological challenges apply to the study as a whole. The first concerns cognitive engagement. The ICAP framework was applied to observable behaviors, what students were visibly doing, rather than to internal cognitive processes. As Chi and Wylie (2014) acknowledged, the constructive and interactive levels involve cognitive activity that cannot be fully inferred from behavior alone. A student writing notes in their own words may or may not be genuinely reflecting; a student participating in discussion may or may not be genuinely co-constructing. The ICAP framework is a powerful inference tool, not a direct window into cognition. Future research using think-aloud protocols or concept mapping would address this gap more precisely.

The second concerns emotional engagement. The CEI captured end-of-course self-reports rather than in-session emotional experience. As Pekrun and Linnenbrink-Garcia (2012) showed, emotional engagement is highly dynamic, shifting within a single session in response to specific activities and interactions. A single retrospective questionnaire cannot capture that dynamism, which means the emotional dimension remains the least precisely documented of the three engagement dimensions in this study. Experience sampling

methodology or in-session measures would add considerably more depth to this aspect of the model in future research.

7. Conclusion

This study set out to answer one central question: how can student-centered approaches to instruction impact student engagement in higher education?

The answer is clear, if not simple. Student-centered approaches do enhance engagement but not automatically, not equally, and not without deliberate design. Across nine courses, 431 students, and three pedagogical approaches (inquiry-based, collaborative-based and game-based), the data consistently showed that when students are given genuine intellectual responsibility (to investigate, to collaborate, to play, to debate), they engage more deeply than when they are asked to receive and reproduce. The behavioral evidence shows it. The student evidence shows it. The teacher evidence shows it. The four inquiry-based courses produced the strongest cognitive engagement scores, driven by epistemic agency and confirmed through constructive and interactive ICAP modes. The four collaborative courses produced the strongest behavioral engagement, with interactive ICAP engagement emerging when time, task design, and psychological safety aligned. The game-based course produced the highest emotional engagement mean in the study, demonstrating that experiential agency activates the emotional dimension first and drives students toward deeper cognitive engagement through the logic of the activity itself. But across all three approaches, the relationship between student-centered design and engagement is conditional. It depends on the quality of the scaffolding, the academic maturity of the students, the degree of psychological safety in the group, and the continuity of the activity design. The Master Year 2 courses produced the strongest engagement profiles in the entire study. The Bachelor Year 3 courses showed the most variability. The Spanish course (the most carefully scaffolded of all nine) produced the highest emotional engagement mean despite being taught to first-year Bachelor students. The pattern is consistent: it is not the label of the approach that determines engagement, but the degree to which the design activates agency at the right level for the students experiencing it.

The theoretical contribution of this study is the demonstration that behavioral, emotional, and cognitive engagement form a hierarchical, interdependent system with agency as the force that moves students through it, and the pedagogical continuum as the model for understanding how much agency is being activated at any given point in the design. The ICAP framework (Chi & Wylie, 2014) provided the analytical tool that made this visible, translating observable classroom behavior into measurable levels of cognitive engagement and producing new contextual examples of what each mode looks like in real university courses. The methodological contribution is the three-point perspective, a triangulated framework, grounded in Schoonenboom and Johnson's (2017) mixed-methods design principles, that made visible what no single method could have captured alone: the convergences and paradoxes that emerge when teachers, students, and observers look at the same classroom and describe what they see. Chapter 13 presents a published article in *Cogent*

Education, which is based on two of the nine case studies, is essential to this thesis because it demonstrates triangulation with real, peer-reviewed data.

The practical contribution is a direction for teachers and institutions: move students along the continuum deliberately, scaffold the transition from compliance to autonomy in ways that match students' developmental readiness, and measure interactive engagement, not just satisfaction, not just grades because interactive engagement is the behavioral expression of what higher education is ultimately for.

Student-centered approaches do not guarantee engagement. They create the conditions for it. Whether those conditions produce the alignment of behavioral, emotional, and cognitive engagement that this study has mapped depends on design, scaffolding, safety, and the conviction of teachers who understand that their role is not to fill students with knowledge but to build the environments in which students can construct it themselves. This thesis has mapped those conditions across nine courses, with nine teachers and 431 students. What comes next is to test whether those conditions hold beyond one university, one country and one study.

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Appendices

Appendix 1 – Classroom Engagement Inventory (CEI)

Appendix 2 – Open-ended responses from students

Appendix 3 –Teacher interview: Insolvency and Bankruptcy Business Law

Appendix 4 –Teacher interview: Marital Law

Appendix 5-Teacher interview: Psychology-Approach to organizational change and
Psychology-Organization Diagnostics

Appendix 6 –Teacher interview: Research Training in Psychology

Appendix 7 –Teacher interview: Cellular Biology

Appendix 8 – Teacher interview: Molecular Biology

Appendix 9 – Teacher interview: Spanish

Appendix 10 –Teacher interview: Communication and Society

Appendices

Appendix 1

Classroom Engagement Inventory

Choose the response that best fits your opinion in THIS class. Some questions will seem the same, but they are asked in a little different way to make sure we really understand your opinion.

Please use a #2 pencil to completely and carefully fill in each bubble.

A. What is your student ID? [Write your ID numbers in the boxes AND fill in the bubble below each number.] Fill in from the left.	<table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td></tr> <tr><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td></tr> <tr><td>4</td><td>4</td><td>4</td><td>4</td><td>4</td><td>4</td></tr> <tr><td>5</td><td>5</td><td>5</td><td>5</td><td>5</td><td>5</td></tr> <tr><td>6</td><td>6</td><td>6</td><td>6</td><td>6</td><td>6</td></tr> <tr><td>7</td><td>7</td><td>7</td><td>7</td><td>7</td><td>7</td></tr> <tr><td>8</td><td>8</td><td>8</td><td>8</td><td>8</td><td>8</td></tr> <tr><td>9</td><td>9</td><td>9</td><td>9</td><td>9</td><td>9</td></tr> </table>							0	0	0	0	0	0	1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3	3	4	4	4	4	4	4	5	5	5	5	5	5	6	6	6	6	6	6	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	9	9	B. What class are you in right now as you complete this survey? (Choose only one.) ☐ Math ☐ Language Arts (English) ☐ Science ☐ Social Studies (History) ☐ Arts or Music ☐ Other (specify): _____	C. What grade are you in? ☐ 4th grade ☐ 5th grade ☐ 6th grade ☐ 7th grade ☐ 8th grade ☐ 9th grade ☐ 10th grade ☐ 11th grade ☐ 12th grade
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E. Did you answer honestly? ☐ Yes ☐ No

Please double-check that you responded to ALL questions. THANK YOU!

Appendix 2

Open-ended responses from the students translated into English

School year: 2016-2017

1. What aspects in particular of this method of learning did you most appreciate? And why?

- (28) Work in groups to learn, share ideas and knowledge/Common reflection, common learning/Having different perspectives from other students/bring their knowledge/Group work makes it possible to ask the question to others and to have a simpler and better understandable explanation/Group work is good to distribute tasks to not waste time/Learn from mistakes/Can correct each other
- (15) Interaction with peers/Motivating/Challenging/More stimulating and intellectually interesting
- (14) Good idea to have groups to do evaluations/Creating exams reassure us for the final/repetitive so we can learn/understand by seeing the questions before the exam
- (9) Easy to learn/Educate myself to make it clear/Like this different way of learning/Interesting
- (6) Good ambiance/A lot of movement during the course/Course as a triangle (teacher-student-course)/Finding links from one class to the next/Allows you to have a course that corresponds to our expectations and our way of learning
- (6) Ability to have freedom, correction, creation of chapters, organization
- (3) Ability to express yourself/Expressing themselves is motivating
- (2) Allows us to do our chapter with our words and therefore to better understand/Let us understand what points are important
- (2) Pushes us to think for ourselves essential for everyday life, professionally/Serves us for the future
- (1) Good management/Clearly explains the objectives

2. What aspects in particular of this method of learning did you least appreciate? And why?

Teaching

- (17) Need verification: Don't know if it is enough/no correction of the chapters/No limits set and when to stop/Need a starting guide/lack of information/Badly explained, don't know the mode of correction and the notes before the exam.
- (11) Not always fair/Problem with students who don't work/not the same effort/everyone works at different levels
- (9) Communication with group members/different personalities and ways of learning/Hard to make your point of view heard/talks too much/Distained looks from peers when wrong answers were said
- (8) Poorly organized chapters/poorly explained chapters (done by the students)/Chapters not interesting/Writing needs to be at a certain level
- (5) Too many resources available/too many chapters to read/Make a grid on what should be in the chapters, the concepts that should be addressed/Long explanations from the teacher
- (4) Certain notions are sometimes too complex and difficult to understand/It's difficult to define the subject/it's sometimes quite vague/hard to understand the questions
- (4) Difficult to create a real complete and coherent course/Doesn't cover all the points of the course/Difficult to learn by just reading
- (2) Changing the grade from 20, how are we supposed to be evaluated?
- (2) Timing: No break/Not enough time for small questions
- (2) Difficult to work on google.doc at the same time/difficult to see the chapters

3. What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.)

- (11) Need structure and limits for chapters/ Make summary sheets of what is important to remember in each chapter/Use simpler diagrams, suitable for students
- (10) Choose group members/Make groups more Homogeneous groups/Change the group after each session/Heterogeneous groups for productive groups
- (8) Feedback (correction) and questions about the chapters during the sessions
- (2) Take out creating chapters
- (2) Do only a part or two of the class in groups and the rest with the teacher/Method too comprehensive
- (2) Diversity of questions for the evaluation
- (1) Not useful
- (1) Less evaluations
- (1) Teach in an amphitheater

School year: 2017-2018

1. What aspects in particular of this method of learning did you most appreciate? And why?

- (17) Group work sharing vision/exchange ideas/Teamwork/interesting discussions
- (9) teaching method that changes throughout the course: various exercises that allow you to learn about different subjects/the use of a diagram for each question makes it easier to understand/explaining the production on the board it helps to better assimilate the information/the search for answers to questions that we present and share with the rest of the class because explaining our work to others is easy to remember and others understand more easily because it is students who explain/the process of comprehension and memorization in progress does not diminish the interest of comprehension/Doing our own research and answering our own questions/ the lessons were not monotonous
- (4) The assessment and the scoring method is fair
- (2) More freedom, being able to take a break whenever you want.

2. What aspects in particular of this method of learning did you least appreciate? And why?

- (10) Unclear roles in group work: not choosing groups/working with people who did not come often and have about the same grade/not working well with group members/Complicated to fairly distribute the tasks within the group
- (4) Redundant explanations: sometimes explanations are too long/we come back to the same question several times in a row/redundant explanations
- (5) Sometimes the course is a little long/long waiting time/complicated schedule in the morning at 8am/sometimes there was no break
- (4) There is no feedback (the follow-up of our work; we don't know if our chapters are good; if we make mistakes; if what we say is coherent; the teacher's interventions are disorganized/ we did not address certain points
- (3) It sometimes lacks structure/ not structured enough/goes in all directions
- (2) Sometimes the fact of not having real courses/I did not like this way of working.
- (3) Difficult to get into the chapters that we have not worked on/ the working method easily leaves us distracted/not always listening to the other groups explaining
- (1) Speaking in front of the whole class.

3. What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.)

- (7) More diversity/have moments of real lectures and have a correction of the production chapters/ have a normal course the first session in order to direct the work/reversed classic pedagogy balance and structure the progression in the course/do more different exercises/Alternate chapters to learn different things/have a little more inspiration from lectures
- (6) Be more guided/add some more explanation by the teacher/check the chapters because we still find errors/plans are clearer/have a global plan and precise indications of what must be done in the chapters.
- (2) More practice with groups/ more group interaction or presentations.
- (1) Room is less suitable for this course.
- (1) Have more time to build the chapter
- (1) Not work four or five lessons in a row on the same subject

Note. Molecular Biology, school year 2016-2017, $n = 31$ and school year 2017-2018, $n=27$ ($N = 58$).

School year: 2016-2017

1. What aspects in particular of this method of learning did you most appreciate? And why?

- (15) Learn while having fun/ more playful/ the playful aspect which makes the course attractive/entertaining side making everyone take part, easier to really get interested/new knowledge through playful animation/discovery of the works and above all retains more information
- (9) originality/ the methods are generally original, you don't get bored/innovative/present in an original way allows to remember better/there was not only a theory/allows you to learn in a different way and allows you to be creative
- (9) Interaction with others/it was a lot of fun exchanging traditional presentations/ share
- (4) Research on your own/ find information yourself
- (4) dynamic/ it made the topics covered more dynamic
- (2) Participation/active participation of the entire class
- (2) student investment/we are more invested
- (2) Variety of supports
- (1) Better distribution of classes

2. What aspects in particular of this method of learning did you least appreciate? And why?

- (8) The presentation, sometimes too long or not enough research in certain groups/Trying to interest the class/sometimes too long when following/sometimes presentations are too long or fast/ sometimes heavy and uninteresting presentations/sometimes too academic/ You are never 100% sure of the information given by other students
- (8) Workload/requires a lot of work compared to the material/Lots of investment/a lot of work if we want to present it in an original but interesting way/a lot time to prepare for the presentations
- (4) Sometimes difficult topic/difficult subject/researching complicated topics/difficulty in making a pleasant presentation on a complex subject
- (2) Work is not always equivalent in the group/ lack of investment from some
- (2) The fact of being noted by classmates, not the objective
- (1) Not sure that we get anything out of it for a long time
- (1) Recurring themes since the license

3. What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.)

- (6) Management of time/ Set a time limit for each group/plan time slots of three hours when more than two groups have to present/Not limit the same time when presenting/the same time for each presentation
- (3) Propose a path to follow for the bibliography/proposal of a bibliography to help us in our research
- (2) Less weight for grading the students/no written notes
- (2) More feedback from the teacher/Vary the support
- (1) Perhaps more professional research interventions and less investment required for students

School year: 2017-2018

1. What aspects in particular of this method of learning did you most appreciate? And why?

- (22) Interactive/ Idea to make presentations livelier/allows everyone to be involved/Students involved in their presentation/Whole class participation/its originality in the presentation in order to interest students/Interest in the subjects because they are presented differently/It is interesting to see the work provided by the other students, we are even more attentive/ makes it possible to bring the lesson, game, sketch, etc. to life/interaction and involvement of presentations/ Diversity of presentations, the way of presenting them
- (17) Doing the content of the course ourselves allows us to master it and, as a result, to transmit it better/we retain the essence of each presentation/Presentations make it possible to make subjects that are not always easy to understand attractive/We retain more spontaneously than a lecture/ learn while having fun without stress/It is explained by students, so easier to understand/ I liked the presentations because thanks to the animations we necessarily learned something. This forced us to get involved in our subject and that of others/ The discussions and the development of the intervention were constructive/Develop autonomy, responsibility
- (14) Group work dynamic/ friendliness/allowed to discover new comrades while doing interesting work/very rewarding
- (13) creativity/free to choose the support of our presentation/ I enjoyed working on the presentation as much as on the game because I am very creative and particularly appreciate the playful side of this method.
- (6) Fun/It's fun when there's interaction/make fun a subject that is not
- (3) participation
- (3) No final exam/Be graded on it instead of the exam/I appreciated the non-existence of a final exam, replaced by presentations.
- (3) Good content for presentations/themes that would not have been addressed to me other than in this course
- (2) speaking practice/Ability to ask simple questions and answers
- (2) Almost everything/ it's good

2. What aspects in particular of this method of learning did you least appreciate? And why?

- (12) Work time/Takes us a lot of time/ preparation and organization time/Difficulty with organization
- (9) Difficult to retain information/Difficult to learn because of the speed/gets confusing, due to lack of knowledge on the subject/ Sometimes it's hard to stay focused until the end/difficult to rely on other students to research on theoretical aspects
- (7) Sometimes too long and redundant/Sometimes long/Too many presentations in one hard-to-follow course/ three presentations in a row
- (7) Some less interesting topics/sometimes off-putting themes/sometimes unmotivating topics
- (4) Group work/fairness/Difficult to set up
- (3) Stressful/ the stress of a presentation in front of the whole class
- (2) Support/Repeat important points at the end of the presentations
- (1) No final assessment
- (1) Grade other presentations
- (1) The feeling of having no course, no content

3. What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.)

- (5) More interesting topics/Have themes that require reflection/More diversified and targeted topics (less general)
- (4) More guidance by both students and teacher/teacher feedback
- (3) Respect the time (twenty minutes)/2 presentations per course
- (3) Everyone returns the work at the same time to avoid same ideas
- (2) Theoretical course/add theoretical courses to review the important parts of the themes
- (2) Have breaks between presentations
- (3) Change rooms
- (1) Learn essential points to public speaking

Note. Research Training in Psychology, school year 2016-2017, $n = 24$ and school year 2017-2018, $n=51$ ($N = 75$).

School year: 2016-2017

1. What aspects in particular of this method of learning did you most appreciate? And why?

- (13) Interesting to exchange and learn from others, interactive
- (4) Outcome of the research
- (3) Become comfortable in speaking
- (3) Working in a group
- (2) Gaining new techniques

2. What aspects in particular of this method of learning did you least appreciate? And why?

- (8) Having just a presentation, difficult to take in the information
- (6) Different work effort from the group members
- (2) Stressful
- (1) A lot of work done outside of class
- (1) Vague presentations

3. What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.)

- (4) Room not adapted
- (2) Different level of knowledge
- (2) Communication between group members
- (1) Have examples and extra sources

School year: 2017-2018

1. What aspects in particular of this method of learning did you most appreciate? And why?

- (7) Outcome of the research
- (4) Interesting to exchange and learn from others, interactive
- (1) Become comfortable in speaking

2. What aspects in particular of this method of learning did you least appreciate? And why?

- (3) Having just a presentation, difficult to take in the information
- (1) Stressful
- (1) Difficult presentation themes
- (1) Different work effort from the group members

3. What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.)

- (4) Have examples and extra sources

Note. Cellular Biology, school year 2016-2017, $n = 19$ and school year 2017-2018, $n=12$ ($N = 31$).

School year: 2017-2018

1. What aspects in particular of this method of learning did you most appreciate? And why?

- (8) Group work: Exchange with peers is interesting
- (8) Interactive
- (6) New way of learning
- (5) Practical way of learning theory
- (3) Quiz allows you to see if you understand
- (2) Teacher prepares the course well, which makes them attentive during class/Diversity of the sessions

2. What aspects in particular of this method of learning did you least appreciate? And why?

- (5) Different work effort from the group members/Too many in a group
- (4) Hard to learn everything/A lot to learn before class (reading, doctrines, diagrams)
- (4) Lack of depth of concepts/Fast explanations
- (2) Presenting to other groups
- (3) Loss time/too long
- (1) Prefer traditional lecture class

3. What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.)

- (5) Room more adapted
- (3) Half traditional course and half new approach/Real practical cases/Not all sessions lend themselves to pedagogical innovation
- (2) More time
- (2) Work in groups more/Choose our own group
- (1) Complex concepts

(1) Give grades on the work

Note. Law, school year 2017-2018, $N = 24$.

School year: 2017-2018

1. What aspects in particular of this method of learning did you most appreciate? And why?

- (3) Collective exchanges
- (2) Dynamic presentations/interesting subjects
- (2) Constructive (practical for the future, learning together)
- (1) New knowledge

3. What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.)

- (2) Not enough class time
- (1) During the debate, write ideas to give back to the class

Note. Psychology- Organization diagnostics: prevention and health, school year 2017-2018, $N = 3$.

School year: 2017-2018

1. What aspects in particular of this method of learning did you most appreciate? And why?

- (4) Interactive/Do-it-yourself method
- (3) Concrete teaching to receive important practical knowledge
- (3) Experience professional life
- (2) Presentations of our work
- (1) Work in groups
- (1) Competitive
- (1) Feedback from the teacher
- (1) Learn from mistakes

2. What aspects in particular of this method of learning did you least appreciate? And why?

- (3) Very demanding/a lot of work
- (3) Time to carry out the work/have more time in between lessons for reflection and preparation
- (2) Hard to offend peers about their work
- (1) Redundancy of the approach

3. What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.)

- (1) Schedule work time during class
- (1) Space time in between lessons
- (1) Presentation of methods

Note. Psychology- Approach to organizational change (group & organizations), school year 2017-2018, $N = 8$.

School year: 2017-2018

1. What aspects in particular of this method of learning did you most appreciate? And why?

- (17) Group work with different aspects/constructive/Exchange ideas
- (12) New method of working/Mind mapping helps to synthesize and have an overview of the course
- (11) Great for learning/Make memorizing easier (visual learning)
- (2) Interesting
- (2) Overcome certain difficulties
- (1) Work rapidly
- (1) Practical
- (1) Good preparation to work in a company

2. What aspects in particular of this method of learning did you least appreciate? And why?

- (12) Some people are not involved/Difficult to agree/Misunderstanding between group members/Divergence of opinions/Some people less invested/ No time because of poor management from group members
- (6) Complicated in the beginning and using the software
- (3) Takes up a lot of time
- (3) Complicated to summarize
- (1) Slow process

3. What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.)

- (4) Change groups more often/Choose your group members
- (3) More mind mapping
- (2) Practice at home/Be autonomous
- (1) Flexible software
- (1) Smaller groups
- (1) Less graded assignments

Note. Insolvency and Bankruptcy Business Law, school year 2017-2018, *N* = 22.

School year: 2017-2018 – Cohort 1

1. What aspects in particular of this method of learning did you most appreciate? And why?

- (9) Exchange with peers is interesting
- (2) Playful to learn
- (2) Learn in a different way
- (1) Speak more Spanish
- (1) Attentive

2. What aspects in particular of this method of learning did you least appreciate? And why?

- (6) Not serious learning for higher education/Not serious because we are playful/ Noisy
- (1) Different profile of peers
- (1) Doesn't like this approach
- (1) Too little time/more important things to learn

3. What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.)

- (6) Want more serious games/infantile
- (1) Too many to play together
- (1) Want to have a class as a whole and not in small groups

School year: 2017-2018 – Cohort 2

1. What aspects in particular of this method of learning did you most appreciate? And why?

- (3) Interesting to learn
- (2) Interactive
- (2) The games

2. What aspects in particular of this method of learning did you least appreciate? And why?

- (1) For kids
- (1) Not happy, so can't learn
- (1) Cheaters in the game
- (1) Doesn't like board games

3. What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.)

- (2) More orals and videos
- (1) Prepare it ourselves

School year: 2017-2018 – Cohort 3

1. What aspects in particular of this method of learning did you most appreciate? And why?

- (7) Interesting
- (7) Interaction
- (3) Fun/learning by playing games
- (2) Innovative activity
- (1) Good for thinking about culture

2. What aspects in particular of this method of learning did you least appreciate? And why?

- (5) No progress in learning
- (2) More vocabulary
- (2) Not dynamic/No interest in approach
- (1) Some games are interesting
- (1) Behavior of some students

3. What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.)

(6) More orals and practical work (2) More tests (2) Need follow-up/More structure with instructions (1) Need motivation from peers
School year: 2017-2018 – Cohort 4 1. What aspects in particular of this method of learning did you most appreciate? And why? (5) Exchange with peers/Enriching (2) Interesting (2) Useful (1) No pressure (1) Fun to play games (1) Variety of games 2. What aspects in particular of this method of learning did you least appreciate? And why? (1) Need more lessons (hours) (1) Not sure of the method (1) Too fast at times 3. What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.) (2) More writing work (1) More structure
School year: 2017-2018 – Cohort 5 1. What aspects in particular of this method of learning did you most appreciate? And why? (3) Exchange with peers (3) Fun/amusing 2. What aspects in particular of this method of learning did you least appreciate? And why? (1) Lacks rigor (vocab, grammar) (1) More lessons 3. What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.) (2) More grammar and vocab (writing) (1) More structure
School year: 2017-2018 – Cohort 6 1. What aspects in particular of this method of learning did you most appreciate? And why? (7) Interactive/Exchange with peers (2) Learning easily (2) Practice oral (1) Interesting 2. What aspects in particular of this method of learning did you least appreciate? And why? (1) Hard to use grammar (1) Some games are hard to understand (1) Learn conjugation (1) Too many games (1) Students lose concentration (1) Not for learning 3. What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.) (3) Make videos and presentations, debates, grammar (1) More supervision (1) Do task work

Note. Spanish, school year 2017-2018, cohort 1 $n=17$, cohort 2 $n=11$, cohort 3 $n=18$, cohort 4 $n=15$, cohort 5 $n=8$, cohort 6 $n=16$ ($N = 85$).

School year: 2016-2017 1. What aspects in particular of this method of learning did you most appreciate? And why? (32) Group work, sharing of ideas, joint reflection/ Exchange/different way of working/joint project/It changes theoretical courses (12) Current topic/Interesting (science fiction)/ broad topic

- (11) Work autonomy/ Autonomous research allows us to better assimilate things because we learn from ourselves and this allows us to remember them more easily/ The challenge it represents to work in a limited time/ Individual research because it allowed me to inform and learn.
- (10) The field experience, because I learned a lot/ Practical aspect, putting theoretical skills into practice and it is a very enriching and interesting experience/The freedom to bring out our own science of theory/The teacher's desire to change the working method and to innovate
- (9) Friendly environment/The configuration of the room which allows a better methodology/working in comfortable places/easier to get involved
- (4) Presentations allow you to do your own research and learn on your own/The subject that asks relevant questions/Informative
- (3) Interesting/dynamic
- (2) Informative
- (1) The brain storming aspect of the task

2. What aspects in particular of this method of learning did you least appreciate? And why?

- (22) The time that is too short/the time does not allow you to reread your work and make it as you would have liked it to be/Generates a lot of stress/ an hour is too short to research, write, synthesize, etc.
- (6) Lack of organization of the course/better structure/lack of connection between the different activities and the course/ too wide, not framed enough/ Left to oneself, poorly defined objectives, few references on how to schematize the work/more instructions on what to do.
- (4) Noise and concentration problem
- (3) The groups, the quality of people in the groups, too many/ Sharing the tasks and we cannot follow
- (3) The theoretical aspect that I found uninteresting/ Lectures on the communication of the ancient/The theory, interesting and enriching general culture aspect but not practical enough.
- (2) Too many presentations/ Presentations (good idea but some presentations had already been done in other classes)
- (1) The subject is too broad, we get lost

3. What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.)

- (10) More hands-on group work/More interaction
- (9) Have more time
- (6) More structure/organization/More specific study framework
- (4) More explanations/More discussion and illustration/Being able to question and discuss
- (4) Environment for learning/a new layout of the room/in the Learning Lab/work in more individual spaces
- (4) More interactive courses/Fewer theory lessons/ More dynamic, non-graded class work, link to work.
- (3) More sessions/More sessions for deeper and better quality work.

School year: 2017-2018

1. What aspects in particular of this method of learning did you most appreciate? And why?

- (37) Pooling of knowledge, teamwork/ ability to discuss and find solutions together/ to reflect with several or debate ideas, to establish a problem
- (4) Oral presentations allow to better understand a subject/ presentation in five minutes plus questions, teaches you to go to the essentials
- (4) Learning about new topics
- (4) Organization, restitution.
- (4) Field investigation/research/ interesting because it allows you to provide fairly advanced work, in terms of research, and then to make a synthetic and at the same time detailed assignment.
- (3) Interaction between the teacher/our comfort zone

2. What aspects in particular of this method of learning did you least appreciate? And why?

- (20) People not invested in group work/ share, know who makes the decisions the work/ not everyone can express themselves/when we do not agree on the division of tasks/ absences that cause difficulties and delays in work
- (5) Subjects sometimes too complex/ not enough theories
- (5) Time management/Organization/no time to answer the question
- (5) Speaking time is too short/ having to summarize a complex idea in five minutes
- (4) Change environment/ no amphitheater/noise in the room
- (4) Uncomfortable with teaching method/ having too much openness possible and not having a defined method/ we are not used to working on this kind of subject in class, which can be destabilizing. We have the impression of not really mastering our subjects/ perhaps the aspect of being too free
- (2) Graded on everything is stressful and not easy/grading, no course, too much control or evaluation
- (1) No time to answer the question

3. What suggestions would you have to better this method of learning? (Content, classroom, activities, environment, etc.)

- (7) Improve the method by doing a lesson before going to the presentation/ be better oriented towards the expectations of the teacher/ Make topics more relevant/ more content to better approach the projects/ more theory/ a class session followed by an exercise session
- (6) Allow more working time/ find a schedule that does not exceed noon to concentrate
- (5) suitable environment for working/ Work in an isolated room for more concentration/ separate the groups by work room with more material available, writing boards/ appropriate space/ change environment, meet stakeholders

(4) More interaction/ continue group work in different formats/ more homogeneous group creation, not friends/ lead more/ potentially, more confrontation or debates (1) Problem-solving
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Note. Communication and Society, school year 2016-2017, $n = 59$ and school year 2017-2018, $n=42$ ($N = 101$).

Appendix 3

Course: Insolvency and Bankruptcy Business Law

(6 jan 2016)

- Maître de conférences (MCF)
- Responsable du Master 2 Pratique du droit des affaires
- co-directrice du Programme Business Law and Management
- Innovative method: Groupwork, real-life practical scenarios, technology (learning lab)

Class: Master 2 Pratique du droit des affaires

- only teacher
- jurist enterprise
- professional
- practical

Reason for change:

1. With such a difficult subject that is very dense she wanted to change to be more interactive
2. With the community of innovators (LIP), gaining ideas from them encouraged change

Info:

- Class average (moyen): roughly 8 (before change)
- Second year teaching this way (started last year 2014)
- Class structure: based on different themes
- Assessment: Final exam
- Moodle: Teacher puts all of the readings on Moodle first so the students can read before class.
- In each class, Teacher changes the groups so that all the students work with different group members.

Class available only during the second semester

2015-2016

Class size: 30 students

Total hours: 20 hrs (7 days of 3 hours)

Class dates:

1. 7/1, 14h00-17h00 - First class, Mindmapping, structuring
2. 14/1, 14h00-17h00 - Observation
3. 21/1, 14h00-17h00
4. 26/1, 14h00-17h00 - observation ?
5. 28/1, 14h00-17h00
6. 15/2, 9h00-12h00 -observation ?
7. 18/2, 14h00-17h00 - observation ?

NEXT:

Classroom observation in the learning lab on 14/1

Appendix 4

Course: Matrimonial Law

Law students – Matrimonial law – 30 hour during the second semester – sessions can be 2-3 hours

Jan 2017

Teaches law students in their 1st year of university

Students range from 40 to 50 each year

She didn't want students to just sit there and take notes

Had students read about the subject before the course starts so that they could understand the fundamental concepts ahead of time, so they can do the activities during class. (received it a few days before the first session)

She does a lot of different activities with the students for them to keep them active in the classroom in groups. Some of the examples of the teaching activities are 7 hats, presentations, mind-mapping, etc.

As a part of the LIP community, she was there to give workshops and participate in workshops.

Apart of her new position at the Law fac, Assesseur au Doyen en charge de l'innovation pédagogique, she would be in charge understanding and promoting teaching approaches that were not based on lecture.

She was also inspired to change her teaching approach because the Law faculty had already decided to change their teaching pedagogy and have students work in seminars and workshops that focus on real world situations rather than just theory. The FLD also decided to change their form of evaluation, they wanted students to not focus on the « penalty of their marks but used as a motivation to keep going. »

The progress of this change has really shaped her courses. She doesn't use lecture-based learning anymore and have students work together in groups. She sees them actively working and discussion and motivated.

Appendix 5

Course: Psychology-Approach to organizational change and Psychology- Organization diagnostics

Jan 4, 2017 at 14H

He teaches Masters 2 in Psycho sociale

He has 3 different courses but all in Psycho sociale

The department was into innovative teaching approaches and he was in the innovative pedagogy group.

Courses :

1. Diagnostique des organization

15 hours per semester (2 hours per session)

Objective – apprendre sujet actuel demain de travail – posture

Teaching approach : explain, argue, debate, etc in professional life

Individual student – choose an actual in their domain

Examples : coworking, droit de disconnection

1. Explain method – find a theme (reflection on the info - imagine)

2. 1 hour for each student (Give info and then debate) till the end of session

2. Methodology

15 hours (17 Jan – 28 Feb)

Capable to do role play

Lead and evaluation

1. Creation of the role play

2. Led the role play

3 hours per group of 2

1. Led

2. Discussion

3. Artist

Objective : experiment with Thierry (produce in an artistic way)

15 hours - 3 sessions

Create 2 groups :

1. To organise the exposition of the artist

2. Organise the day when people are to come (open house) journée d'étude

Appendix 6

Course: Research Training in Psychology

(7/1/2016)

Class: Formation de Recherche M1

- the only teacher
- only done in the 2nd semester
- collaborates with other teachers to decide how the course will go and the evaluation. (15 jan at 10:00)

Reason for change:

- previous methods: Lecture and gave readings
- no longer motivation from the students and from the teacher
- long classes and TD with just material and without any interaction from the students
- Nov or Dec 2012: went to a conference where XXX was presenting Flipped classroom. (Inspiration)
- Few months after (start of Feb 2013), went to a meeting with the LIP.
- 4th year of Flipped classroom starting in 2nd sem of 2013.
- After the first initial change, students said that it was a lot of work but in the end they thought it was great and were really happy.
- Grade before: 60% of the students were able to pass to the next level (40% didn't pass)
- Grade after 2013: 100% pass rate with an average of 10/20
- Need for the class: in M2 these students will do professional and they didn't have the necessary research to achieve that. So the need for them to do research was there to help them for their M2.

2015-2016

Class size: roughly 45 students

Total hours: 18 hrs for the course, 12 hrs for Les travaux dirigés (TD) (2 hours per course)

Salle: 384

18 hrs Course:

- 1st class- presentation of the method/breakdown of the course, Divide into groups of 4.
- Each class, one group has to do
 1. Oral (Theater, emission, etc.)
 2. Presentation of a thematic Poster
- Each group is given a paper where the objectives for what they have to do for their themes are explained in detail.
- The groups are essentially teaching the other students the information needed to research

12 hrs TD:

- 6 sessions
- 1st class - all the students are presented with the logistics of the research provided by B.U.
- After the 1st class the students are divided into their subjects:
 - 3 sessions of 2 hours are with the Social students
 - 3 sessions of 2 hours are with the Patho students

Social: first class date 1/2/16

PsychoPathologie: first class date 22/2/16

Description of past classes:

2012-2013 & 2013-2014

Socio/Patho

1st class: Ethics

2nd class: Classic (resume from a text)

3rd class: Round table exercises

- rotation between tables
- each table has a theme
- teacher gives each table a paper with objectives
- each group has to write a summary of what was learnt from the students collaboratively.
- last group will have to write a combined summary all of the different rotated ideas/information that was done in class.
- Summary = information used for the final exam

2014-2015

2 group per course

- Each group has to invent a game based on their theme
- there was no final exam:
 1. 10 points for creating a question thematic
 2. 10 points for answer other people's questions
- Group that won got to create/construct their game into reality but it raised questions of the rights (a game that already had a copyright/similarities)
- issues: The grades for the class (final, oral and poster) didn't equal the amount of work that went into it. The oral and poster marks have a smaller percentage weight compared to the final (questions), therefore the grades aren't really justified.

Appendix 7

Course: Cellular Biology

(15/1/2016)

FGES:

Semester 1	Semester 2
Bio-Chemistry L1	Bio-Chemistry L1, L2, L3
Immunology L3	Cell Biology L3
Bio-Technology L3	Bio-Technology L3 (Professional License)

FLM:

Histology: Sem 1 & Sem 2

ISA:

FoodTech M1 (done in English)

- FGES teachers share experiences as a science department
- Change: The dean of FLST and his ideas were evident in his own teachings.
- Don't know the average of the past years, didn't keep data.

2015-2016

Class: Cell Biology

Class size: 24 students

Hours: 12 hours (TD) and 6 hours (TP) = 18 hours total

Material: All the class texts, readings, examples, class layout, team topics and presentations done are on icampus.

Objectives: The ability to understand the texts that they read and to be able to extract main concepts in the text.

- (1. explain their understanding of the text,
2. How to synthesize (major info from any given subject,
3. Being able to have that explanation in written in form)

Started teaching ped: 2011-2012 (Traditional one year but then went back)

Assessments/grades:

- In-pairs students prepare presentation in both animals and plants - 60%
 - a. Presentation
 - b. Q&A
 - c. Write a summary
- 2 practical work - 20%
- Final exam (based on what was presented by the students) - 20%

Presentation:

- Teachers choose the subject theme for the students (picked at random)
- Teachers use a rubric (created by them)

Exam:

- Summarize the text
 - a. To be able to understand what they read
 - b. To be able to extract the main ideas/concepts

Observation dates:

1. Cell Biology: 8 feb 2016, 13h00-16h00

Salle: RS308

6 groups will present their work

2. Histology: 26 feb 2016, 15h00-16h00

Salle: This is an interchangeable lab

Appendix 8

Course: Molecular Biology

7/1/2016

Innovative Method: Flipped classroom (classe inversée)

Classes: L3 Génétique Moléculaire

Group 1: Science de la vie - FGES

Group 2: Agroqual - ISA

- the only teacher
- Taught only in the second semester
- Class average: Before: CC: 11-12, Final: 12
After the first year of change (2011-2012): CC: 15, Final: 8
Last year (2014-2015): CC: 15, Final: 12

2015-2016

Group 1: L3 Génétique Moléculaire

Science de la vie - FGES

- 12 sessions, 2 hour lessons = 24 hours
- 48 students
- 6 teams (6-7 students in a team) pre-assigned based on other prof who know them.
- taught in the learning lab
- heterogeneous group (mixed levels)
- Will find info for 6 chapters (same chapters as group 2)*

Group 2: L3 Génétique Moléculaire

Agroqual - ISA

- 8 sessions, 3 hour lessons = 24 hours
 - 4 sessions: students build the chapters
 - 4 sessions: flipped classroom based on the literature the students produced in the 4 * sessions of building chapters.
- 20 students
- 3 teams (6-7 students in a team)
- taught in the meeting lab
- low level students (didn't study genetics, they are in a School/Work program)
- Will find info for 6 chapters (same chapters as group 1)
- New class for the teacher (usually has just FGES, ISA asked if he could do it)

Assessments:

2 grades (Control Continue (CC) 30% + Final exam 70%)

1. CC marks: Based on points given by the teacher both when they are in a team and individually.
 - team: everyone receives the same points, peer-evaluation (anonymous) and self-reflection (grades him/herself and others in the group)

Before 2012 (traditional): CC: 11-12, Final: 12

2012-2013 (new pedagogy/traditional final): CC: 15, Final: 8

2014-2015 (new pedagogy/new final): CC: 15, Final: 12

Past example 1: *He takes pictures of the chapter the group has done. Based on those pictures he awards students points for how well they did (20 points = very informative)(13 points = informative)(10 points = there is info but not just a little). He then notices 6-7 students that are really engaged in class (doesn't have to be in the same group) and XX award them 15 points.*
- All students will receive points no matter if they do the work or not
- students will get a high grade based on the highest amount of points

- to transfer those points into grades: XX projects a cluster of points on the screen and with everyone in agreement (student and XX), they will decide what is the average point to receive an average grade. The students negotiate their grades.

- In the past, points were up to 20 based at the end of each chapter. Since last year (2014-2015), XX changed his methods of how the students produced the chapters, so he changed his CC. His change in chapters all lead from previous chapters, so the points had to be continuous.

Past example 2: When XX realized he needed to change his final exam (2012).

Before: CC: 11-12, Final: 12

After the first year of change (2012): CC: 15, Final: 8

He was disappointed and questioned how could the students get such low grades in their finals and get high grades in their CC. He was very disappointed. 15 days later after grading 10 finals (they were given later because they had to do a make-up of the course in a short period of time). XX realized that those students final grade average was 16. In the past, students who take the test later usually have lower grades but this certainly was not the case. It seems, just before the exam the students really focused on 1 or 2 of the modules and because of that the exam reflected the classroom activities.

Past example 3: 2014-2015: How XX prepares the students for the final.

Students create their own questions in a pool of questions from the whole class. Based on that XX and the class spends 3-4 hours to prepare the questions for the exam which consist of

- 50 short questions

- 6 to 10 big questions

- During the final exam: 2 hours, no documents/books/etc.

- example exam: 5 small questions (10 points), 2 big questions (10 points)

Past example 4: Methodology, 2014-2015

- Flipped classroom where students find their own documents (reading/info/etc)

- Students prepare all of the questions and answers for the final exam where they will come up with

Inspiration to change

- 3 years ago (started Jan. 16, 2012) XX decided to change completely (which was a drastic change for him)

- He started doing innovative pedagogical strategies (Codesign) with workshops that he was doing with different companies. It came to him, why am I not doing it in my classroom?

- He was a part of the LIP community at Iacatho

- He thought it was crazy at first, how could the classroom = business as enterprises

- It took 3 months to find a protocol (that he would be ok with) then in Nov, he decided he was going to change.

- In Dec, he had a meeting with the students so that he can talk to them about his new methods and explain what he plans to do in terms of pedagogy.

- He realized that for a 24 hour course, how was he suppose to give all the necessary information needed for these students to learn and really understand what he is teaching? (not surface learning, deep learning)

- Students receive 60% of the teachers knowledge (given in class) but in reality it isn't so, usually lower.

- PROBLEM = LOSS OF TIME - wants to organize differently because they are only capable of receiving that 60%, when they can get 100% if he changes his pedagogy. (They should have the possibility to get receive 100%)

- STARTED, Jan 16, 2012 is when he started his first class of new innovative technology.

Revelation for this year (2015-2016)

1. 3 hours of course is better for him to do this type of ped.

- To present

- To do activities where they can change/rotate

- To have time for questions and answers

Objectives:

2011-2012: gave papers that were very detailed on what he specifically wanted in the class.

EX: Chapter had to have 5-8 pages including pics, links, etc.

2014-2015: Gave them the freedom to do whatever they wanted but they had to have information what they understand and limit themselves to just copying straight from the internet. It also allows for them to look up new/current information that is recent, which XX may or may not know.

Self-Improvement/Self-Assessment:

After every class, XX gives the students something to think about in terms of his ped/methods. It could be to write something positive and negative, to write suggestions, etc.

After he collects all of these findings, he categorizes it into something more tangible (see XX notes, impressions positives et impressions négatives). And then he posts it on his blog and sends it to all the students.

Past example 1: One student writes one positive response: It was difficult to find info to build the chapter. And one negative response: Not interesting to do this chapter because he already did it the year before.

XX's response: How can this polar opposite response make any sense. Based on Biggs idea of surface learning and deep learning: We can conclude that he was able to get the basic knowledge (surface learning) last year but is now struggling with or having a hard time producing deep learning (XX's class).

Appendix 9

Course: Spanish

10 january 2017

1. What course do you teach? and how many students do you usually have?

Spanish. Overall I have students from Political Sciences and Law.

Usually my groups have around 20 students each. At most, 24.

2. How is your course structured? (How many hours do you teach? How many hours are dedicated to teaching through games? what kind of teaching activities do you do?)

I have between 16 and 24 hours per semester.

Usually, each week we have 2 hours. In these 2 hours, the first one is used to enhance written comprehension and several grammar aspects that we'd practice later.

The second hour is dedicated to oral expression and different games to practice the things we are studying (grammar, vocabulary, etc).

3. What inspired you to change from a lecture-based learning environment to a student-center learning environment? (where you use games to teach the students spanish)

I wanted to change a bit the way I was teaching Spanish, so I started using some of them, doing more oral activities, and I saw they were much more effective than written activities to "force" the students to talk and speak Spanish.

I have gone to conferences and studied about teaching approaches. I used to go to LIP meetings that were provided by lacatho.

4. What have you seen different from your courses now compared to before you changed your teaching approach? (grade change? motivation? engagement? speaks more, etc.)

I've seen that, even if every group is different and some groups don't work as well as others, in general they are more motivated to "do" things in Spanish than before. Even if perhaps it was difficult

to express themselves, they were more engaged in the course and they tried to do it (with a lot of mistakes, but it seems they didn't care to have them and everybody could understand the meaning of what they were explaining).

Sometimes I could see the reflection of it in the grades at the end of the semester, but it depends too on the group, and overall, the size of the group. The results are much better when the groups have no more than 15 students... in general, when the group is small size, almost every student is motivated and you can see the results on the grades... when is bigger is more difficult to engage everyone of them, so sometimes is more difficult to make them to play and use the language.

Appendix 10

Course: Communication and Society

Jan 16 2017

Teaches : communication and society (during the moyen-age)

2nd semester – 24 hours a semester, 12 sessions (2 hours)

L3 students in MCC (Media, Culture and Communication)

Her class is too big – wants to divide the class into groups

She was having a hard time motivating the students because they have to take the course

Evaluation – for each session, they corrected in class

Last year : she did presentations – didn't work well (10-15 min in groups)

Dossier and presentations (Contrôle continue) – intelligent cities – investigation

She was present to guide their dossier and presentation

After the end of each session, she gives a simple question (that allows them to reflect on what they did) and she goes over it with the students

Environment – Her classes are always in an amphitheater, which is difficult to do any collaborative groupwork

She wanted to guidance for changing her course, she consulted with XX (FLSH). XX was a part of LIP at lacatho