

# TEACHER QUALIFICATION FOR COMPETENCY-BASED COLLABORATIVE LEARNING

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**Abstract.** *The article describes an internal institutional teacher qualification program aimed at adapting teaching for competency-based collaborative learning (CBL) and STEM education. A total of 28 teachers were trained through team-based work. The effectiveness of the training and attitudes toward the implementation of CBL in the educational process were assessed via a survey. Teachers' self-assessment of teamwork and the demonstrated abilities in collaboratively developing teaching materials indicate the relevance of the methodological approach. The main conclusion is that a significant portion of the teachers have a positive attitude toward the integration of innovative practices such as CBL and STEM education.*

**Key words:** Competency-Based Learning, Collaborative Learning, STEM, DigCompEdu, Teachers.

## Introduction

Legislation in the Bulgarian educational system, effective since 2016, is based on the concept of the European Qualifications Framework (EQF) and the competency-based approach in education [23]. The introduction of competency-based learning (CBL) is associated with numerous challenges that need to be overcome. This is understandable, considering the need to transform traditional context-based learning into CBL, which focuses on achieving learning outcomes and places the learner at the center of the educational process [24].

Another influencing factor is the rapid development of technology. The digitalization of educational processes and the emergence of artificial intelligence, with its potential benefits and risks, represent significant aspects of the ongoing transformation in education.

The concept of CBL began with the pioneering work of McClelland [2] and Boyatzis [16] and has been thoroughly explored and structured by Khutorsky for educational purposes [1]. Numerous studies dedicated to CBL and its related issues address: (1) its implementation in schools-

teacher competence [14], motivation [3, 7, 17], innovations [4, 8, 18], organizational culture [5] within the school system; (2) CBL methodology – [6, 12, 13, 15, 19, 24], (3) STEM education; all of which provide valuable experience that can be analyzed and later synthesized into solutions for current challenges. CBL emphasizes the creation of a powerful and enriched learning environment that allows students to engage in meaningful learning processes [9, 13, 15, 21]. The most distinctive features of this approach include: (1) Meaningful contexts: The educator creates and seeks meaningful contexts in which students can realize the importance and relevance of the competencies that need to be acquired; (2) Multidisciplinary approach: Competencies are viewed as holistic and authentic [12]; (3) Constructive learning: Learners actively participate in constructing their own knowledge through interaction with their surroundings; (4) Collaborative and interactive learning: Teamwork and interaction among students are encouraged, fostering the exchange of ideas and experiences; (5) Personalized learning: Learners develop personal knowledge and competencies based on their individual needs and interests; (6) Discovery-based learning: Students are placed in the role of researchers and explorers, with the teacher acting as a partner and mentor; (7) Reflective learning: Skills for self-assessment, motivation for learning, self-awareness of learning qualities, and the selection of optimal learning approaches are developed. This represents “learning to learn”.

According to CompetencyWorks [21], CBL requires alignment around five key elements: (1) Evidence of success: Students progress in their learning by demonstrating mastery, which is a key indicator of their development; (2) Measurability and transferability: Competencies include clear, measurable, and transferable learning goals that contribute to the development of student abilities; (3) Meaningful assessment: Assessment within the CBL context is meaningful and encourages positive student learning, providing constructive feedback; (4) Personalized support: Learners receive timely and differentiated support based on their individual learning needs, enhancing their engagement and motivation; (5) Application and creation: Learning outcomes emphasize competencies that involve both the application of knowledge and the creation of new knowledge, along with the development of important skills and attitudes.

The high level of professional competence of teaching staff [22] is identified as a fundamental prerequisite for the effective implementation of

other components included in the CBL model [14, 20].

### **Research Process**

The teaching staff at “Hristo Botev” Secondary School in the village of Chepintsi was briefly introduced to the ideas of Competency-Based Learning (CBL) as well as its legal framework in Bulgaria. A preliminary survey indicated that teachers consider such an approach necessary. During internal institutional training, a total of 12 astronomical hours were devoted to lectures, a seminar, a discussion, and practical work.

The training covered topics such as “Effective School and the Competency-Based Approach”, “Paradigm for Competency-Based Learning”, and “Implementation of CBL – Key Components and Developing Educational Materials”. Teachers were introduced to the requirements of the European Qualifications Framework (EQF), the DigComp framework, and the specific framework for teachers, DigCompEdu [22], relevant to their professional success and development. The latter was analyzed in detail across three areas: educational-professional, educational-pedagogical, and learning competencies.

After clarifying the theoretical foundations of CBL and its connection to constructivism [10, 11], practical training on creating sets of tasks for implementing CBL was conducted. Teachers worked in teams to create task sets for different subjects, aimed at acquiring knowledge and skills. They jointly developed practical task variations designed to develop key competencies in students. The tasks were selected from real-life scenarios, requiring interdisciplinary knowledge, skills, and abilities.

Following the internal institutional training, a scientific study was conducted using a survey method to assess teachers’ self-evaluation of their readiness to implement CBL collaboratively.

### **Research Results**

The survey involved 28 teachers and consisted of 14 questions. For questions 1 to 10 (Table 1), the teachers provided responses on a 5-point Likert scale, ranging from “rather NO – 1” to “rather YES – 5”. For questions 11 (Figures 1) and questions 12 (Figures 2), they could select 0 or more possible answers, and for question 14, they chose 1 of 2 possible answers (Figure 3). The final question, number 15, asked, “Are there any methods (and which ones) for teaching and/or assessment specific to

CBL that you would apply in your work?” requiring a short answer. The respondents provided the following answers: formative assessment; teaching methods where students more deeply and permanently connect what they learn in school to real life; practical application of knowledge; self-assessment; expert assessment; working on interdisciplinary projects; methods that improve motivation for learning.

Table 1. Survey Results of Questions 1–10

N	Question	Number of Respondents who answered with:					Average
		1	2	3	4	5	
1.	I differentiate between skills and competence.	0	0	2	14	12	4,357
2.	I have improved my understanding of CBL and its components.	0	0	3	13	11	4,296
3.	I realize that it is important for modern education to be holistic.	0	0	2	8	18	4,571
4.	It is necessary to use various specific forms for assessing learning outcomes in modern CBL.	0	0	2	11	15	4,464
5.	I am motivated to apply different forms of teaching and/or assessment specific to CBL in my work.	0	0	3	15	10	4,250
6.	After the training, I now have an idea of how I can effectively apply Bloom’s taxonomy for creating teaching and assessment materials	0	0	10	9	8	3,926
7.	I consider social-emotional competencies (soft skills) to be important in modern CBL	0	0	4	13	11	4,250
8.	I consider collaborative teaching across different subjects to be fundamental for modern CBL.	0	0	5	11	12	4,250
9.	CBL will enhance motivation among students.	0	0	7	12	9	4,071
10.	Do you consider it appropriate for the school to synchronize its vision, goals, and strategy so that education is holistic and competence-based?	0	0	5	12	10	4,185

I will apply the CBL methodology because:

28 answers

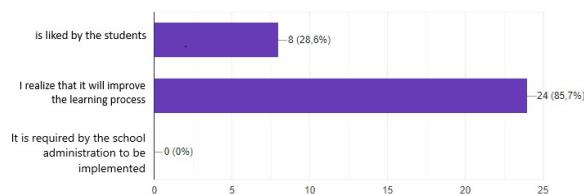


Figure 1.

I wish to improve the following digital pedagogical competencies (according to DigCompEdu)

28 answers

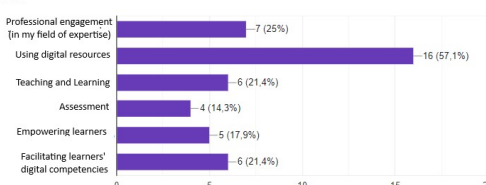


Figure 2.

Competency-Based Learning is:

28 answers

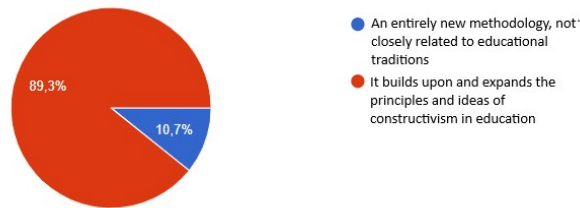


Figure 3.

## Findings

The conducted research shows that teachers recognize the importance of preparing for the implementation of CBL and express a readiness to build upon their competencies. They agree that practical tasks, which can be solved by combining knowledge and skills from various natural sciences, will increase students' interest in STEM. Teachers need support in enhancing their digital skills as well as in carrying out joint learning projects in areas like STEM, STEAM (including art), and solving real-world problems. Teachers have enriched their understanding of CBL and accept the concept of holistic CBL as suitable for modern education. They are motivated to implement collaborative learning in both STEM and the humanities and express a desire to improve their level of digital competence. The teachers demonstrate a willingness to expand traditional forms of assessment with methods specific to CBL.

## Conclusion

The current state of the Bulgarian educational system requires focused and intensive efforts to align with the concepts of CBL. On one hand, the legislative framework has laid the foundation for CBL, but teachers need support to implement this educational transformation, both in terms of ideas and practice. The DigCompEdu framework is a suitable tool for analyzing teachers' needs and for developing the necessary resources to help them implement the concepts embedded in the CBL paradigm.

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