Cross-Cultural Adaptation and Validation of the Spanish Version for Measuring Students' Perception of Pedagogical Content Knowledge in University Health Teachers

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Abstract

Background: Ongoing professional development for college teachers has been much emphasized. Students' perception of pedagogical content knowledge (SP-PCK) is a self-report questionnaire that assesses students' perception of pedagogical content knowledge exhibited by their teachers within the classroom. There are no Spanish versions of this questionnaire available in the literature. The purpose of this study was to valid, and reliable version of the SP-PCK instrument to be used in a sample of university students attending a health education programme.

Method: After translation and cross-cultural adaptation, a definitive questionnaire was generated in Spanish. The validation was carried out by applying the questionnaire to a total of 105 undergraduate students of a health school in Bogotá, Colombia. The adapted version was applied to students of a physiology course. Cronbach's alpha, Cohen's kappa coefficient, exploratory factor analysis, and content validity index were used to assess content validity and internal consistency.

Results: The study population consisted of 78.4% women and the participants' average age was 19.2 ± 1.03 years-old. SP-PCK scored 0.923 (range 0.670 to 0.806) on the Cronbach α and intra-observer reproducibility was excellent (Kappa = 0. 918). Exploratory factor analysis determined 2 factors, which accounted for 52.536% of the variance, with 7 interactions (factor 1=36.351% and factor 2=16.185%). In the 28 reactives, the test sampling adequacy (KMO=0.844) and Bartlett's sphericity test (χ^2/gL=216.551; $p<0.001$) indicated a moderate fit of the data for analysis.

Conclusion: The SP-PCK instrument indicated adequate internal consistency and content validity. The instrument is recommended for the study of university students' perception of health teachers' pedagogical content knowledge within the classroom.

Keywords: Validation studies, Surveys and Questionnaires, Teaching, Adaptation, Teachers, Students.

Background

In recent years, pedagogical knowledge has become a fundamental element for effective teaching in humanities, social sciences, and medicine [1]. Several authors have considered the potential of studying pedagogical knowledge for the development of better educational practices [2]. The purpose of this perspective is that university teachers validate their own knowledge about how to teach a subject matter better. That is why pedagogical content knowledge (PCK) becomes relevant in health education in order to approach deep understanding of the teaching and learning processes, practices, and methods [3].

PCK is a complex construct and difficult to be achieved in practice [4]. This concept has been proposed by Shulman [5], who defined it as the combination of disciplinary and pedagogical knowledge that takes place within the classroom [6]. This combination of pedagogical and disciplinary knowledge has been increasingly observed and explored in different educational contexts with teachers of social, natural, and mathematical sciences [7]. There are few studies on PCK relating to health. The studies that have stood out are those conducted by Backes et al. [8], and Menegaz et al. [9], which have assessed the configuration and sources of PCK in teachers and students of nursing, medicine, and dentistry. Other authors have assessed PCK in the context of clinical practice [10] and physiology teaching [11].

On the other hand, authors such as Shulman et al. [5], Grossman et al. [12] and Marks et al. [13] have proposed several components of PCK, which have been grouped into five components, according to the proposal of Magnusson et al. [14]. These components are: i) the perspective and purpose of teaching; ii) knowledge about how students learn; iii) knowledge about the curriculum; iv) knowledge about teaching strategies and representations; and v) knowledge about how to evaluate learning. On the other hand, Park et al. [15], and Brigido et al.

[16] consider it necessary to include the affective aspects of the teachers as a new PCK component.

To evaluate PCK components, different measurement techniques have been proposed, namely: self-report questionnaires for teachers [17]; perception questionnaires for students [3, 18, 19]; and direct observation techniques [20]. In the same way, one of the most used techniques is content representations, which correspond to traces of teachers' reflection relating to the structure and purposes of teaching [21].

In Latin America, especially in Colombia, PCK has been studied addressing teaching of biology [22], physics [23] and the social sciences [24]. Accordingly, validated and specific instruments are required to facilitate a better understanding of PCK in university health teachers. Therefore, in the absence of adaptation and validation studies on perception questionnaires for PCK, the present study was conducted in order to estimate the validity of the questionnaire proposed by Jang et al. [3].

Materials and Methods

Study design, setting and participants

The methodological validation was carried out by applying the questionnaire to a total of 105 undergraduate students of a health school in Bogotá, Colombia between June and November 2017 following the guidelines for translation, adaptation, and validation of instruments, or scales, for their use in intercultural research by Sousa et al. [25].

Instrument PCK

The SP-PCK instrument measures students' perceptions of PCK exhibited by teachers within the classroom. This instrument has been prepared by Jang and his team of researchers at Chung Yuan University in Taiwan and applied to 172 university students of education. It has four

dimensions related to the five basic PCK components, with a total of 28 items: Subject Matter Knowledge (SMK), Instructional Representation and Strategies (IRS), Instructional Objects and Context (IOC), and Knowledge of Students' Understanding (KSU) (see Additional File: 1). The survey adopted the Likert scales, with five points designed for students to express their opinions as follows: "Never", "Seldom", "Sometimes", "Often", and "Always" correspond respectively to 1 - 5 points according to students' responses. To evaluate the psychometric properties of this instrument, we followed the protocol of adaptation and validity of the original questionnaire, and performance [3], applied to university students of a school of humanities and education in a university of Taiwan, who reported a reliability level of the instrument that indicated a good internal consistency (Cronbach's alpha = 0.965).

Procedures

Phase 1: Cultural adaptation procedures

For cross-cultural adaptation, we used the translation and back-translation technique, starting with semantic and non-literal translations for each item or question. Two translations were made into Spanish, which were consolidated after the analysis. The consolidation was translated into English twice, and the whole process was evaluated to obtain a version with conceptual and cultural equivalence. Both the original and Spanish authors received the back-translated version so that final changes could be implemented.

Phase 2: Pretesting

After having been proofread, the SP-PCK (see Additional File: 1) was tested on 6 third-year students during their physiology clerkship in September 2017. We used cognitive interviews [26], applying the 'paraphrasing' method, in which the individuals were asked to repeat each item

using their own words [27], and the 'probing questions method' to inquire about the comprehension level for each item [28]. Twenty-one of the twenty-eight items were considered to be non-difficult regarding the translation from English into Spanish by the students interviewed. The other items were adjusted according to their suggestions.

Phase 3: Validation

To evaluate content validity, we used the model proposed by Lawshe [29] with a group of 12 experts in the area, who were given a questionnaire in which the 28 items were included, in addition to the criteria of 'essential', 'useful but not essential', and 'not essential' assessment, so that each individual could evaluate the level of importance of each item. Subsequently, we determined the content validity ratio (CVR) for each item using the equations described in the Lawshe's model. In addition, we calculated the content validity index (CVI).

The instrument adapted in its definitive version was applied to a sample of students of the School of Medicine and Health Sciences, who were attending the course of Physiology of Effort during the third and fourth semesters of the Physiotherapy and Medicine Graduate Programme. The purpose was to determine the psychometric properties of the instrument [30,31].

Prior to the application of the instrument, we obtained the approval from the institution. The students were invited to participate in the study and signed and informed consent form. We obtained a sample of 111 university students aged between 18 and 27 years, of which 78.4% were women (age = 19.2 ± 1.03). The final sample was composed of 105 students, due to the exclusion of the instruments that had not been correctly completed (5.4%). The information was collected through the distribution of the adapted instrument in print. We recorded basic personal data, such as age, sex, and academic semester. The instrument was applied in two occasions with an interval of one week.

The entire study was in compliance with the current provisions for the protection of human subjects participating in research, according to Resolution No. 8430 of 1993 provided by the Ministry of Health of Colombia, and contemplated in the Declaration of Helsinki. The confidentiality of the information was maintained, preserving the anonymity of the informants at all times. In addition, the present study was approved by the Ethics Committee of the Rosario University where it was applied (No. CEI-ABN026-000151).

Statistical analysis

The calculation of the CVR of each item and the CVI was performed using the equations described in the Lawshe's model [29]. Equation 1 is the formula used to determine the CVR for each item.

Equation 1

$$CVR = \frac{n_e - N/2}{N/2}$$

Where: n_e = number of judges who agreed in the category 'essential'
N = total number of judges

According to Tristán [32], this expression has been proposed by Lawshe [29] with the purpose of interpreting it as if it were a correlation, by taking values from -1 to +1 in such a way that: if the agreement occurred in less than half of the judges, the CVR would be negative: if the agreements were exactly the half, the CVR would be null; and if there were more than half of agreements, the CVR would be positive.

Once the CVR of all the items was calculated, and those that had values higher than the minimum proposed by Lawshe [29] were accepted (in this case, the minimum value was 0.56 for

12 evaluators), the average of the CVR was calculated to obtain the global CVI of the instrument. Equation 2 is the formula used to calculate the CVI according to Lawshe's model [29].

Equation 2

$$CVI = \frac{\sum\limits_{i=1} CVRi}{M}$$

Where: CVRi = content validity ratio of the acceptable items according to Lawshe's criterion [29].

M = total of acceptable items of the test.

Internal consistency (reliability) indicated the degree to which the questions included in a sub-dimension (or domain) measured the same concept. This procedure was performed using Cronbach's alpha reliability coefficient. According to Nunnany [33], a Cronbach's α value equal to or greater than 0.70 is sufficient to use the questionnaire for comparison between groups. All participants successfully completed the SP-PCK on two occasions (one week apart) and were included in the reliability study (Cohen's kappa coefficient). Finally, an exploratory factorial analysis (EFA) was performed using the principal components with varimax rotation technique, deciding the number of factors to retain utilizing a parallel data matrix analysis for a random replica, repeating the process 250 times. Through Bartlett's sphericity test, the determinant of the correlations matrix and the Kaiser-Meyer-Olkin (KMO) test (acceptable with values above 0.6) were applicable in a factor analysis. Each item was included in a particular factor if the degree of saturation was at least 0.35 and there was an Eigenvalue greater than 1 (construct validity). We performed descriptive analyses on all items and determined the item-total correlation (the degree to which each item correlates to the total score) using Pearson's coefficient. The processing and

analysis of the information was conducted using the Statistical Package for Social Science (IBM Inc., Chicago, Illinois, United States) software, version 22.

Results

Among the participants of the present study, 87 (78.4%) were women. The age of the participants ranged between 17 and 27 years, with an average of 19.21 ± 1.53.

Cross-cultural adaptation

Twenty-one of the twenty-eight items were considered to be non-difficult in the language adaptation process. Seven items were considered to have greater difficulty to achieve a conceptual equivalence. With the information obtained through the cognitive interviews, and the suggestions of the translators and students, we performed changes in the corresponding items. Table 1 shows the descriptive statistics of the responses provided by the university students to the four dimensions of the instrument, including average scores and standard deviation.

Table 1. Descriptive and reliability statistics of the university students' responses for four categories of college students' perceptions of teachers' PCK (n=105)

Category	Item	Mean (SD)	Cohen's kappa (95% CI)	Cronbach's alpha
SMK	7	4.5 (0.6)	0.700 (0.607 to 0.779)	0.670
IOC	7	4.3 (0.8)	0.757 (0.682 to 0.821)	0.806
IRS	7	4.1 (0.9)	0.704 (0.612 to 0.782)	0.719
KSU	7	4.1 (0.8)	0.767 (0.695 to 0.828)	0.772

Subject Matter Knowledge (SMK), Instructional Representation and Strategies (IRS), Instructional Objects and Context (IOC), and Knowledge of Students' Understanding (KSU), SD (standard deviation), CI (confidence interval).

The highest average score corresponded to SMK (4.5 ± 0.6), followed by IOC (4.3 ± 0.8). On the other hand, IRS (4.1 ± 0.9) and KSU (4.1 ± 0.8) obtained the lowest scores. All these dimensions were between 'often' and 'always'. According to these results, the students considered SMK as the dimension of the PCK that had an optimal influence on the teaching-learning

process. In addition, they also considered that IOC, IRS, and KSU were the dimensions of teachers' PCK that could be improved.

For content and layout validation, 25 experts in education and health research reviewed the items regarding their congruence, clarity, and bias, obtaining a weighted average of 4.68 on a 0-5 scale. The layout validation of the instrument was carried out by calculating the CVI following the procedure proposed by Lawshe [29]. The result of CVR was obtained taken into account the criteria of the instrument items 'essential' and 'non-essential' in a sample of 12 experts. The results indicated a CVI of 0.89, which was considered high. In general terms, the content validity of the SP-PCK instrument was very good.

Reliability of the instrument

In reliability of this instrument, we used Cronbach alpha and Cohen's kappa coefficient values to evaluate its internal consistency. After statistic analyzing, the Cronbach's alpha value of 28 items was $\alpha = 0.923$, indicating that the questionnaire had a excellent according to Nunnally's criterion [33]. Likewise, Cohen's kappa coefficient of the instrument was established as $\kappa = 0.918$, with a 95% confidence interval. This way, the instrument exhibited an almost perfect agreement force according to the values proposed by Landis and Koch [34]. Table 1 shows the agreement values for each dimension of the instrument.

Moreover, in "Item-Total Statistics" (Table 2), the section of "Corrected Item-Total Correlation" revealed each corrected item not only presented a higher correlation (all correlation values were greater than 0.400) but also had a higher psychological homogeneity. Furthermore, from the section of "Cronbach's alpha if item Deleted", it meant: if we deleted one of the items, the Cronbach's alpha values were almost the same, even smaller than items deleted. It followed from what had been said that the instrument had a higher consistency and reliability so that it

was unnecessary to delete any item from the scale (Table 2). Given that none of the values was negative, the 28 items were taken into consideration.

Table 2. Reliability values for four categories of college students' perceptions of teachers' PCK (n=105)

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected total correlation	Cronbach's Alpha if Item Deleted	Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected total correlation	Cronbach's Alpha if Item Deleted
A1	26.37	5.378	0.458	0.625	C1	24.36	11.242	0.493	0.681
A2	26.90	4.627	0.470	0.607	C2	25.24	10.577	0.492	0.732
A3	26.72	5.233	0.435	0.647	C3	24.73	9.974	0.551	0.657
A4	26.56	5.182	0.482	0.635	C4	24.56	10.511	0.409	0.693
A5	26.63	5.282	0.406	0.631	C5	24.70	9.874	0.580	0.650
A6	27.11	4.711	0.462	0.696	C6	24.64	10.476	0.543	0.664
A7	26.74	4.977	0.481	0.609	C7	24.49	11.206	0.265	0.730
B1	25.71	11.052	0.529	0.783	D1	24.78	10.421	0.417	0.759
B2	25.64	10.175	0.693	0.754	D2	25.27	8.747	0.535	0.740
B3	25.70	10.114	0.555	0.779	D3	24.40	10.431	0.469	0.749
B4	25.80	10.585	0.607	0.769	D4	24.43	10.474	0.519	0.741
B5	26.02	11.230	0.428	0.825	D5	24.59	9.773	0.600	0.723
B6	25.71	10.975	0.593	0.774	D6	24.48	10.610	0.472	0.749
B7	25.75	10.688	0.555	0.778	D7	24.49	10.082	0.489	0.745

Item A1-A7 means question 1 – 7 of SMK, Item B1-B7 means question 1 – 7 of IRS, Item C1-C7 means question 1 – 7 of IOC, Item D1-D7 means question 1 – 7 of KSU.

Table 3 reports the results of EFA on our data. Using the screen test and the analysis of the scree plot (Figure 1), 2 factors were found, each consisting of 2 domains, which accounted for 52.536% of the variance, with 7 interactions (factor 1=36.351% and factor 2=16.185%). In the 28 reactives, the test sampling adequacy (KMO=0.844) and Bartlett's sphericity test (χ^2/gL=216.551; p<0.001) indicated a moderate fit of the data for analysis.

Table 3. Components and factorial statistical the four categories of college students' perceptions of teachers' PCK (n=105)

Statistical	Inicial eigenvalues			Sums of squared extractions loadings		
	Total	Variance (%)	Cumulative (%)	Total	Variance (%)	Cumulative (%)
Factor 1	2.5	36.351	36. 351	2.0	29.556	29.556
Factor 2	1.3	16.185	52.536	1.6	22.980	52.536
Factorial component						
KMO index	0.844	-	-	-	-	-

Barlett test (χ^2)	216.551	-	-	-	-	-	-
Degrees freedom (gL)	21	-	-	-	-	-	-
α-Cronbach	0.923	-	-	-	-	-	-
Significant trend	0.0001	-	-	-	-	-	-

KMO: Kaiser-Meyer-Olkin Index. Extraction Method: Principal Component Analysis and Varimax Rotation.
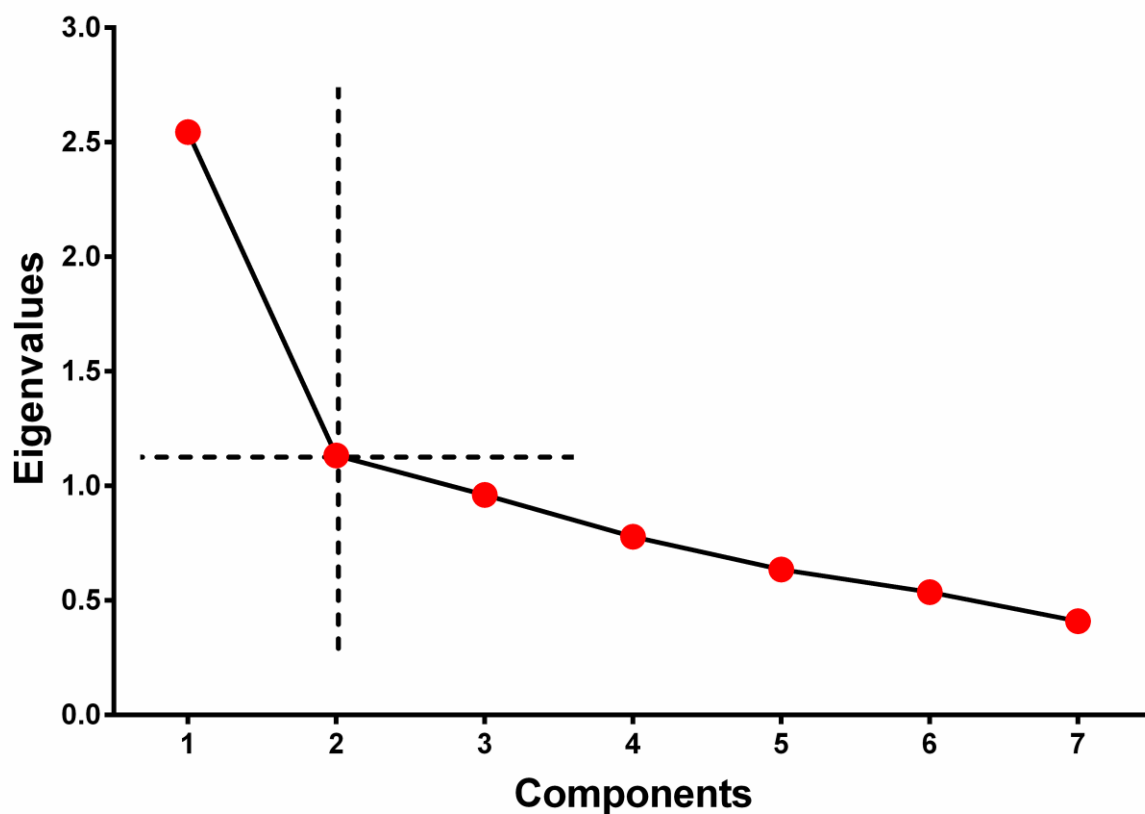
Figure 1. Sedimentation graph of the of college students' perceptions of teachers' PCK.

Discussion

The goal of the present study was to carry out the cross-cultural adaptation and validation of the SP-PCK questionnaire, prepared to assess the perception of PCK in a sample of university health students aged between 17 and 27 years. This study was based on the method proposed by Jang et al. [3], following the steps suggested in the guidelines for translation, adaptation, and validation of instruments for intercultural research on healthcare [25].

The main results of the present study indicated that the adapted SP-PCK questionnaire exhibited very satisfactory layout validity, with CVI of 0.89. The Cronbach's alpha value of the 28 items was $\alpha = 0.923$. This value was close to that reported by Jang et al. [3], who obtained a result of $\alpha = 0.965$, confirming that this instrument had adequate equivalence in reliability for the university health students in Colombia. With respect to the structure of the instrument, the data obtained indicated that the instrument behaved in the same way as the Taiwanese version.

The EFA indicated that the four dimensions were maintained, and that the results and indices of each item were adequate. Complementary to the above, the content validity was adequate for the total reactives and constructs, with an adequate concordance value between experts (CVI=0.89). The EFA revealed an appropriate index fit to confirmed models, with eigenvalues greater than 1.0 explaining 52.2% of the total variance, with high factorial loads (range: 0.373 to 0.730). In addition, the results of this study show communality between factors greater than 0.579 (data no shown). These data match the psychometric theory by Nunnaly [33] showing that each factor must contain variables that are highly and exclusively correlated with this factor with values above 0.50. Therefore, it could be observed that the present Colombian SP-PCK version had adequate reliability and validity to be used in university health teachers and students. However, future investigations with representative samples from other regional contexts of Colombia must estimate the test-retest reliability and confirmatory construct validity to identify more evidence of different sources of reliability and validity.

In addition to these results, Jang et al. [34] applied the instrument to compare 116 students' perception of PCK in physics teachers, novices, and experts, demonstrating that the SP-PCK questionnaire provided adequate information for improving the quality of teaching in university education. Other authors, such as Halim et al. [18], Criu and Marian [19], and

Sa'adatu et al. [34], have studied the influence of students' perceptions of PCK as a factor associated with self-efficacy in self-regulated learning for the training of future teachers.

The SP-PCK instrument and the content representations instrument proposed by Loughran et al. [21] are emerging as the two instruments most used by researchers to assess PCK of teachers after a period of training, analyse the role of the mentor in the training, or as an element of self-evaluation and teacher feedback [17].

As strengths of the present study, we highlight the application of methodological steps for cross-cultural adaptation, the validation of questionnaires proposed by Souza et al. [25], and compliance with the recommendations suggested by Borsa et al. [36]. So far, our study is one of the first in cross-cultural adaptation and validation of university health students' perceptions of teachers' PCK in Colombia. In the same line, these findings are important because they allow establishing the characteristics of four of the five PCK components proposed by Magnusson et al. [14]. However, it is necessary to conduct further studies with representative samples from other scientific fields and other populations assessing test-retest reliability and validity of the four dimensions of the studied questionnaire, in order to find greater evidence of different sources of reliability and validity relating to the utility of the instrument.

The SP-PCK instrument has limitations, because it is a self-report and perception questionnaire. Another limitation is inherent in its cross-sectional nature, in addition to the existence of a selection bias, limiting the participation of undergraduate in other geographical areas of Bogota, Colombia; the age range of participants (18 to 25 years) included in this work is also a limitation. However, this work used a tool based on the theory of areas of teacher knowledge that can be seen as the cornerstones of the emerging work on professional knowledge for teaching: General pedagogical knowledge, knowledge of context, subject matter knowledge,

and PCK [3, 34]. However, it has been observed that the instrument was valid and reliable to estimate the characteristics of the four PCK domains according to students' perception. However, the limitations described in this work do not compromise the results achieved in the population studied.

Conclusion

In conclusion, the results of this study provide evidence of sufficient validity for the Colombian version of the SP-PCK instrument, which assessed university health students' perceptions of the four PCK components in their teachers. Subsequent studies should continue the process of providing evidence of confirmatory and divergent validity in other areas of Colombia and Latin America.

Abbreviations

CVI: Content Validity Index

CVR: Content Validity Ratio

EFA: Exploratory Factorial Analysis

IOC: Instructional Objects and Context

IRS: Instructional Representation and Strategies

KMO: Kaiser-Meyer-Olkin

KSU: Knowledge of Students' Understanding

PCK: Pedagogical Content Knowledge

SMK: Subject Matter Knowledge

SP-PCK: Students' Perception of Pedagogical Content Knowledge

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Additional File 1

VERSION ESPAÑOL:

CUESTIONARIO SOBRE EL CONOCIMIENTO PEDAGÓGICO DEL CONTENIDO (CPC) DE PROFESORES UNIVERSITARIOS

Primer test ☐
Segundo test ☐

Este cuestionario contiene cinco afirmaciones acerca de las prácticas de enseñanza que podrían tener lugar en esta clase. A usted, se le preguntará con qué frecuencia lleva a cabo cada una de las prácticas. No existen respuestas "correctas" o "incorrectas". Cada una de las afirmaciones describe cómo es esta clase para usted.

Asegúrese de responder todas las preguntas.

Coloque una "X" alrededor de acuerdo a las siguientes categorías

1. Si la práctica docente se lleva a cabo..............................Nunca
2. Si la práctica docente se lleva a cabo..............................Rara vez
3. Si la práctica docente se lleva a cabo......................Algunas veces
4. Si la práctica docente se lleva a cabo......................Frecuentemente
5. Si la práctica docente se lleva a cabo......................Siempre

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A. Conocimiento de la materia de estudio (CME)

1. Mi profesor(a) conoce el contenido que me está enseñando
   ○ Nunca ○ Rara Vez ○ Algunas Veces ○ Frecuentemente ○ Siempre

2. Mi profesor(a) explica claramente el contenido de la materia
   ○ Nunca ○ Rara Vez ○ Algunas Veces ○ Frecuentemente ○ Siempre

3. Mi profesor(a) conoce como se han desarrollado las teorías o principios del tema que me enseña.
   ○ Nunca ○ Rara Vez ○ Algunas Veces ○ Frecuentemente ○ Siempre

4. Mi profesor(a) selecciona el contenido apropiado para los estudiantes.
   ○ Nunca ○ Rara Vez ○ Algunas Veces ○ Frecuentemente ○ Siempre

5. Mi profesor(a) sabe las respuestas a las preguntas que hacemos sobre el tema
   ○ Nunca ○ Rara Vez ○ Algunas Veces ○ Frecuentemente ○ Siempre

6. Mi profesor(a) explica el impacto de la materia en la sociedad.
   ○ Nunca ○ Rara Vez ○ Algunas Veces ○ Frecuentemente ○ Siempre

7. Mi profesor(a) conoce la estructura completa del conocimiento de la materia de estudio.
   ○ Nunca ○ Rara Vez ○ Algunas Veces ○ Frecuentemente ○ Siempre

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B. Objetivo & contexto de enseñanza (OCE)

1. Mi profesor(a) me hace entender claramente los objetivos del curso
   ○ Nunca ○ Rara Vez ○ Algunas Veces ○ Frecuentemente ○ Siempre

2. Mi profesor(a) proporciona una interacción apropiada o un buen ambiente de aprendizaje
   ○ Nunca ○ Rara Vez ○ Algunas Veces ○ Frecuentemente ○ Siempre

3. Mi profesor(a) presta atención a la reacción de los estudiantes durante la clase y ajusta sus estrategias para enseñar.
   ○ Nunca ○ Rara Vez ○ Algunas Veces ○ Frecuentemente ○ Siempre

4. Mi profesor(a) crea situaciones en el salón de clase para promover mi interés por el aprendizaje.
   ○ Nunca ○ Rara Vez ○ Algunas Veces ○ Frecuentemente ○ Siempre

5. Mi profesor(a) prepara materiales de enseñanza adicionales.
   ○ Nunca ○ Rara Vez ○ Algunas Veces ○ Frecuentemente ○ Siempre

6. Mi profesor(a) maneja el contexto de salón de clase apropiadamente.
   ○ Nunca ○ Rara Vez ○ Algunas Veces ○ Frecuentemente ○ Siempre

7. El actuar de mi profesor(a) durante la enseñanza es activo y motivador
   ○ Nunca ○ Rara Vez ○ Algunas Veces ○ Frecuentemente ○ Siempre

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C. Representación & estrategias de enseñanza (REE)

1. Mi profesor(a) utiliza ejemplos apropiados para explicar los conceptos relacionados con la materia de estudio.
   ○ Nunca ○ Rara Vez ○ Algunas Veces ○ Frecuentemente ○ Siempre

2. Mi profesor(a) utiliza analogías familiares para explicar conceptos de la materia de estudio
   ○ Nunca ○ Rara Vez ○ Algunas Veces ○ Frecuentemente ○ Siempre

3. Los métodos de enseñanza de mi profesor(a) me mantienen interesado en la materia.
   ○ Nunca ○ Rara Vez ○ Algunas Veces ○ Frecuentemente ○ Siempre

4. Mi profesor(a) provee oportunidades para que yo pueda expresar mis puntos de vista durante la clase.
   ○ Nunca ○ Rara Vez ○ Algunas Veces ○ Frecuentemente ○ Siempre

5. Mi profesor(a) utiliza demostraciones como ayuda para explicar el concepto principal del tema de estudio.
   ○ Nunca ○ Rara Vez ○ Algunas Veces ○ Frecuentemente ○ Siempre

6. Mi profesor(a) utiliza una variedad de métodos de enseñanza para transformar la materia de estudio en conocimiento comprensible.
   ○ Nunca ○ Rara Vez ○ Algunas Veces ○ Frecuentemente ○ Siempre

7. Mi profesor(a) utiliza multimedia o tecnologías de enseñanza para expresar el concepto de la materia.
   ○ Nunca ○ Rara Vez ○ Algunas Veces ○ Frecuentemente ○ Siempre

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D. Conocimiento sobre la comprensión de los estudiantes (CCE)

1. Mi profesor(a) evalúa el conocimiento previo de los estudiantes antes de la clase.
   ○ Nunca ○ Rara Vez ○ Algunas Veces ○ Frecuentemente ○ Siempre

2. Mi profesor(a) conoce las dificultades de los estudiantes sobre la materia antes de la clase.
   ○ Nunca ○ Rara Vez ○ Algunas Veces ○ Frecuentemente ○ Siempre

3. Las preguntas que realiza mi profesor(a) evalúan mi comprensión sobre un tema.
   ○ Nunca ○ Rara Vez ○ Algunas Veces ○ Frecuentemente ○ Siempre

4. Los métodos de calificación de mi profesor (a) evalúan mi compresión sobre la materia.
   ○ Nunca ○ Rara Vez ○ Algunas Veces ○ Frecuentemente ○ Siempre

5. Mi profesor(a) utiliza distintos métodos (preguntas, discusión, etc.) para averiguar si he entendido.
   ○ Nunca ○ Rara Vez ○ Algunas Veces ○ Frecuentemente ○ Siempre

6. La tareas o actividades que mi profesor(a) asigna facilitan mi comprensión sobre la materia.
   ○ Nunca ○ Rara Vez ○ Algunas Veces ○ Frecuentemente ○ Siempre

7. Los exámenes que realiza mi profesor(a) me ayudan a darme cuenta sobre mi situación de aprendizaje.
   ○ Nunca ○ Rara Vez ○ Algunas Veces ○ Frecuentemente ○ Siempre

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Comentarios:

En este curso, si usted tiene alguna dificultad con el aprendizaje o una opinión, por favor descríbala a continuación.

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Gracias por diligenciar este cuestionario.