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Research Article

Analysis of mastery and application of the competency-based approach by area of knowledge in professors of the Autonomous University of Baja California (UABC, Mexico)

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Abstract

The aim of the research was to evaluate from the perception of university professors from four areas of knowledge of a Mexican public university the effectiveness of the competency-based approach regarding its application in the classroom. The dimensions considered were: syllabus; knowledge of the approach; application in the classroom; and perception of advantages and disadvantages of said approach. The sample consisted of 341 professors. Descriptive and comparative analyses were performed (chi-square). The main results, among others, show that depending on the area of knowledge a considerable percentage of professors are not familiar with the approach and they find it difficult to apply in the classroom; this regarding the type of teaching methods related to the approach as well as the learning assessment strategies used. It is also questioned the impossibility of the application of the approach in large groups. The development of this research, among other contributions, presents empirical evidence that contributes to the discussion on the difficulties and possibilities in the instrumentation of the competency-based approach in the classroom; the importance of assessing the institutional context; and the particularities of the area of knowledge where the approach is applied.

Keywords: competency-based approach, areas of knowledge, institutional context.

1. Introduction

The Bologna Process opened the door to the globalization of higher education by creating a unified structure to improve the potential of higher education. This process encourages the growing and continuous interconnection between the different strategies of higher education used around the world (Gonçalves, 2016). Latin American countries have also favor an education based on the competency-based model, and projects related to this model have been launched. One of them is the Tuning Latin America Project (2017) - also known as the Alpha Tuning Latin America Project- which is led by Latin American and European universities with the aim of exchanging information to raise quality, effectiveness and transparency in the Higher Education Institutions (HEIs).

The educational competency-based approach emerges as a response to the need of building a quality higher education. Most Mexican universities have adopted this approach and have implemented teacher-training policies where a new objective predominates: teach to learn. This for students to develop cognitive processes to be applied to changing situations for which they must develop skills, attitudes and competencies (Jiménez, Hernández, and Alfonso, 2013). This approach not only imposes new challenges on students and professors; it also influences the curriculum, the syllabi and the study programs as well as the assessment of competencies in students, with the complexity that all of this entails.

Rueda (2009) notes that the process for the development of the competency-based approach shows restricted and complex possibilities. The application of this approach in the classroom is a current challenge that requires the identification and assessment of the main competencies that professors must have, among other aspects. Tobón (2013) also emphasizes that professors face relevant obstacles for the implementation of the competency-based curriculum; obstacles originated from the confusion regarding objectives, purposes and competencies, corresponding to the traditional training paradigm and the current one, respectively. This paper reports the results of a study conducted at a Mexican state public university—Universidad Autónoma de Baja California (UABC). The main purpose of this paper was to analyze from the perception of university professors from four areas of knowledge the effectiveness of the competency-based approach regarding its application in the classroom. Four dimensions were considered: relevance with the syllabus; knowledge of the approach; application of the approach with regard to the teaching strategies professors use and the learning assessment tools they apply; and their perception of the advantages and disadvantages of the competency-based approach.

2. Theoretical references

The term of *competency* is not novel. It has evolved along with society from classical Greece extending up to the business world in the last century, and later to the education area (González-Bernal, 2008). For the philosophers of Ancient Greece, this term was a work method also used to contextualize problems related to the way of being of humankind (Tobón, 2004 quoted in Repreza, 2009). Moreover, Latorre (2016) notes that the history of the word *competency* comes from the business sphere and it was initially incorporated into the world of work of countries such as the United States, England, and Germany. Subsequently, it was the phenomenon of globalization which triggered the use of competencies since it was sought to increase quality through the acquisition of knowledge produced in the new society in order to train people capable of performing competently at their jobs.

In Mexico, it was until the eighties and nineties when the education system was decentralized, and in turn, the term of *competency* started to be used (Amorós, 2013). This model was gradually adopted by the educational levels in the international and national sphere, which brought innovations to the educational process (López-Figueroa, 2014). The study of the competency-based approach in the educational field has led to various insights. These go from the assurance of the structuring of the formal education system for the needs of the productive and social sectors to the idea of contributing to the training of individuals in order to meet a set of fundamental needs identified by groups of experts and international bodies that can contribute to the effective performance of the professions (Rueda, 2009).

From the conceptual-theoretical perspective, Perrenoud (2004) suggests that a competency is characterized by the capacity to mobilize resources such as knowledge, abilities, and information to act with relevance and efficacy in a set of situations, resulting in the desired result. This statement evince the action for the development of a complex activity that implies a certain degree of mastery. In this circumstance, Bolívar (2007) notes that the concept of competency in education has two perspectives: one theoretical and the other practical; from the theoretical perspective, competency is conceived as a cognitive structure that facilitates specific behaviors. From the practical or operational vision, a competency comprises a broad spectrum of skills to function in complex situations, which implies knowledge, attitudes, metacognitive and strategic thinking. That is, for this author, competencies have a mental component of representative thought and another of behavioral nature by action.

However, there is a broad debate in literature regarding the interpretation of the meaning of the term *competency*. This interpretation ranges from a description of *competency* in terms of performance and skills acquired through an integral training process, which encompasses elements such as understanding, knowledge, skills and attitudes. The essential problem seems to be that these terms are used in a general way to refer to several aspects of performance, without any attempt to give precise definitions of these aspects. According to Kennedy, Hyland & Ryan (2009), the lack of clarity of the concept of competencies complicates the definition of methods and assessment tools of these competencies. While several efforts have been made to reach a unique definition of the term competency, a consensus has not been reached; there is still a wide variation of its meaning among cultures and professions. These authors suggest that competencies should be considered based on the particularities of context; and on a clear definition of the assessment of the expected results in the students' learning.

Along with its conceptual discussion, a debate has also been developed around competences according to the areas of knowledge and how these influence teaching and learning strategies. A pioneering study of great importance was the one developed by Biglan (1973), who proposed a model that divides the disciplines according to their paradigmatic orientation, distinguishing two types: i) monoparadigma and ii) multiparadigma. Monoparadigma disciplines are those in which training is centered around the same theoretical body of knowledge, while multiparadigma are those in which there is the possibility of addressing a common problem from different theoretical bodies of knowledge. His empirical research resulted in the classification of three major dimensions: i) based on the degree of development of his paradigm, in hard and soft sciences; (ii) in accordance with their applicability, in pure and applied; and (iii) based on their orientation to the system of life, in animate and inanimate.

However, in front of the previous perspective, León Urquijo, Risco del Valle and Alarcón Salvo (2014) argue that regardless of the particularities of each area of knowledge, the competency-based approach promotes the application of teaching and learning strategies associated with a greater role for students and their cognitive processes, such as self-regulation, metacognitive strategies and self-evaluation. In the case of the UABC, its educational model is based philosophically and pedagogically on constructivism, humanism and education throughout life, promoting student-centered learning and the role of the teacher as a facilitator of learning through his teaching action. In this sense, the teaching function of the teacher is transcendental: he must promote meaningful learning in his students through the use of strategies that go beyond a simple transmission of content, trying to make his students build meaning and attribute meaning to educational content.

The process of implementation and adaptation of the competency-based approach in the Higher Education Institutions (HEIs) has not been a simple task. In addition to the lack of consensus on the term of competencies, universities and their professors have faced the need to design competency-based syllabus and study programs; to use or try to use teaching methods based on this approach; this apart from a highly complex task: assessment of competencies in students, since the strategies and assessment tools are often very limited. In this sense, the role of the professor plays an important role in enabling the development of the competency-based approach for it is expected that the educator contributes to the students' acquisition of the specific competencies of their graduate profile.

In this regard, Bergsmann, Schultes, Winter, Schober & Spiel (2015) propose three stages that provide a more comprehensive assessment concept that can contribute to the sustainable improvement of competency-based teaching. In syllabi that have been designed based on this approach, the first stage evaluates whether the competencies that students must acquire within the curriculum are well determined (ideal situation); the

second stage evaluates the teaching process and whether students actually acquired competency (real situation); the third stage evaluates specific aspects of each stage of the teaching process. From the perspective of these authors, the existing assessment tools are not appropriate for the assessment of competency-based teaching because they focus on unique competencies or on specific aspects of the teaching process. For professors, to educate with a competency-based approach implies the creation of learning experiences so that students develop skills that will allow them to cultivate resources and strategies that are considered essential to perform the required activities.

According to Argudín (2005), the desirable basic competencies that professors must have are from academic, didactic, and administrative nature; this, in turn, must be strengthened with teamwork, leadership, rational use of ICT tools, ethics, use of effective communication, and continuous professional development. Rueda (2009) proposes a set of teaching skills (his own and from other authors) that serve as indicators of a teaching based on the competency-based approach, but he warns about the importance of redefining according to the institutional context in which professors work. The institutional context plays a relevant role in the competency-based approach since educational institutions must evaluate the advantages and disadvantages of this approach (Barriga, 2005).

Based on the participation of Mexico in the Tuning Project, a large number of Mexican universities began the process of modifying the study programs. UABC, under the guidelines established in the Institutional Development Plan 2003-2006, undertook the University Reform for the instrumentation of a new Educational Model. All schools and faculties gradually changed their syllabi to fit the competency-based model. Currently, all degrees of UABC are taught under the competency-based approach. However, after more than a decade of the implementation of the competency-based approach in UABC, there are still doubts about the way in which professors are carrying the principles and methodology of this approach to the classroom. The discourse of the educational competency-based approach states that the focus of teaching is the student, but in a manner similar to what happens with professors, students may not be seizing the opportunity of taking responsibility for their own professional education and they expect the professor to decide the important contents and to teach them, as in the traditional model.

In order to determine how the competency-based approach of UABC is being implemented in the classroom the main actors (professors) are the ones to be asked.

3. General objective

To analyze the perception of professors of UABC about of the effectiveness of the competency-based approach regarding its application in the classroom.

Specific objectives

- To evaluate the degree of knowledge of teachers about the competency-based approach offered by UABC
- To determine the main teaching strategies and learning assessment tools used by professors and to what extent do these strategies and tools correspond to a competency-based approach
- To know the opinion of professors about the advantages and disadvantages of the implementation of the competency-based approach in the classroom

4. Method

- **Design**

The type of research has a quantitative approach; the design is exploratory, descriptive, comparative and cross-sectional.

- **Participants**
  The participants were full-time and adjunct teachers who teach courses at the educational programs of the following areas of knowledge: Legal Sciences; Administrative Sciences; Social Sciences; and Natural/Exact Sciences. Term: 2019-1.
- **Sample**
  An intentional non-probabilistic sample was used for the research. The inclusion criterion was to apply the instrument to professors who teach courses in educational programs of these areas of knowledge. The sample consisted of 341 professors.
- **Data sources**
  The main source of information was an instrument designed *ex professo* for the study and it comprises four dimensions: **1.- Syllabus**, which contains five items that evaluate the perception of professors regarding the correspondence of the syllabus with the competency-based approach: if the student and graduate profiles are consistent with this approach; if in the Learning Units Programs (PUA per its initials in Spanish) the design of teaching and assessment strategies correspond to this approach **2.- Knowledge of the approach**, which contains six items that evaluate the level of knowledge professors have in regards to the different types of competencies. **3.-Application of the approach**, which has two items where the different strategies for teaching and learning assessment that professors apply in their teaching are organized in hierarchy by importance. **4.- Perception of advantages and disadvantages of the approach**, which comprises six items where professors assess aspects related to the effectiveness of this approach in the education of students comparatively with the traditional model and identify the main difficulties in applying the approach in the classroom.
- **Procedure**
  The procedure was carried out in three stages: in the first one, the instrument was applied to professors from the four areas of knowledge mentioned above. In the second stage, the database was designed and the data was entered using the statistical program Statistical Package for the Social Sciences (SPSS). In the third stage, the descriptive, statistical analyses and non-parametric tests of contrast of independence hypothesis known as chi-square were performed.

5. Results

Table 1 shows the basic descriptors for some personal variables of UABC professors. Regarding gender, the sample was mostly represented by male participants (n=185; 45.7%) while the mean age was 44.5 years old with a minimum of 24 years old and a maximum of 71 years old. In turn, it is observed that most professors participating in the study have postgraduate studies: 46.9% have a master's degree and 41.6% have a doctorate.

Table 1. Basic descriptors for personal variables of UABC professors

		n	%
Gender	Women	156	45.7
	Men	185	54.3
Academic degree	Bachelor's degree	23	6.8
	Specialization	16	4.7

	Master's degree	159	46.9
	PhD./Posdoc.	141	41.6
Age	Minimum	24	
	Maximum	71	
	Mean	44.5	
	S.D.	9.4	

Table 2 shows the basic descriptors for some variables related to participants' work aspects. Regarding the work relationship with UABC, more than half of the participants (55%) are adjunct professors of the university, which implies that they teach courses during the week and are exempt from administrative duties. In turn, less than one-third (29.1%) of the participants has a contract as full-time professor. It should be noted that more than two thirds of professors (71.1%) affirm that they teach only at UABC, the university being their only source of work. Finally, the average of years of teaching experience of participants was 14.4 years, although with a wide dispersion of years (s.d.=9 years).

Table 2. Basic descriptors for work variables of UABC professors

		n	%
Other institution	Yes	98	28.9
	No	241	71.1
Type of contract at UABC	Adjunct	187	55.0
	Part time	54	15.9
	Full time	99	29.1
Years of teaching	Mean	14.4	
	S.D.	9.0	

Four areas of knowledge were established from the degrees in which the professors participating in this study teach: administrative sciences, social sciences, experimental/exact sciences, and legal sciences. Table 3 shows the percentages of participants for each area and the degrees included in each area: at a general level, the highest percentage was of professors who work in the social sciences area (42.5%), followed by those who teach at one of the degrees within the experimental/exact sciences (32.6%).

Table 3. Distribution of participants by the areas of knowledge in which they teach

	n	%
Administrative Sciences*	55	16.1
Social Sciences**	145	42.5
Experimental/Exact Sciences***	111	32.6
Legal Sciences****	30	8.8

* Accounting1, Business Administration, IT, Common core curriculum Administration

** Education, Psychology, Communication, Sociology, Common core curriculum Social sciences, History

***Common core curriculum Engineering, Civil Engineering, Industrial Engineering, Computer Sciences, Electronic Engineering, Nanotechnology, Biotechnology, Architecture

****Law

With the aim of demonstrating significant connections between the areas of knowledge and some variables regarding the opinion of professors about the application of the competency-based model in UABC, non-parametric tests of contrast of independence hypothesis known as chi-square (X^2, 95% trust) were performed. This test allows comparing the expected frequencies (those that should be theoretically found in case the variables were independent) and those observed.

As shown in Table 4, the variables related to the opinion of professors on the design and the components of the syllabus correspond to a competency-based approach. Two of them showed significant rates in the tests performed, from which it is inferred that only two are independent from the area of knowledge in which professors teach. Regarding the design of the learning units programs (PUA) and their alignment with the competency-based approach, there are significant differences between the areas. The highest percentage of agreement was shown by the social sciences professors (A=89.7%); while professors from the legal sciences area showed the highest disagreement percentages (D=37%). When asked about the alignment of the student profile and the graduate profile of their degrees with the competency-based approach, the administrative sciences professors as well as the legal sciences professors record the highest disagreement percentages (20%). In this last area of knowledge (legal sciences) the highest percentage of disagreement was also observed regarding the establishment of the methodological teaching strategies (group dynamics, discussions, etc.) in the PUAs for applying the competency-based model in the classroom (D=36.7%).

Table 4. Opinion of professors regarding the alignment of syllabi to the competency-based approach in UABC by areas of knowledge

	PUA		**Profile**		**ProfileMod**		**Strategy**		**Assessment**	
	***D**	***A**	**D**	**A**	**D**	**A**	**D**	**A**	**D**	**A**
AS	14.8	85.2	14.5	85.5	20.0	80.0	23.6	76.4	30.9	69.1
SS	10.3	89.7	5.5	94.5	14.5	85.5	31.7	68.3	22.8	77.2
ES	11.7	88.3	1.8	98.2	12.7	87.3	31.2	68.8	25.2	74.8
LS	33.3	66.7	3.3	96.7	20.0	80.0	36.7	63.3	33.3	66.7
X^2	11.704		11.7903		2.086		1.876		2.359	
Sig.	.008		.008		.555		.598		.501	

*D= Disagrees. A= Agrees

With the aim of exploring the self-concept of the participants about their knowledge of the competency-based model as well as their theoretical mastery, some items were proposed whose percentages can be observed in Table 5. Regarding the degree of knowledge, in general, the majority self-defined within a regular-high level (R-H), with the professors of the experimental/exact sciences area standing out with the lowest percentage (84.5%) in this respect. In turn, five questions were asked to explore the degree of theoretical mastery of the competency-based approach in UABC professors: knowledge to be developed by students according to the model (Mod1); key competencies to be developed (Mod2); and types of competencies (professional, generic, and specific) that are included in the model (Mod3, Mod4 and Mod5). Legal sciences professors stand out for generating the highest percentages of incorrect answers (I) regarding the theoretical mastery of the competency-based approach. In turn, the question concerning the key competencies to be developed in students according to the approach showed the lowest correct answers (C) percentages in all areas of knowledge. It should be noted that chi-square tests (X^2) were performed to corroborate the hypothesis of independence of variables by areas of knowledge, of which not one showed significant rates.

Table 5. Opinion of professors regarding the knowledge of the competency-based model by areas of knowledge

	LevelKnowledge		Mod1		Mod2		Mod3		Mod4		Mod5	
	N-G	R-H	I	C	I	C	I	C	I	C	I	C
AS	3.6	96.4	23.6	76.4	41.8	58.2	27.3	72.7	23.6	76.4	21.8	78.2
SS	8.3	91.7	21.4	78.6	32.4	67.6	17.2	82.8	16.0	84.0	20.1	79.9
ES	15.5	84.5	22.5	77.5	35.1	64.9	15.3	84.7	16.2	83.8	15.3	84.7
LS	13.3	86.7	43.3	56.7	50.0	50.0	30.0	70.0	30.0	70.0	30.0	70.0
X^2	6.752		6.821		4.168		5.962		4.582		3.534	
Sig.	.080		.078		.244		.113		.205		.316	

Regarding the areas of knowledge in which professors work and the teaching strategies they use to teach the contents of their subjects, an item in a nominal scale was proposed with five categories: solo/group presentation (1), problem-based learning (2), teacher presentation (3), teamwork in the classroom (4), and assessment of students' previous knowledge and curriculum adaptation (5). The chi-square test of independence (95% trust) was performed and it showed a statistical significance rate (sig. =.000), from which it is inferred that both variables are dependent. In this regard, the teacher presentation strategy predominates in all areas of knowledge (with administrative sciences representing almost half of the sample with 49.1%) except for professors of social sciences, where it reaches a significantly lower percentage (16.6%). Within this last area of knowledge, what predominates as the main teaching strategies that professors use is class discussion (24.8%) and assessment of previous knowledge (23.4%) ; strategies that have the lowest percentages within the rest of the areas of knowledge.

Table 6. Teaching strategies used by professors by areas of knowledge

	1	2	3	4	5
AS	5.5	23.6	49.1	3.6	18.2
SS	12.4	22.8	16.6	23.4	24.8
ES	8.1	28.8	37.8	7.2	18.0
LS	10.0	30.0	33.3	6.7	20.0
X^2	42.957				
Sig.	.000				

1=Students' presentation; 2=PBL; 3=Teacher presentation; 4=Assessment of previous knowledge; 5=Class discussion

In turn, to investigate the main learning assessment tools used by professors by areas of knowledge in which they teach, five categories were established: multiple choice exams (1), research work (2), essays (3), presentations (4) and portfolios (Table 7). The non-parametric statistical test X^2 was also applied to verify the hypothesis of independence between the two variables, which showed statistical significance (sig. =.000) with 95% trust. Again, in all areas of knowledge, a learning assessment tool (multiple choice exams) predominated, except in the social sciences area (9.7%). In the latter, research works (37.5%) stood out as the main assessment tool used by its professors.

Table 7. Learning assessment tools used by professors by areas of knowledge

	1	2	3	4	5	6
AS	34.5	23.6	10.9	10.9	9.1	11.0
SS	9.7	37.5	10.4	18.8	18.8	5.4
ES	39.6	13.5	8.1	14.4	9.9	14.5

LS	36.7	26.7	3.3	20.0	10.0	3.3
X^2	95.021					
Sig.	.001					

1=Multiple choice exams; 2=Research work; 3=Essays; 4=Presentations; 5=Portfolios; 6=Other: open-ended exams, field practices, reading reports, among other tools.

Finally, to explore the opinion of professors about the main problems they face in applying the competency-based model within the classroom, five categories were established which are shown in Table 8. Overall, the main obstacle that professors mentioned to implement effectively the approach is the amount of students per classroom (43.4%): large groups would prevent the application of the theoretical proposals suggested on the competency-based model. In turn, both the lack of training of professors regarding the model (18.8%) as well as the resistance to change by some professors (17.9%) appear as elements that make it impossible to successfully apply the competency-based approach within the classroom, according to the opinion of the participants.

Table 8. Main problems in applying the competency-based model in the classroom according to the opinion of professors by their area of knowledge

	n	**%**
Large classes	148	43.4
Lack of training	64	18.8
Absence of differences	32	9.4
Doubts about effectiveness	29	8.5
Resistance to change	61	17.9
Other	7	2.0
TOTAL	341	100.0

6. Conclusions

The aim of this study was to evaluate from the perception of university professors the effectiveness of the competency-based approach regarding its application in the classroom in various dimensions. This paper works on the basis of the fact that the process of implementation and adaptation of the competency-based approach in universities has been gradual and its instrumentation shows restricted and complex possibilities. Since there is still a wide variation of the meaning of this approach between cultures and professions, it is undertaken that the particularities of the institutional context must be considered in the implementation of this approach (Rueda, 2009: Kennedy, Hyland & Ryan 2009). One of the key actors is the professor, who plays a fundamental role in enabling the application of the competency-based approach in the classroom, with all the limitations, advantages and disadvantages that this implies. In this sense, the importance of exploring the perception of professors from different areas of knowledge cannot be underestimated.

Regarding the variables related to the opinion that professors have on the design of the syllabus, they correspond to a competency-based approach. The opinion of professors from the Legal Sciences area significantly stands out since more than one third consider that in a general way, the subjects' study programs are not aligned with the competency-based approach: and in particular, the design of the proposed teaching and learning assessment strategies do not correspond to the approach. It is also noted that in two areas (Legal Sciences and Administrative Sciences) one fifth considers that the student profile and the graduate profile do not correspond to the approach.

By exploring the self-knowledge that professors generally state to have regarding the competency-based approach, most professors mentioned having relatively high knowledge. However, in the concrete answers to the questions related to the mastery of this approach, the Legal Sciences area stands out with the highest percentages of incorrect answers, followed by the Administrative Sciences area. It is interesting that the question concerning the key competencies to be developed in students to achieve personal, social and economic well-being showed the highest percentage of incorrect answers in all areas of knowledge.
Regarding the teaching strategies most used by professors from the different areas of knowledge, it was significantly shown that the strategies 'teacher presentation' and 'teamwork by students' predominate in all areas of knowledge as the most widely used ones; with a greater strength in the Administrative Sciences area. Moreover, it stands out that the teaching strategy related to the assessment of previous knowledge of students -and the curriculum adaptation based on this- is the strategy that professors used less by professors except for those from the social sciences area. This finding is contrary to what Ausubel (2012) has proposed: that the most important teaching strategy in the educational process is to know what the student already knows. Some teachers are using traditional strategies to impart the contents of their subjects, coinciding with what some authors (Bravo Mancero y Varguillas Carmona, 2015; Abreu, Naranjo, Rhea y Gallegos, 2016) highlight regarding the persistence of transmissive procedures by teachers and receptive by students in the current teaching-learning processes, which is contrary to the competency-based approach

In regards to the strategies of learning assessment carried out by professors in all areas of knowledge significantly predominated multi choice exams, except in the social sciences area; and the second most used strategy was student presentation. In the last analysis where the general opinion of professors was explored regarding the main problems they face in applying the competency-based model within the classroom, it was found, by order of importance, the following: the occurrence of large classes, which prevents the application of the theoretical proposals of the competency-based model; the lack of training of professors regarding the model; and the resistance to change from professors.

These results, among others, exhibit the complexity of implementing new educational approaches and achieving them in the classroom. Also, the importance of considering the possibilities and limitations of educational institutions (Rueda, 2009; Barriga, 2005). It is interesting that more than a decade from the implementation of the competency-based approach in UABC, a very high percentage of professors prefer to use teaching and learning assessment strategies from the traditional model. The significance that educational institutions evaluate the impact of these approaches on students' learning stands out. The development of this research, among other contributions, presents empirical evidence that contributes to the discussion on the difficulties and possibilities in the instrumentation of the competency-based approach in the classroom; the importance of assessing the institutional context; and the particularities of the area of knowledge where the approach is applied. Fundamental proof that can contribute to a possible improvement of the quality of education.

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