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Original Article

Flipped classroom and teaching skills: a case study in a hybrid training cours

Sala de aula invertida e competências docentes: um estudo de caso em curso de capacitação na modalidade híbrida

Aula invertida y competencias docentes: un estudio de caso en un curso de formación híbrido

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Abstract

This article presents how the Flipped Classroom can enhance, through a training course in hybrid mode, the development of teaching competences of instructors who work in Secondary Technical Professional Education. As a methodology, exploratory-descriptive research and a case study were carried out, with a qualitative approach to the data. The procedures used were bibliographical research, documentary research, observation and questionnaires applied to student instructors, aiming to identify self-perceptions of the competences developed during the course; and the course teachers, in order to identify perceptions regarding the Flipped Classroom approach to developing teaching competences, in the hybrid modality. The data was analyzed from the perspective of the Addie model of instructional design. Despite the small sample analyzed, it is considered that the Flipped Classroom is one of the hybrid strategies with the potential to optimize the development of teaching competences.

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Keywords: Hybrid teaching. Flipped Classroom. Competences. Teaching competences. Secondary Technical Professional Education.

Resumo

Este artigo apresenta como a Sala de Aula Invertida pode potencializar, por meio de um curso de capacitação na modalidade híbrida, o desenvolvimento de competências docentes de instrutores que atuam na Educação Profissional Técnica de Nível Médio. Como metodologia, realizou-se pesquisa exploratória-descritiva e estudo de caso, com abordagem qualitativa dos dados. Os procedimentos utilizados foram pesquisa bibliográfica, pesquisa documental, observação e questionários aplicados aos instrutores-alunos, visando identificar as autopercepções das competências desenvolvidas durante o curso; e aos professores do curso, no intuito de identificar as percepções quanto à abordagem da Sala de Aula Invertida para o desenvolvimento de competências docentes, na modalidade híbrida. Os dados foram analisados na perspectiva do modelo Addie de design instrucional. Considera-se, apesar do pequeno amostral analisado, que a Sala de Aula Invertida é uma das estratégias híbridas com potencial para otimizar o desenvolvimento de competências docentes.

Palavras-chave: Ensino híbrido. Sala de Aula Invertida. Competências. Competências docentes. Educação Profissional Técnica de Nível Médio.

Resumen

Este artículo presenta cómo el Flipped Classroom puede potenciar, a través de un curso de formación en modalidad híbrida, el desarrollo de competencias docentes de los docentes que se desempeñan en la Educación Secundaria Técnico Profesional. Como metodología se realizó una investigación exploratoria-descriptiva y un estudio de caso, con un enfoque cualitativo de los datos. Los procedimientos utilizados fueron investigación bibliográfica, investigación documental, observación y cuestionarios aplicados a los estudiantes docentes, con el objetivo de identificar las autopercepciones de las competencias desarrolladas durante el curso; y los docentes del curso, con el fin de identificar percepciones respecto del enfoque Flipped Classroom para el desarrollo

de competencias docentes, en la modalidad híbrida. Los datos fueron analizados desde la perspectiva del modelo Addie de diseño instruccional. A pesar de la pequeña muestra analizada, se considera que el Flipped Classroom es una de las estrategias híbridas con potencial para optimizar el desarrollo de competencias docentes.

Palabras clave: Enseñanza híbrida. Aula Invertida. Competencias. Competencias docentes. Educación Profesional Técnica Secundaria.

1. Introduction

One of the most consensual issues in the various discussions about education is the need for a solid initial and ongoing training of teachers, regardless of the level or modality of their work. In the current scenario, we see on one side the 21st century with its significant transformations, and on the other, schools being required to develop the necessary competencies for individuals to be able to deal with this new world. Faced with this tension, the teacher, being the main mediator in the teaching-learning process, needs to equally develop teaching competencies to operate in this context.

Competence is a complex and still evolving concept. Perrenoud and Thurler (2002, p. 19) define it as "[...] the ability to face a family of analogous situations, mobilizing in a correct, fast, relevant, and creative way, multiple cognitive resources: knowledge, skills, micro-competencies, information, values, attitudes, perception schemes, evaluation, and reasoning." Meanwhile, Zabala and Arnau (2010, p. 37), based on extensive analysis, state that "[...] competence will consist of effective intervention in different areas of life through actions in which attitudinal, procedural, and conceptual components are mobilized simultaneously and interrelatedly." Additionally, Moretto (2013, p. 70, author's emphasis), drawing from the studies of Guy Lê Boterf, Philippe Perrenoud, among others, conceptualizes competences as "The ability of the subject to mobilize resources aimed at approaching and resolving complex situations."

Taking into consideration the aforementioned concepts, it is understood that active methodologies and new educational technologies are allied for the development of competencies, serving as facilitators for their operationalization. Zabala and Arnau (2020) discuss a series of active methodologies considered most relevant for competency development. The authors start from the premise that the selection of the most suitable method depends on epistemology; and they argue that meaningful learning is the key to competency-based teaching, as it enables the establishment of non-arbitrary relationships between students' prior and new knowledge.

Hence, teaching through competencies may not be a simple task, as it requires a (re)thinking both in educational (institutional dimension) and pedagogical (didactic-pedagogical dimension) aspects. Zabala and Arnau (2010), focusing solely on the first level of requirement for the school adaptation to competency-based teaching, characterized by its functional nature as opposed to traditional propaedeutic teaching, highlight the need for profound changes, asserting that "[...] the organizational structure of the school, scheduling management, and teacher training are neither designed nor prepared for a teaching approach that, as we will see, requires more time and a classroom dynamic far removed from the traditional model of transmissive teaching" (Zabala; Arnau, 2010, p. 24, emphasis added).

Similarly, Moran (2017) criticizes the closed model of instructional design in institutions that may want to make changes, but their traditional disciplinary models emphasize content over competencies. The author further advocates for the combination of active methodologies, hybrid teaching, and educational technologies as fundamental for the flexible learning of today. Specifically addressing hybrid teaching, Horn and Staker (2015, p. 10) state that the combination of competency-based teaching and hybrid teaching, if well implemented, "[...] forms the foundation of a student-centered learning system."

In the context where the teacher is the student in formation, Kuenzer (2016) criticizes the hurried and questionably quality of courses that only address the lower dimensions of the competency taxonomy,

without developing higher cognitive processes. As a counterpoint, the author repeatedly advocates for the necessity of a solid epistemological, theoretical, pedagogical, and methodological training with the development of complex competencies that ensure intellectual autonomy and digital literacy for the teacher.

Within the challenging context of ongoing teacher training, especially considering the urgency to equip them for competency-based teaching, Flipped Classroom emerges as a strategic solution. In the examined educational institution, where time availability for this training is limited, the hybrid approach of Flipped Classroom stands out. This active methodology allows classroom time to be directed towards more participatory learning, where students "[...] practice problem-solving, discuss issues, or work on projects" (Horn; Staker, 2015, p. 43). Thus, classroom time is optimized by leveraging other active methodologies and, through them, developing competencies (Zabala; Arnau, 2020).

The aim of this article is to present Flipped Classroom as a strategy to enhance the development of teaching competencies in a training course for instructors working in Technical and Vocational Education and Training (TVET). Specifically, the study sought to assess the progress of teaching competencies among instructor-students throughout the course, using learning outcomes and self-perceptions as indicators; and to explore how Flipped Classroom can be an effective strategy for the development of these competencies, according to the perceptions of the course instructors.

Therefore, the approach of Flipped Classroom articulated with the Revised Bloom's Taxonomy (RBT) will be presented, and how Flipped Classroom articulated with RBT can serve as a strategy to enhance classroom time in favor of the development of teaching competencies. Next, the methodological journey of the research will be described. Following that, the conducted case study will also be described. Subsequently, the results of the data collection will be presented, and the implications of these results for the development of teaching competencies will be discussed. Finally, the concluding remarks of this research will be presented.

The main findings indicated that Flipped Classroom is one of the hybrid strategies with the potential to optimize classroom time for the development of teaching competencies. Learning outcomes indicated satisfactory development of the course competencies, and the surveyed students reported progress in their self-perceptions of their teaching competencies development, although they still demonstrate a need for ongoing training. The perceptions of the course instructors indicated that Flipped Classroom is promising for the development of teaching competencies, although training and pedagogical support are necessary for the implementation of this strategy.

2. The flipped classroom and building teaching skills

Flipped Classroom has been widely used, researched, and discussed among teachers and researchers (Bacich; Tanzi Neto; Trevisani, 2015; Bergman, 2018; Horn; Staker, 2015; Pavanelo; Lima, 2017; Valente, 2014). According to Valério and Moreira (2018), Flipped Classroom originated from the experience report developed by Lage, Platt, and Treglia (1996); while Suhr (2016) points out the emergence of the flip in the 1990s with the advent of information and communication technologies (ICT).

Despite the diversity of authors discussing Flipped Classroom, according to Valério and Moreira (2018, p. 219), it shares "[...] prior study, the use of digital technologies, and active student participation in class." For the authors, such strategies are not innovative, as they have been present in education for centuries, at least since the assumptions of the New School movement. However, Horn and Staker (2015) do consider hybrid models, including Flipped Classroom, as innovations. They explain that the roots of these hybrid innovations lie in online teaching, which, around the turn of the 21st century, began to combine with face-to-face teaching in the context of K-12 education.

In this sense, Bacich, Tanzi Neto, and Trevisani (2015, p. 56) discuss Flipped Classroom as one of the models of Rotation in hybrid teaching, where "[...] theory is studied at home, in an online format, and the classroom space is used for discussions, solving activities, among other

proposals. Thus, what was done in class (content explanation) is now done at home, and what was done at home (application, activities on the content) is now done in the classroom."

Bergman (2018, p. 11, emphasis added) defines Flipped Classroom as follows:

> At its core, direct instruction and delivery of basic content are provided to students through an instructional video (referred to as flipped video), thus allowing classroom time to be dedicated to *application*, *analysis*, and *practice*, with the teacher present to clarify misconceptions and answer questions. Essentially, the lighter work is done before the face-to-face class. When teachers and students meet in the classroom, the basic content has already been presented, and the *class time*, now serving a new purpose, is used to engage students in *more complex cognitive processes*. Students do the lighter work before class and the more challenging work in class, where the teacher is there to assist them.

Thus, in Bergman's conception, Flipped Classroom seeks to systematically organize study moments, facilitating and maximizing student dedication in both out-of-class and in-class environments. Furthermore, the sophistication of the approach lies in the fact that out-of-class study supports in-class activities. This is how student time and, especially, class time are better utilized. It is observed, both in Bacich, Tanzi Neto, and Trevisani (2015) and in Bergman (2018), that the organization of out-of--class (online) and in-class (face-to-face) moments is equally delineated, as well as the content: theoretical for homework and practical for class, which becomes more evident in the RBT.

The RBT is a revision of Bloom's Taxonomy (BT), proposed by Benjamin Bloom in 1956 and his team of educational scientists. The BT, in the cognitive domain, envisioned a systematic and hierarchical organization of cognitive processes, ordered from simplest to most complex: knowledge, comprehension, application, analysis, synthesis, and evaluation. This theoretical-methodological conception proposed that for students

to reach a higher level, they must have necessarily mastered the previous level (Ferraz; Belhot, 2010).

Anderson et al. (2001), led by a group including David Krathwohl—who was part of the development group for the BT—sought to update and revise the BT to meet current psychopedagogical and technological advances. According to Ferraz and Belhot (2010, p. 425), "[...] they began to realize that changes to the original taxonomy would be necessary, and the first point analyzed was related to the issue of the verb and its direct association with the cognitive objective, objective assessment, and competency development." One significant outcome of this revision work is the Two-Dimensional Table of the RBT (Table 1).

Table 1 - Two-Dimensional Table of Revised Bloom's Taxonomy

Dimension of Knowledge	Dimension of Cognitive Processes					
	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Factual						
Conceptual						
Procedural						
Metacognitive						

Source: Author's production, translated and adapted from Anderson et al. (2001).

The main changes in the RBT consisted of changing the names of cognitive processes from nouns to verbs and reorganizing them. Additionally, another category related to the dimension of knowledge was explicitly outlined, along with its subcategories. This second dimension is conceived to be crosscutting with the cognitive processes, thus giving the table two dimensions.

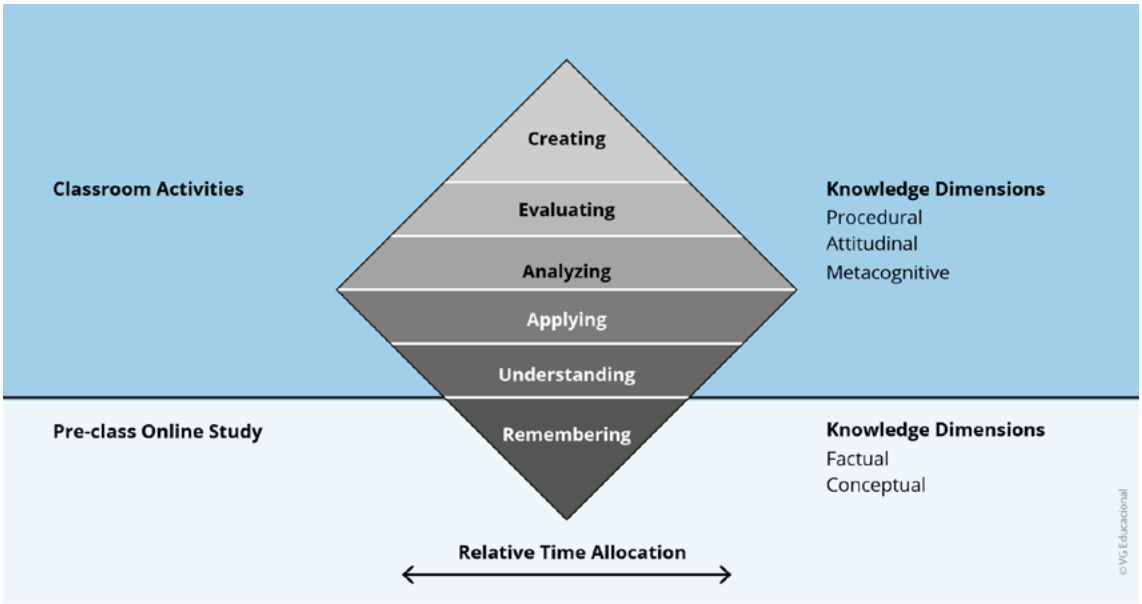
From the Two-Dimensional Table of the RBT, it is possible to articulate types of knowledge (content) with desired cognitive processes. A conceptual content can be operationalized so that the student: (re)calls a concept, understands it in its connections, applies it to reality, analyzes

it in search of its components, evaluates it by judging its value, and even creates a new concept in different contexts. This same logic can be applied to other types of knowledge, and it is in this way that the RBT aligns with the logic of competencies.

Another interesting factor is that in the RBT, according to Ferraz and Belhot (2010), the hierarchy of cognitive processes allows for flexibility. Thus, depending on the context, subject, activity, among other factors, a certain competency can be developed at a certain level of the cognitive process before or without necessarily having been developed at a previous level.

The Flipped Classroom proposed by Bergman (2018) utilizes the theoretical-methodological framework of the RBT. Figure 1 illustrates how Flipped Classroom is articulated with the RBT and competency--based teaching.

Figure 1 - Articulation of the Flipped Classroom with the RBT and competency-based teaching



Source: Author's production based on Bergman (2018).

According to Figure 1, the online self-directed pre-class study time is structured to develop the cognitive levels of remembering and understanding from factual and conceptual content. Meanwhile, the in-class time

is dedicated to the development of more complex activities at the levels of applying, analyzing, evaluating, and creating, through predominantly procedural, attitudinal, and metacognitive content.

It is evident that, in addition to the organized system provided by the online and in-person environments, the diamond-shaped RBT model proposed by Bergman (2018) also takes into account the relative time allocation between study moments. That is, while in traditional classroom settings there was little time left for higher-order processes, in Flipped Classroom, time is optimized: minimal time is allocated for pre-class study, while more time is used in class for intermediate and higher-order processes. Additionally, the key knowledge dimensions crucial for competency development (Zabala as cited in Behar, 2009; Zabala; Arnau, 2010, 2020) are explicitly outlined in this model, on the right side, applied to the context of hybrid teaching using Flipped Classroom.

With these being the main concepts used in this study and serving as the theoretical framework for analyzing the hybrid training course, the following section describes the methodology employed for data collection and analysis.

3. Methodology

The qualitative approach methodology and exploratory-descriptive research employed bibliographic research, documentary research, and case study strategies, with data collection instruments including observation, document analysis, and questionnaires (Gil, 2008). A naturalistic case study approach was adopted, which, according to Ventura (2007, p. 384), "aims at investigating a specific, well-defined case, contextualized in time and place to allow for a detailed search for information"; and of the instrumental type "[...] when a case is examined to better understand another issue, something broader, to guide studies or serve as an instrument for subsequent research [...]." Thus, through the case study, it is expected to better understand the researched phenomenon, identify gaps, and generate insights for future research.

The case analyzed was the training course conducted at a Training

Center of the Brazilian Navy located in the municipality of São Pedro da Aldeia, in the state of Rio de Janeiro. This Training Center is a Military Education Organization, part of the Naval Education System (SEN). The research involved the participation of 15 instructor-students and 4 course instructors, representing the total number of teachers and students who participated in the course at the time of the research.

Data collection through on-site documentary research was based on SEN-related norms, curriculum documents, and course and class planning documents, aiming to understand aspects such as the need for instructor training, teaching competencies, hybrid teaching modality, active methodologies, and digital resources. As a parameter for the analysis and systematization of documentary and material findings, the Addie model was used, which, according to Filatro (2023), corresponds to the phases of analysis, design, development, implementation, and evaluation. The training course was characterized through a sort of instructional design matrix (Filatro, 2023) in light of the concepts and other characteristics found in the literature review, particularly regarding competency-based teaching, Flipped Classroom, and Revised Bloom's Taxonomy.

Data collection through questionnaires was conducted via Google Forms, administered to both instructor-students and course instructors. Two questionnaires were administered to the instructor-students to gather self-perceptions regarding the development of their teaching competencies. The first questionnaire was administered at the beginning of the course and had a diagnostic nature, aiming to assess the initial level of their teaching competencies. The second questionnaire, administered at the end of the course, aimed to self-assess the progress achieved. The objective was to compare the results to determine whether there was progress in the development of teaching competencies throughout the course.

These questionnaires were structured with three categories of closed-ended questions, each corresponding to a component of the KSA (Knowledge, Skills, and Attitude). Within each category, four topics were defined: three aligned with the areas of the course's teaching competency frameworks (competency-based teaching, active methodologies, and new educational technologies), and one additional topic for the integration of these three areas (innovative teaching-learning strategies). For each of

these topics, participants had four response options reflecting different levels of knowledge, skill, or attitude. This structure aims to comprehensively assess the development of teaching competencies of the instructor--students throughout the course. Below is the structure of the beginning and end-of-course questions, as detailed in Table 2.

Table 2 - Structure of Objective Questions for Students (Instructor-Students)

Categories	Topics	Response options
1- Knowledge; 2- Skills; 3- Attitudes.	- Competency-based teaching; - Active methodologies; - New educational technologies; - Innovative teaching-learning strategies.	- None; - Little; - Reasonable; - Much.

Source: Author's production based on the research form.

It is worth noting that the structure of the questionnaire administered at the end of the course was very similar to the one administered at the beginning, with minor adaptations. The topics of the third category related to attitudes were formulated with a future perspective: instead of "Do I teach using competency-based teaching?" the question was "Will I teach using competency-based teaching?". This change was made because, during the interval between the beginning and end of the course, participants had not yet had the opportunity to apply what they had learned, and this adjustment aimed to stimulate reflection on the attitudinal aspect after the course.

In the questionnaire administered to the course instructors, on the other hand, the aim was to assess the perception of the contribution of the Flipped Classroom to the development of teaching competencies of the instructor-students. Five questions were directed, two of them being objective with response options as seen in Table 3; and the remaining three were subjective, described later on.

Table 3 - Structure of Objective Questions for Teachers

Question	Topics	Response options
1- In your perception as a teacher, how did the Flipped Classroom (FC) contribute to:	The initial preparation of students through pre-class online study? Optimization of classroom time used for more complex activities? The development of teaching competencies of students?	- None; - Little; - Reasonable; - Much.
2- If the FC, as well as its pre-class online study strategy, were removed, would it be missed in the course?		

Source: Author's production based on the research form.

The open-ended questions were: "3- What is the greatest advantage, positive aspect, or ease of the Flipped Classroom?"; "4- What is the greatest disadvantage, negative aspect, or difficulty of the Flipped Classroom?"; "5- In case there is a disadvantage, negative aspect, or difficulty with the Flipped Classroom, what can be done to improve it?". In the next section, the case study is presented with the description of the instructional design of the course.

4. Case study: the Hybrid Training Course

In this section, the instructional design (ID) of the instructor training course for competency-based teaching will be presented. ID can be defined as the "[...] intentional and systematic process of planning, developing, and applying teaching methods, techniques, activities, and materials, based on principles of learning and instruction, in order to facilitate learning" (Filatro, 2004, p. 64-65). The characteristics of ID will be outlined through a framework based on the Addie model (Filatro, 2023), comprising the following phases: analysis of the context and educational need, design of planned learning situations, development of these learning situations, implementation of teaching-learning strategies, and, finally, evaluation of the competencies developed.

4.1. Analysis

Identification of educational needs is the first step in the course creation process, "[...] understanding what demand needs to be met and - equally important - knowing the profile of the people involved with it" (Filatro, 2023, p. 32). The course was conceived and implemented at a Training Center of the Brazilian Navy (MB), specifically aimed at instructors involved in the EPTNM modality of the military axis, according to the National Catalog of Technical Courses (Brazil, 2023c). Within this Training Center, the curricula of Technical Professional Courses of Medium Level have recently undergone modifications, in accordance with the teaching policy of the MB, which adopted the competency-based pedagogy (Brazil, 2009). However, it is important to note that the instructors were trained and qualified to teach according to the previous conception, known as the task-based pedagogy (Brazil, 2023b). This implies that they have extensive experience in the technical approach, primarily based on traditional expository methods. Faced with this scenario, it becomes evident that the transition of instructors to the competency-based teaching approach, with its innovative practices, represents a significant challenge in terms of training.

Given this need for continued professional development of the instructors at the Training Center, the course was proposed with the purpose of training them to teach in accordance with competency-based education, using active teaching methodologies and new educational technologies (Brazil, 2023a). The expected professional profile of the instructors for competency-based courses within the SEN includes the ability to carry out strategic didactic planning in line with competency-based education. This implies promoting learning situations with innovative methodologies and new technologies adapted for education, thereby enabling the development of students' professional competencies (Brazil, 2023a).

The researched course instructors are also staff members of the Pedagogical Department of the institution. They are pedagogues whose roles include pedagogical training for the instructor faculty. The training course was incorporated into the Teacher Training and Qualification Plan (PCQD) of the Training Center. The PCQD is the main annual training

planning document for the teaching staff and corresponds to a demand from the Navy's Education Directorate.

4.2. Design

After the analysis phase, the course is designed, which is the solution to the identified demand. Based on the overall planning, the following are defined: "[...] competencies to be developed, strategies to assess whether the objectives have been achieved, types of learning and support activities proposed, forms of interaction among people, structure of the content to be worked on, media and technologies used, and estimated duration" (Filatro, 2023, p. 34). In the case of the training course, the general objective, the reference competencies for teaching, teaching methods and techniques, as well as the learning objects, digital tools, and strategies planned for the course will be presented.

The objective of the course is to develop knowledge, skills, and attitudes (KSA) for teaching in competency-based courses at the Instruction Center, following the competency-based teaching guidelines in the Brazilian Navy. To achieve this, according to Brazil (2023a), the goal is to develop the competencies listed in Table 4.

Table 4 - Reference Framework of Teaching Competencies for the Training Course

Competencies	Indicators (specific competencies)
Technical competencies (knowledge and skills)	
1-Employ competency-based instruction methodology.	1.1- Discuss the principles guiding competency-based teaching. 1.2- Relate the contents according to their classifications for competency-based teaching. 1.3- Develop technical and behavioral competencies in teaching practice. 1.4- Develop assessments in the competency-based teaching mode.
2-Use active methodologies and new educational technologies in teaching practice.	2.1- Discuss principles of contemporary education allied with new technologies and methodologies. 2.2- Use active methodologies in teaching practice. 2.3- Apply new digital technologies in education in teaching practice.

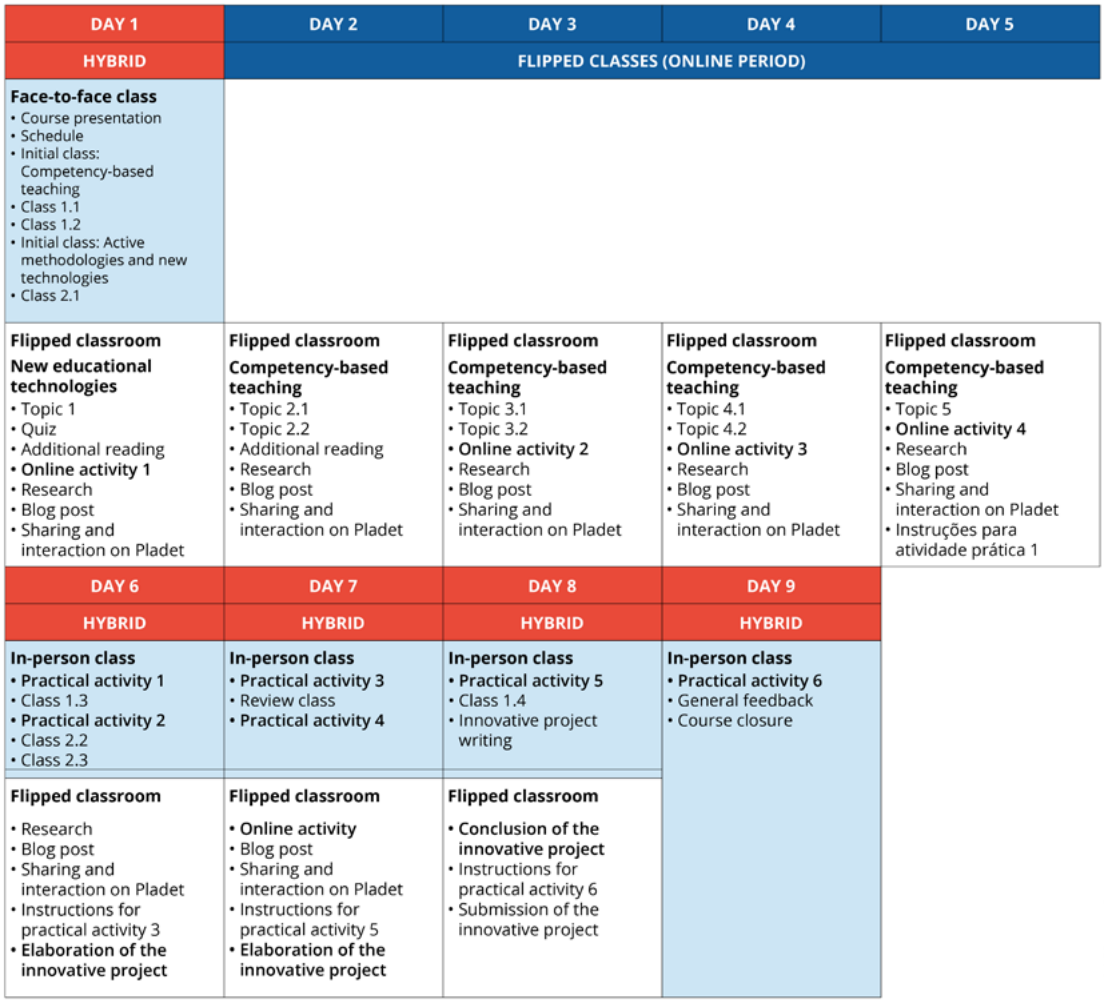
Behavioral competencies (attitudes)	
1-Commitment	1.1- Complete all proposed tasks even if they require time outside the classroom to complete them. 1.2- Stay engaged in tasks throughout all stages of execution, demonstrating interest in team dynamics.
2-Creativity	2.1- Present new alternatives to improve work processes. 2.2- Seek viable alternatives in the face of limitations of material and/or financial resources.
3-Adaptability	3.1- Integrate new technologies and active methodologies into teaching practice.

Source: Author's production based on the curriculum of the training course (Brazil, 2023a).

The organization of the competency framework into technical and behavioral competencies followed the guidelines of the Navy's Directorate of Education, as per the Manual for Developing Professional Competency Frameworks (Brazil, 2023b). According to this manual, technical competencies consist of knowledge (K) and skills (S), while behavioral competencies relate to attitudes (A). Behavioral competencies play a cross-cutting role in relation to technical competencies. Therefore, this is how KSA is configured in the Brazilian Navy. Through the frameworks presented in Table 4, it is evident that the training course aims to develop teaching competencies related to competency-based teaching, active methodologies, and new educational technologies. It is noteworthy that the latter two aspects were integrated into the same competency. Although working with active methodologies and new educational technologies could be structured into distinct competencies as they address different content, the decision was made to integrate these two themes, linking them under the same competency. This choice highlights the importance of integrating methodology and technology in the teaching-learning context.

The training course was designed to be offered in a hybrid modality, with Flipped Classroom as the rotation strategy between online and in-person teaching. Figure 2 presents the instructional design (DI) matrix of the course, considering the class days, rotations of in-person and online moments, indications of pre-study topics and online activities, as well as in-person classes and activities.

Figure 2 - Instructional Design Matrix of the Training Course



Source: Author's production based on the instructional design of the course.

According to Figure 2, the hybrid course spans nine days, distributed as follows: four hybrid days, with both in-person and online classes (days 1, 6, 7, and 8); four consecutive days with entirely online classes (days 2, 3, 4, and 5); and the last day (day 9), exclusively in-person. Therefore, the configuration of the Flipped Classroom allowed for a predominantly online period (first week) with flipped study sessions, preparing the students for the hybrid days (second week) where daily rotations between in-person and flipped classes occurred, except for the final day of closure, which was entirely in-person.

In the course's ID matrix, a variety of online activities can be identified, including readings, research, textual production, and digital presence and interaction among students, along with the provision of several

practical activities interspersed with theoretical classes during in-person sessions. The effective implementation of the Flipped Classroom strategy requires careful planning: the production and structuring of materials to be used online, as well as the planning of in-person activities, are fundamental (Valente, 2014). Table 5 presents the activities, topics, and classes organized by the competencies of the course.

Table 5 - Topics, classes, and activities of the training course

Competence	Activity	Description
Technical competence 1	Online tipic	2.1: Basic principles of competency-based teaching; 2.2: Types of content; 3.1: Origins and foundations of competency-based teaching in basic education; 3.2: SEN: an experience in the practice of competency-based teaching.
	Online activity	2: Textual production on competency-based teaching; 4: Textual analysis and group work; 5: Survey of competencies, knowledge, and attitudes (CKA) of teachers for competency-based teaching.
	Face-to-face class	Initial class of technical competence 1; 1.1: Principles guiding competency-based teaching; 1.2: Classification and relationship of content in competency--based teaching; 1.3: Technical and behavioral competencies in teaching practice; 1.4: Evaluation in the competency-based teaching model.
	Practical activity	1: Guiding questions: analysis of the text "Guerreiro de Selva"; 2: Strategic lesson planning: correlating objectives, content, and techniques; 4: Mapping and writing competencies.
Technical competence 2	Online tipic	1: New educational technologies; 4.1: Active teaching-learning methodologies; 4.2: Strategies to facilitate student learning.
	Online activity	1: Creation of the blog; 3: Research and selection of active methodologies.
	Face-to-face class	Initial class of technical competence 2; 2.1: Principles of contemporary education allied with new technologies and methodologies; 2.2: Active methodologies in teaching practice; 2.3: New digital technologies in teaching practice.
	Practical activity	3: Maker workshop: creating an instructional resource; 5: Analysis of Digital Tool 2.0.

Technical competence 1 and 2	Online activity	- Internet research (related to the course); - Blog post (self-produced or third-party content); - Sharing the post on Padlet (collaborative class mural); - Interaction with classmates' and teachers' posts; - Development of the Innovative Project.
	Practical activity	6: Innovative Project.

Source:Author's production based on the curriculum and instructional design of the course..

The practical activities during the in-person classes observed in Table 5 confer a striking characteristic to this strategy, which avoids the predominant use of the lecture method in the classroom, prioritizing active methods that promote discussion, problem-solving, projects, and group work (Bergman, 2018; Pavanelo; Lima, 2017). The online topics and activities, when well-structured, contribute to the taxonomic progression of the student, as "class time can be dedicated to deepening their understanding of the acquired knowledge, having the chance to retrieve it, apply it, and thus, build new knowledge" (Valente, 2014).

4.3. Development and implementation

In this section, the digital resources used in the flipped classroom and the teaching-learning strategies employed in the classroom will be presented. After the analysis and design phases, what was designed is developed to implement the educational solution. In the development phase, "Teaching materials are produced, learning environments (physical and digital) are organized, and teams are trained" (Filatro, 2023, p. 36). And it is in the implementation phase that "[...] the design decisions and materials produced to support the planned experiences and learning are applied and put to the test" (Filatro, 2023, p. 37).

4.3.1. Flipped classroom

In the flipped classes, in accordance with Vilaça (2013), the category of virtual learning environment (VLE) adopted is what he defines as adapted VLE - in a broad sense, which is an environment consisting of digital

tools that, although not created for education, are adapted for it, such as examples: Google Drive and social networks. The adapted VLE - in a broad sense, according to the author, differs from the dedicated VLE - in a strict sense, which is characterized by the conventional model of environments specifically designed for distance learning, such as Moodle and Google Classroom, for example. The choice of the broad sense VLE was made to take advantage of a more flexible and decentralized online environment, meeting the strategy of the short-term hybrid course. In Table 6, the digital tools adapted for the course are presented.

Table 6 – Digital Tools Used in the Course

Google Drive	Used as a platform for sharing digital educational materials (DEM).
WhatsApp	Used as a tool for information, communication, and tutoring.
Blog	Used as an e-portfolio for students to record their learning paths.
Padlet	Used as a collaborative class bulletin board.

Source: Author's production based on observation of the training course.

Via WhatsApp, daily communications and instructions were disseminated in the class group. Students also used it to form small groups and discuss activities, while the tutor used the tool to address questions and guide the students. Google Drive played a central role during online sessions. Through it, students accessed the Learning Objects (LO) and carried out the "flipped activities." According to Torrezzan as cited in Torrezzan and Mendes (2022, p. 200), LO, synonymous with learning objects, are "instruments developed for didactic purposes, composed of digital resources such as videos, audios, hypertexts, games, among others." On the blog, students published course-related content, sourced from internet research or even authored production, as part of their activities. The posts on the blog had their links shared on Padlet so that classmates could be informed and interact with the class's productions.

The Google Drive was structured as follows: specific folders were created to store the Learning Objects (LO) intended for pre-class study. For each class day, there were two folders: one for Essential Content (EC) and another for Supplementary Content, intended for lifelong learning (LL). Students were instructed that EC was introductory and served as a foundation for in-person meetings. Failure to complete this study could result in difficulties during classroom activities. In general, EC consisted of articles in PDF format (the topics of the day), videos accessible through hyperlinks or QR codes embedded in the text, and a consolidation activity, such as a quiz or textual production.

In addition to the LOs, Behar (2009), addressing content for Distance Learning, emphasizes the importance of proper planning so that, based on the content, it is possible to build knowledge and develop competencies. Thus, the pedagogical structure of Google Drive was conceived as a curation of educational content. In the educational context, curation is defined by Filatro (2023) as "[...] a methodology for researching, discovering, filtering, contextualizing, and making available, to a defined audience, content in different formats, aiming at specific needs".

The approach of the teachers as content creators, selecting, adapting, and producing materials for students' pre-class study, is fundamental to the effectiveness of Flipped Classroom. As highlighted by Valente (2014, p. 92), '[...] if the student prepares before the in-person meeting, class time can be dedicated to deepening their understanding of the acquired knowledge, having the chance to retrieve it, apply it, and thereby, build new knowledge.' Therefore, the structuring of the content aims to introduce students to the topic of the class, working on the simpler levels of the competency taxonomy, which enables the continuity of learning progress in the classroom through activities that develop the more complex levels. The organization of the Flipped Classroom folders and pre-class Learning Objects can be seen in Figure 3.

Table 6 – Digital Tools Used in the Course

Source: Author's production based on observation of the training course.

4.3.2. Classroom

The in-person sessions were carefully planned to employ active teaching and learning strategies, aiming to engage students in the development of higher-level competencies, especially procedural and attitudinal components. Flipped classroom sessions played a crucial role in this process, providing an introduction to the topic and the development of basic competencies. During the in-person classes, teachers were able to dedicate more time to guiding students in building more complex competencies, utilizing class time for activities where students were the protagonists of their learning.

It is important to highlight that, even during the expository moments, which comprised about 30% of the in-person class time, the technique of Dialogical Exposition was used, considered an active teaching methodology due to the active participation of students in the exposition of their prior knowledge and ideas (Malheiros, 2019). Students arrived in the classroom with prior knowledge acquired during the flipped classroom sessions, and this knowledge was strategically used in the Dialogical Exposition. The aim was to assess the level of retention of factual content and the comprehension of concepts learned during the flipped classroom sessions, in order to then discuss, problematize, and deepen conceptual knowledge.

Table 7 presents the teaching-learning strategies used for the development of practical activities in the course. The information is organized by in-person practical activities, followed by the competency or indicator

and the objective of the activity in the left column. In the right column, the scenarios and pedagogical strategies used for the application of the activity and development of competencies are detailed.

Table 7 - Scenarios and Pedagogical Strategies

Practical Activity / Associated Competence / Activity Objective	Scenarios and Pedagogical Strategies
Activity 1 - Indicator: 1.1 Activity Objectives: Analyze a text related to competency-based teaching; Reflect on the attitudinal component of competency-based teaching, elaborating a symbol representing professional values.	In the flipped classroom: The student will have studied topic 5, related to competency-based teaching, and participated in a group discussion activity to create a symbol representing the profession's values. In the classroom: The teacher provides guiding questions for students to consult the text of topic 5, discuss in groups, and present their answers, along with an explanation of the created symbol. At the end, the teacher provides evaluative feedback and facilitates a reflection on the activity.
Activity 2 - Indicator: 1.2 Activity Objective: Develop a strategic lesson plan, correlating objectives, content, and teaching techniques for competency development.	In the flipped classroom: The student will have studied topics 2.1 and 2.2, related to competency-based teaching. In the classroom: After lessons 1.1, 1.2, and 1.3, the teacher briefly reviews the subjects and presents the instructions for the activity. Students, in groups, after completing the strategic planning of a lesson, present their strategies to the class. At the end, the teacher provides evaluative feedback and facilitates a reflection on the activity.
Activity 3 - Indicators: 1.3 and 2.2 Activity Objective: Develop a model representing an instructional resource for competency-based teaching.	In the flipped classroom: The student will have studied topics 4.1 and 4.2, related to active methodologies, and accessed the instructions. They will organize, along with their group, the acquisition of the necessary materials for the activity. In the classroom: The teacher reinforces the instructions and explains the development of the activity. Students create a model and then present it, explaining its use in a competency-based lesson. At the end, the teacher provides evaluative feedback and facilitates a reflection on the activity.
Activity 4 - Indicators: Mapping competencies; and elaborating competencies* Activity Objectives: Map the competencies required for creating a model. Elaborate competencies according to their structure. Identify the CHA for competency-based instruction.	In the flipped classroom: The student will have studied topics 2.1, 2.2, 3.1, and 3.2, related to competency-based teaching. In the classroom: The teacher presents the objectives of the activity and explains how the dynamics will unfold. They lead each stage of the didactic sequence, reviewing topics, addressing doubts, and guiding the mapping and elaboration of competencies. At the end, the teacher provides evaluative feedback and facilitates a reflection on the activity. In the flipped classroom: After the face-to-face class, the student will reflect on the KSA (Knowledge, Skills, and Attitudes) necessary for competency instruction and respond to a form listing them.

Activity 5 - Indicator: 2.3 Activity Objective: Analyze a digital tool 2.0, identifying its pedagogical potentialities for competency-based instruction.	In the flipped classroom: The student will have studied topic 1, related to new educational technologies, and accessed the instructions. In the classroom: The teacher reinforces the instructions and explains the development of the activity. Students, in groups, present the results of their analyses to the class. At the end, the teacher provides evaluative feedback and facilitates a reflection on the activity.
Activity 6 - Technical Competencies: 1 and 2 Activity Objective: Transform a regular class into an innovative class, applying the principles of competency--based instruction, mediated by active methodologies and with the assistance of new educational technologies.	In the flipped classroom: The student will have studied all topics and completed all proposed activities, including the conception and development of the Innovative Project (IP). Additionally, they will have accessed the instructions for the submission and presentation of the IP. In the classroom: After attending all classes and participating in all activities, the student will have sufficient theoretical and methodological foundations to have conceived and developed the IP during the course. During this time, the teacher guides and supports the construction of the IP and reinforces the instructions for its submission and presentation. At the end, the teacher provides evaluative feedback and facilitates a reflection on the activity within the framework of the course's formative itinerary.
Activity 7 - Technical Competence 2 Activity Objective: To utilize digital tools from the course, generating content, sharing, and interacting with the class.	In the flipped classroom: The student creates their account on the class blog and Padlet. They conduct internet research and share the links to their posts on the Padlet. Subsequently, they interact with their peers. In the classroom: The use of digital tools is not limited to the flipped classroom; they can also be utilized during in-person sessions. The teacher encourages this usage by sharing digital learning materials (MED) and posts. The class tutor observes, interacts, encourages participation, and evaluates the students.

Table 7 - Source: Author's production based on the observation of the training course.

Table 7 indicates that the practical activities were developed in line with the course competencies. In general, the activities are associated with one or more indicators, except for activities 6 and 7, which, due to their comprehensive nature, are directly associated with one or two competencies of the curriculum. This highlights how in-person classes were integrated with flipped classes, featuring theoretical and, primarily, practical lessons aimed at developing teaching competencies. According to Zabala and Arnau (2010), the logic of competency-based education is fundamentally focused on knowing how to do. Zabala (1998) cited by Bacich, Tanzi Neto, and Trevisani (2015) assert that activities are the core of a teaching model. Practical activities suitable for competency development were considered central to the course implementation.

Upon observing Table 7, one can infer the active learning methodologies and procedures used in face-to-face classes: Seminars, Discussions, Group Work, Maker Learning, and Project-Based Learning (PBL), as well as the didactic sequence strategy. From on-site observations during the

course, it was possible to identify procedures that enriched the Dialogic Exposition, such as Brainstorming and Debate. However, these procedures occurred spontaneously, unplanned. Thus, although the pedagogical strategies are varied, it would be interesting to explore a greater diversity of active methodologies, including planning and using, for example, Case Study, Debate, Games, Problem-Based Learning, Design Thinking, Station Rotation, among others.

On the other hand, the use of PBL was identified as the backbone of the course, where students produced an educational product called the Innovative Project (IP), in Activity 6. The IP was essentially an activity in which students needed to transform a chosen class into an innovative lesson. The challenge was to carry out a strategic planning process that would make the class suitable for competency-based teaching. To achieve this, the class needed to consider the technical and behavioral competencies to be developed, through innovative methodologies and with the assistance of new digital technologies. Thus, through this educational product, the student demonstrates the ability to apply the competencies developed in the course in their professional context.

The theoretical premise for the use of PBL is the conception of a globalized method (Zabala; Arnau, 2020). According to the authors, "[...] when various disciplines are used to respond to knowledge of reality, we will say that a globalized method is being used" (Zabala; Arnau, 2020). The project method is one of the globalized methods discussed by these authors as suitable for developing competencies. Bergman (2018) states that other active methodologies, such as PBL, should be used in the classroom, as they make class time more meaningful and even increase the value of flipped learning.

As the PI is a globalized product that involves various areas of knowledge (competency-based teaching, active methodologies, and new educational technologies), it cannot be developed in isolation. Therefore, the specific competencies required for the PI are developed throughout the course in both face-to-face and flipped classroom sessions and practiced in each practical activity. Zabala and Arnau (2020) use the term workshops to describe this systematic and specific characteristic within the

context of the globalized method. Thus, the workshops have a globalizing character, meaning they develop specific competencies that are related and integrated into the overall project. As Zabala and Arnau (2020) state, "[...] each of the disciplines becomes workshops of disciplines, with the aim of developing, from each of the areas, the competencies and components that emerged in the global method." Therefore, the completion of activities (1, 2, 3, 4, 5, and 7), topics and activities in the flipped classroom, as well as theoretical classes, serve as support for students to apply specific competencies in the PI, indicating the overall development of the course's competencies.

Activity 7 does not specifically appear in the course design outlined in Figure 2, as it is a continuous activity that spans all days with flipped classroom sessions. Students use the course's digital tools and the internet to experience this innovative context, developing digital literacy and presence, and encouraging authorship. According to Silva and Behar (2022, p. 116), digital literacy is "[...] a state or condition acquired by those who appropriate digital technologies and engage in reading and writing practices on the screen." Furthermore, these tools were used to develop behavioral competencies (commitment, creativity, and adaptability) and as a resource for developing the other technical competencies of the course.

The behavioral competencies were omitted from Table 7 because they are cross-cutting, meaning they are present without exception in all activities and are assessed alongside the technical competencies. In the next section, the evaluations conducted will be described.

4.4. Evaluation

In this section, the evaluation processes used to measure the level of development of teaching competencies among instructor-students will be addressed. According to Filatro (2023), despite evaluation being treated as the last phase in the Addie model, concerning learning outcomes, evaluation occurs throughout the instructional design process: at the beginning (diagnostic evaluation), during implementation (formative evaluation), and at the end of the process (summative evaluation). There

are two possibilities in the evaluation phase: "[...] learning outcomes and the effectiveness of the proposed educational solution" (Filatro, 2023, p. 39). However, during the research, it was only possible to address the first possibility. To evaluate the effectiveness of the training course, it would be necessary to assess the conduct of the trained teachers in the classroom, verify if there has been a change in behavior, if the training for competency-based teaching has indeed resulted in innovative strategies, and if the students in technical courses have truly benefited from this innovation.

Three types of assessment were used in the course: diagnostic assessment, regulatory assessment (also known as formative assessment), and summative assessment (Zabala, 2014). The instrument used for diagnostic assessment was the survey questionnaire administered at the beginning of the course with the aim of allowing students to self-assess their teaching competencies. The information gathered from this survey was crucial for identifying the level of training of the class and of individual students, enabling personalized measures to be taken. An example of a personalized strategy was the grouping defined by the course instructors. The goal was to mix students with varying levels of skills and engagement profiles so that, through collaboration, there could be leveling within the groups and the class as a whole.

Throughout the course, observation was mainly used as the regulatory assessment tool. Instructors and tutors observed students during their online and in-person participation, providing attention, guidance, and support to those facing greater difficulties. This was possible both during face-to-face meetings and online through the class WhatsApp group or direct contact with instructor-tutors. Another tool used for formative assessment was the rubric. The rubric, also known as a scoring guide, is a type of observation-based evaluation tool. According to Brasil (2021), "Observation: consists of the instructor's verification of the individual student's performance in carrying out certain tasks. It requires the prior preparation of scripts or cards containing the aspects to be observed, as well as the evaluation criteria to be adopted." Thus, the rubric contained indicators of technical and behavioral performance, as well as proficiency

levels for each indicator, enabling the identification of students' progress in the evaluated activity.

The rubric was also used for the summative assessment of all practical activities. Unlike formative assessment, where the focus is on observing the student's progress in completing the activity, a graded scale of grades was assigned to each indicator of the instrument. Thus, the instructor observed the student's technical and behavioral performance in carrying out the activity and recorded the degree of performance. The sum of the scores obtained results in the final grade for the activity. Table 8 presents an example of a rubric used in the course.

Table 8 - Assessment Rubric for Activity 6 - Innovative Project

Criterion	Indicators	Performance levels / Scoring range					Scores obtained
		No	Below average	Average	Above average	Planning	
		0	1-4	5-6	7-9	10	
Performance in elevating the innovative project.	Did the student create their innovative project within the deadline?						
	Did the student adequately plan the lesson?						
	Were the scenarios and pedagogical strategies well developed?						
	Did the student present at least two active methodologies in the project?						
Teaching - individual performance of the student.	Did the student mention the use of at least three new technologies applied to education in their project?						
	Did the student create at least one rubric to assess the students in their project?						
	What is the quality of the innovative project?						
Behavioral competencies.	Did the student demonstrate commitment?						
	Did the student demonstrate adaptability?						
	Did the student demonstrate creativity?						

Source: Author's production based on the Google Drive materials from the training course.

According to Filatro (2023, p. 178), "Rubrics allow for the assessment of more complex learning, as they target the integrated application of knowledge, skills, and attitudes. Through multiple-criteria scales, they examine both the processes and the products of a specific learning in a more descriptive and interdisciplinary manner." Therefore, it was understood that the use of this assessment tool was the most appropriate for the course, especially given its utilization of ABProj (Filatro, 2023).

To pass the course, students needed to achieve a minimum academic average of 6.0 points (Brasil, 2023a). This grade is calculated by the arithmetic mean of the grades obtained in the assessments of the practical activities, with Activity 6 - Innovative Project carrying a weight of 50%

due to its high complexity and globalized nature. In the next section, the research results will be presented, along with analysis, interpretation, and discussion.

5. Results and discussion

In this section, the learning outcomes of the instructor-students will be presented, along with the responses to the questionnaires administered to them and the course instructors.

5.1. Student learning outcomes (instructors-students)

As stated in the previous section, the final grade for the course students is determined by the arithmetic mean of the evaluations from all activities, with the PI accounting for 50% of the weight in the calculation. Table 1 presents the learning outcomes through the final averages of the students.

Table 1 - Learning Outcomes (Summative Assessment)

Student	Final course average
Student 01	9,72
Student 02	9,72
Student 03	9,69
Student 04	9,67
Student 05	9,66
Student 06	9,48
Student 07	9,44
Student 08	9,39
Student 09	9,32
Student 10	9,04
Student 11	8,98

Student 12	8,93
Student 13	8,93
Student 14	8,87
Student 15	8,75
Average of the students	**9,30**

Source: Author's production based on the course documentation..

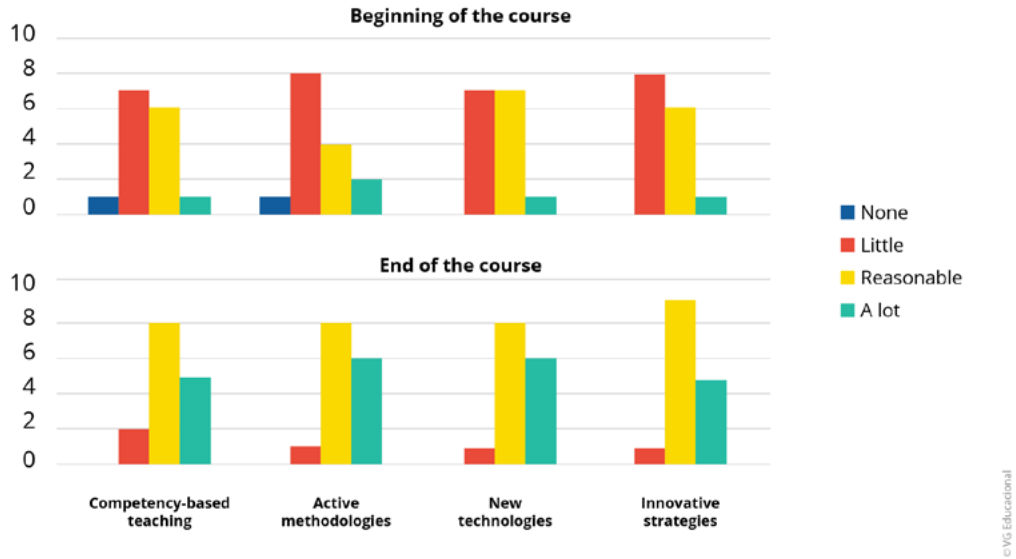
According to Table 1, the lowest mean was 8.75 and the highest was 9.72, thus indicating a difference of less than 1.0 point in the results among the students. It is important to consider that most assessments have grades assigned to groups of, on average, 4 students. Only assessments for activities 5 and 6 have individual grade assignments. Even with activity 6 of the Innovative Project (IP) being weighted at 50% of the assessment average, there appears to be a certain level of homogenization within the class. Research on the utilization of the Flipped Classroom model suggests improvements in students' performance on assessments, particularly when compared to classes and courses not employing this strategy (Moran; Milsom, 2014; Tune; Sturek; Basile, 2013 cited in Pavanelo; Lima, 2017; Pavanelo; Lima, 2017). In summary, the learning outcomes of students based on the assessment instrument used in the course indicate satisfactory performance in competency development. We will now proceed to the analysis of questionnaire responses.

5.2. Student responses (instructors-students)

From the results of the pre-course and post-course questionnaires administered to the students, a comparative analysis was conducted to understand the self-perceptions of instructor-students regarding the teaching competencies they possessed prior to the course and the level of development of these same competencies after the course.

In the first category, knowledge, when asked about their level of knowledge, i.e., what they knew before and what they came to know after the course, the instructor-students responded to each topic as per Graph 1:

Graph 1 - Students' Responses - Knowledge (Do I know?)

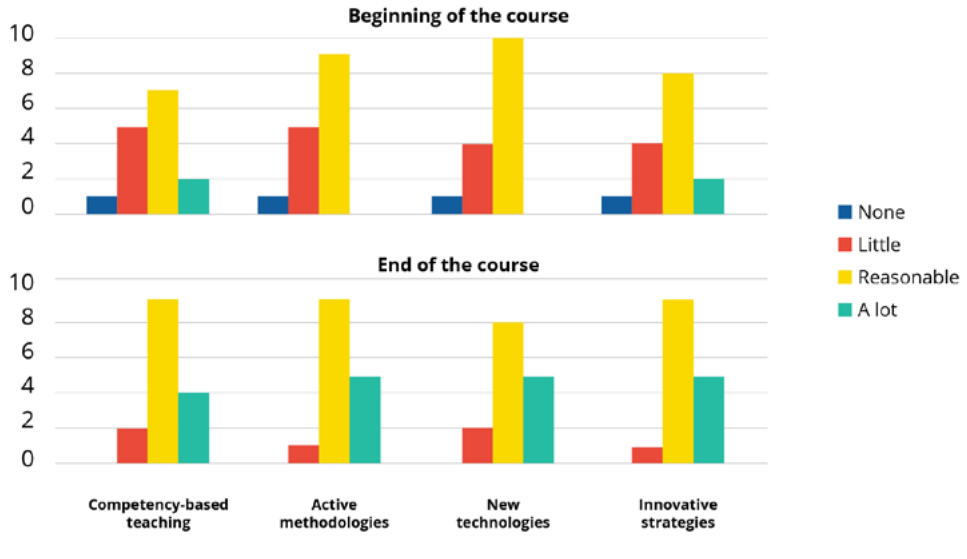


Source: Author's production based on responses from instructor-students.

With blue and red representing the most concerning levels, indicating none and little respectively, and yellow and green representing the most esteemed levels, indicating reasonable and high, the visual communication of the responses presented in Graph 1 allows for a quick identification of progress in the students' self-perceptions regarding their knowledge. Comparing the upper graph (start of the course) with the lower graph (end of the course), it is evident that after the course, there is a clear predominance of reasonable and high levels, with some minor occurrences of little, distinguishing from the start of the course where little and reasonable levels predominate, including occurrences of the concerning none.

When asked about their level of skills, in the second category, that is, what they were able to do before and after the course, the students responded to each topic (Graph 2) as follows:

Graph 2 - Students' Responses - Skill (Can I do?)

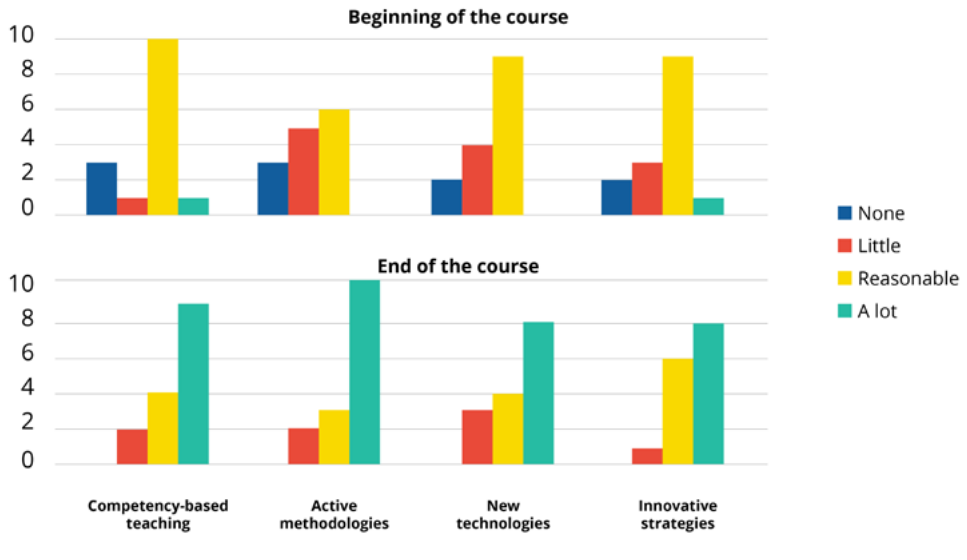


Source: Author's production based on responses from instructor-students.

The results were quite similar to the previous category, both in the self-perceptions indicated at the beginning and at the end of the course. Again, in Graph 2, there is a shift from the predominance of little and reasonable levels to reasonable and high levels. However, there is a slight difference in the expressiveness of the reasonable option compared to the others, at the beginning and end of the course, indicating that the skills aspect represented greater difficulty than the previous one, knowledge, in the students' self-perceptions.

Finally, the third category addressed attitudes, in other words, the willingness to do or behaviors towards the listed topics. Graph 3 presents the comparison of responses.

Graph 3 - Students' Responses - Attitudes (Do I do?)



Source: Author's production based on responses from instructor-students.

The attitudinal category, represented in Graph 3, garnered the most attention from the students' responses. In addition to the clear progress in self-perception levels from the beginning to the end of the course (similar to the preceding categories), this category also showed the highest expression of deficit at the beginning and the most significant progress at the end of the course. The option "high" was prominent, suggesting the possibility of greater engagement from these instructor-students after the course experience.

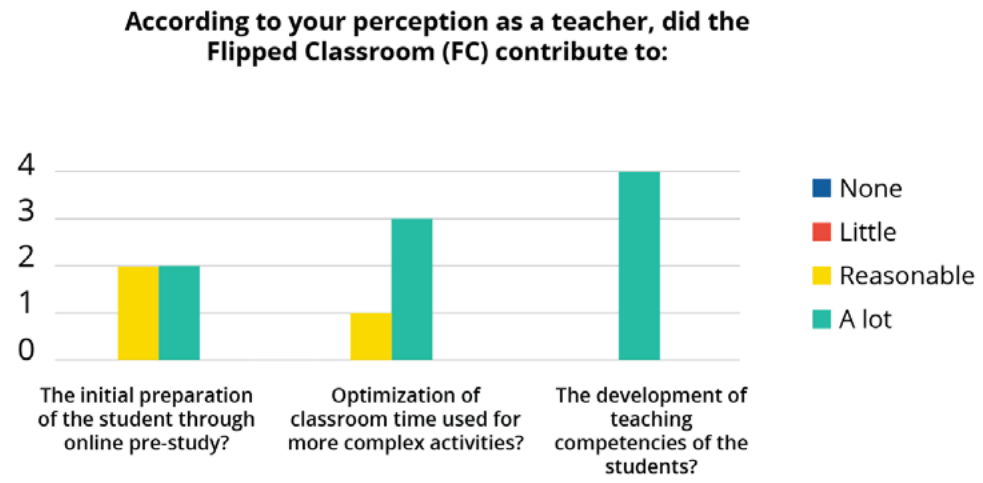
In summary, based on the responses of the course students, there was a considerable progress in the self-perceptions of teaching competencies among the instructor-students surveyed, with the attitudes category showing the highest progress, followed by the knowledge category; the skills category showed the least progress among the three categories. Several studies indicate progress in student learning and satisfaction in courses utilizing the Flipped Classroom strategy (Bacich; Tanzi Neto; Trevisani, 2015; Pavanelo; Lima, 2017), including within the context of competency-based learning (Bergman, 2018; Horn; Staker, 2015).

On the other hand, while progress is evident, deficit self-perceptions are also observed in some respondents, especially in the skills category. This indicates a need for further training of this nature, refinement of instructional design, and extension of the course duration to promote a more favorable training framework. We will now proceed to the analysis of the teachers' responses.

5.3. Teachers' answers (course teachers)

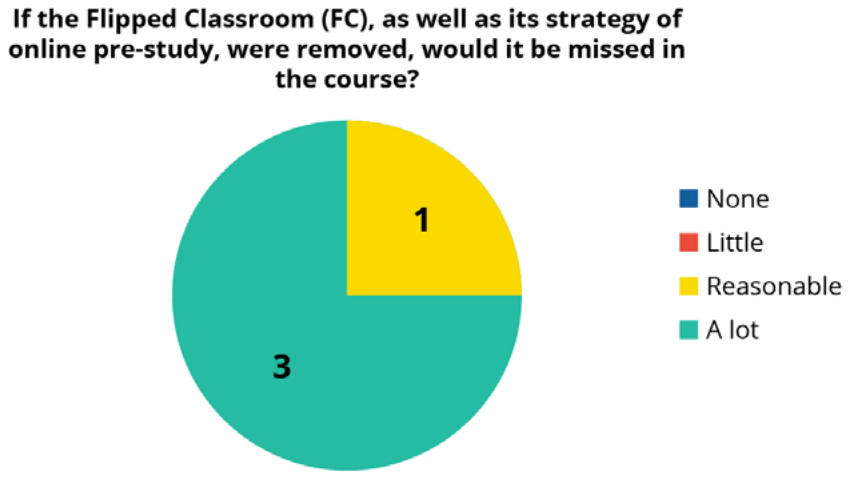
Unlike the students, where the focus was on analyzing the progress of self-perceptions of competencies developed in the course, with the teacher group, the aim was to identify perceptions regarding the contributions of the Flipped Classroom model to the development of teaching competencies in the hybrid training course. When asked about the contributions (Graph 4) and impact (Graph 5) of the Flipped Classroom, the course teachers responded as follows:

Graph 4 - Responses to the first objective question by teachers



Source: Author's production based on responses from course instructors.

Graph 5 - Responses to the second objective question by teachers



Source: Author's production based on responses from course instructors.

In addition to the objective questions, three subjective questions were directed to the teachers. Table 9 presents the questions along with a summary of the course teachers' responses.

Table 9 - Summary of open-ended responses from teachers

3- What is the greatest advantage, positive aspect, or ease of the Flipped Classroom (FC)?	Saves and optimizes time. Facilitates the mediation of activities in the classroom. Develops "learning to learn" through pre-study. Develops higher levels of taxonomy. Student autonomy and active learning.
4- What is the greatest disadvantage, negative aspect, or difficulty of the Flipped Classroom (FC)?	Non-compliance with pre-study by the student. Controlling self-discipline. Greater dedication time in the Flipped Classroom (FC) with mediations and pedagogical interventions. Greater planning time to elaborate activities.
5- In the case of there being a disadvantage, negative aspect, or difficulty with the Flipped Classroom (FC), what can be done to improve it?	Use tools that highlight student participation. Encourage students to develop commitment to the activity. Persist in the process until there is adaptation by the group. Train the teaching staff and integrate the Flipped Classroom (FC) among instructors. Allocate more time in the course and provide pedagogical guidance to develop the Flipped Classroom (FC).

Source: Author's production based on responses from course instructors.

In the objective responses of the teachers (Graph 4 and Graph 5), there is a tendency towards the green option for "high" and yellow for "reasonable." The predominant indication of the "reasonable" option in Graph 4 for the topic "The initial preparation of the student through pre-online study?" may be explained possibly through the subjective responses (Table 9) stating negative aspects such as: "Non-compliance with pre-online study by the student"; and, as a proposal for improvement, "Using tools that highlight student participation" and "Encouraging students to develop commitment to the activity." Bergman (2018) proposes a dynamic of accountability for students who do not fulfill pre-online study. During the training course, this accountability was perceived through the embarrassment of some students for not having completed the activity and therefore not being prepared like their peers who had dedicated themselves.

On the other hand, both Bergman (2018) and Bacich, Tanzi Neto, and Trevisani (2015) consider the need for student monitoring through digital tools and the importance of encouraging students to participate in activities. Some instances of monitoring were observed through online questionnaires, observation of the e-portfolio, and tracking of posts and interactions on the Padlet wall. At times, teachers and tutors needed to intervene using WhatsApp to communicate with the specific student or even the entire class. According to Pavanelo and Lima (2017), the teacher's attitude can mitigate this issue when they convince the student of the need for pre-online study and make themselves available for difficulties.

The topic highlighted in Graph 4, "The development of teaching competencies of the students," received unanimous agreement on providing a high level of contribution. The elaboration of this advantage can be perceived in opinions such as: "Facilitates the mediation of activities in the classroom" and "Develops higher levels of taxonomy." These advantages are consistent with the concepts and insights of Bacich, Tanzi Neto, and Trevisani (2015) and Bergman (2018) regarding the Flipped Classroom.

In the second objective question (Graph 5), which asked whether the removal of the Flipped Classroom would be missed in the course, the majority indicated that it would be greatly missed. The aspects pointed out in the subjective question "3- What is the greatest advantage, positive aspect, or ease of the Flipped Classroom?" illustrate the consideration of

the impact of the Flipped Classroom on the training course, regarding aspects such as time optimization, mediation of active learning, development of learning how to learn, student autonomy, and higher levels of competency taxonomy.

Finally, it is also evident from Table 9 that the teachers felt the need for more time for the course, training, and support for the use of the Flipped Classroom. Although it is not part of the objective of this research to analyze the competencies of the course teachers, but only those of the instructor-students, their responses indicated a need for teacher training in the use of the Flipped Classroom. Thus, it is observed that the Flipped Classroom contributes to the development of teaching competencies, but on the other hand, it is necessary to develop teaching competencies for the use of the Flipped Classroom.

6. Final considerations

The objective of the article was to present how the Flipped Classroom can enhance the development of teaching competencies in a short-duration hybrid course. To achieve this, a case study of the hybrid training course was conducted, investigating both the teachers and students of this course. The aim was to identify the learning outcomes and self-perceptions of the instructor-students regarding the development of teaching competencies, as well as the perceptions of the course teachers regarding the potential of the Flipped Classroom for developing students' teaching competencies.

A review of the literature indicates that competency-based teaching can align with active methodologies, hybrid teaching, and new educational technologies (Bergman, 2018; Moran, 2017; Zabala; Arnau, 2020). As a result, the Flipped Classroom is a promising hybrid option as it organizes two moments: out-of-class (online) and in-class (face-to-face), leveraging the best of both. During the out-of-class time, students develop initial levels of competency taxonomy, and then in class, they engage in more complex activities individually or in groups, mediated by the teacher, while developing intermediate and higher levels of competencies

(Bacich; Tanzi Neto; Trevisani, 2015; Bergman, 2018; Horn; Staker, 2015; Pavanelo; Lima, 2017; Valente, 2014).

The learning outcomes, measured through rubrics, an assessment tool that allows observation and assessment of performance in complex activities involving the evaluation of knowledge, skills, and attitudes (Filatro, 2023), indicated a satisfactory level of competencies developed in the training course. The instructor-students self-assessed themselves at the beginning of the course, indicating needs for training in competency-based teaching. At the end of the course, progress was identified in their self-perceptions of their competencies. The results indicated that they still feel the need for ongoing training, although they recognize that they have evolved, leaving the course better than when they started. Despite their difficulties, they demonstrated possible engagement with the challenge of teaching based on competencies.

In summary, the results of the perceptions of the course teachers were favorable towards the Flipped Classroom. They pointed out difficulties and areas for improvement, mainly in terms of training and teacher integration, course duration, encouragement and monitoring of pre-class study, and greater dedication to activity planning with the assistance of pedagogical guidance. Their positions reflect the need for improvement in the instructional design of the course and the knowledge, skills, and attitudes required for adequate development and implementation of this educational solution based on the Flipped Classroom.

A Flipped Classroom is considered one of the hybrid strategies with the potential to optimize the development of teaching competencies. However, this optimization should not be interpreted as a shortcut in the course—doing so would distort the Flipped Classroom and likely lead to a deficiency in education, as pointed out by Kuenzer (2016). On the contrary, optimization is understood as the best use of time in both face-to-face and online environments, integrated for the highest possible level of competency development, thereby enabling a solid teacher education.

It is important to note that the research was conducted in a limited universe of students and teachers in a short-duration course, thus not allowing for generalizations. Therefore, there is a need for further studies,

research, and refinement of the application of the Flipped Classroom in larger audiences and in courses with longer durations to consolidate more relevant results. As a research suggestion, it is necessary to evaluate the effectiveness of what was indicated in the learning outcomes and perceptions of students and teachers. A careful observation of the teaching practice of trained instructors would provide information capable of validating or not the training course, based on the observation of changes in the behavior of trained teachers. It is also suggested that the integration of hybrid teaching for competency development continues to be explored in different contexts, as well as the teaching competencies necessary for the use of hybrid models, such as the Flipped Classroom.

Considering the above, this research will continue through the Professional Master's Program in Professional Education and Technology (ProfEPT) at the Fluminense Institute of Education, Science, and Technology (IFFluminense). Instead of investigating hybrid teaching for the development of teaching competencies, the aim will be to identify the teaching competencies necessary for the application of hybrid models in the context of EPTNM.

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