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Student Response to Instructional Practices (StRIP) Survey in Engineering Classrooms: Validating a Spanish Version

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Abstract

This research paper reports the validity methodology and the results obtained in constructing the Spanish version of a well-known instrument to assess instructional practices. Since 2014, the School of Engineering of the Universidad Andres Bello in Chile has invested resources into transforming teaching practices from a traditional approach to active learning methodologies. To reach this goal, the Educational and Academic Innovation Unit (UNIDA, for its acronym in Spanish) designed a recursive Engineering Faculty Development program that uses the *conceptual change* approach as a framework. It is specially designed to promote and ensure the use of innovative, active-learning methodologies in Engineering classes. Since 2015, we have been implementing this program and reporting on its evolution and the resulting shifts in paradigm in the teaching practices of the faculty members. All the interventions are done by the faculty (*teaching*); however, the final impact is on the students (*learning*). So, we assessed how students responded to these new programs and analyzed the diverse types of teaching implemented by the engineering faculty, using the Student Response to Instructional Practices (StRIP) survey. The StRIP measures students' responses to the kinds of instruction delivered in the undergraduate engineering classrooms. It consists of three main sections: 1) the types of instruction, categorized as interactive, constructive, active, and passive, 2) the strategies underlying the in-class activities, i.e., explanation and facilitation, and 3) the student responses to instruction, as measured in the subscales of value, positivity, participation, distraction, and evaluation.
In this paper, we present the process of translating the StRIP from English into Spanish and its subsequent validation. The process included i) forward and backward translation, ii) review by an expert committee, iii) two focus group sessions with engineering students and iv) pilot testing. In the pilot testing, 346 students enrolled in Engineering courses in various semesters of their curricula participated. We used this data to evaluate the internal reliability of the tool using the Cronbach alpha test (α = 0 .920), which indicated that our Spanish version of the StRIP was internally consistent. We concluded that the translated version of the StRIP was a validated instrument that could be applied in future formal implementations where the aim is to understand better the students' responses to pedagogical strategies used in Spanish-speaking classrooms.

Keywords: Active learning, instructional practices, STEM, educational innovation, higher education

Introduction

Engineering institutions continuously attempt to improve education by restructuring their curricula and teaching practices. In the areas of science, technology, engineering, and mathematics (STEM), there has been much research concluding that active learning (AL) promotes student engagement, improves students' competencies, boosts academic achievements, and brings the students closer to the real professional world. [1]. However, the adoption of AL has been slow. Research suggests that students' responses to the AL methodologies may affect how this adoption process takes place. Student perception of the learning process is critical for a successful active learning adoption [2]. Therefore, we are interested in exploring the perceptions of our students. Several factors affect students' opinions about the learning process. One concerns how it prepares them for future professional development [3]. Other factors involve intrinsic and extrinsic resistance to new learning approaches [2, 4].

According to the literature, there are several approaches to measuring student engagement and its impact on the learning process. Some implement qualitative observation that follows a rigorous process. One example is the Practical Observation Rubric to Assess Active Learning [5]. It focuses on practice, cognitive development, and the students' resistance and engagement. The approach of Hinkin [6] uses assessment questionnaires that consider well-established psychometric principles. Similarly, DeMonbrun et al. [7] proposed a valid tool for the measurement of student perceptions from a quantitative perspective that looks at this from the type of instruction, the strategies in the classroom, and the students' responses to teaching. Other questionnaires focus on learning outcomes and the development of "hard" and "soft" competencies related to their professional profiles [8, 9], teamwork vs. lecture-based strategies [10], and problem-based approaches [11].

It is not a new issue that the type of teaching is something that it is notably important. It has been shown that the use of student-centered learning strategies promotes learning and the development of various skills, such as teamwork, critical thinking, and reflection, among others. Considering this, the School of Engineering of the Universidad Andres Bello in Chile, where this research took place, has been investing effort into reforming how faculty members teach classes and promoting active learning strategies. To trigger the needed transformation, the Educational and Academic Innovation Unit (UNIDA, for its acronym in Spanish) designed a recursive Engineering Faculty Development Program that uses the conceptual change approach as a framework. It is specially designed to promote and ensure the use of innovative, active-learning methodologies in Engineering classes. Since 2015, we have been implementing this program and reporting on the program's evolution and the shifts in paradigm the teaching practices of the faculty members. [12, 13]. We have also reported how students responded to the modifications made in their engineering courses, in which they are no longer passive listeners but active participants in their learning through the activities implemented by instructors [14].

Since UNIDA’s educational innovations showed positive signs of change in the classroom, we conducted a literature review looking for an instrument to evaluate students' responses to different types of teaching, both traditional and non-traditional, to measure the change at the university where this study took place. The intention was to find an assessment tool that allows us to determine longitudinally how students respond to new instructional methodologies and analyze the diverse types of teaching implemented by the engineering faculty. After in-depth research, we chose the Student Response to Instructional Practices (StRIP) survey [7], which evaluates the students' responses to the use of traditional and non-traditional pedagogical methods. In this paper, we present the process of translating the StRIP from English into Spanish and its subsequent validation. In the next section, we describe the methodology and then the sections and subscales of the instrument. After describing the survey translation process, we present the results of the Cronbach alpha test (α = 0 .920), showing that the Spanish version of the StRIP is internally consistent.

Methodology

In this section, we describe the setting, participants, instrument, and the methods used to construct and validate the Spanish version of the StRIP, namely: i) forward and backward translation, ii) an expert committee review, iii) two focus group sessions with engineering students and iv) a pilot testing.

Setting and participants

The School of Engineering of the Universidad Andres Bello, where this research took place, has three campuses in three of the most important cities of the country, namely, Santiago, with 5567 students, Viña del Mar with 1344 students, and Concepcion with 889 students. The numbers include students from the morning and evening sessions and advanced students (students who have already finished a bachelor's degree and are studying a second one). Among the three locations, the university offers a total of 17 engineering programs. We gathered data from 346 current engineering students (282 students from Santiago and 64 students from Viña del Mar) enrolled in different semesters of their curricula in nine engineering programs.

Instrument

The Student Response to Instructional Practices (StRIP) Survey was designed to measure students' responses to the types of instruction delivered in the undergraduate engineering classrooms [7]. It consists of three main sections and eleven subscales, as seen in Table I.

TABLE I
SECTIONS OF THE StRIP QUESTIONNAIRE AND ITS SUBSCALES

Instrument	Sections	Subscales
Student response to instructional practices (StRIP)	A. Types of instruction	1. Interactive 2. Constructive 3. Active 4. Passive
	B. Strategies for using in-class activities	5. Explanation 6. Facilitation
	C. Students' response to instruction	7. Value 8. Positivity 9. Participation 10. Distraction 11. Evaluation

A. Types of instruction. DeMonbrun et al. [7] report that in designing the instrument, they considered that the instrument needed to capture a wide range of types of instruction, the number of students involved (individuals, pairs, groups), and the cognitive process that is required from the students during the activities. This section has four subscales, described as follows:

1. Interactive instruction: An activity must involve the collective construction of knowledge; students' interactions create that construction. The items for this subscale include group activities performed during class, such as solving problems, hands-on

activities, and group discussions; or outside the classroom, such as completing homework, working on a project, and studying outside of class.

2. Constructive instruction: Promotes behaviors in *"which learners generate or produce additional externalized outputs or products beyond what was provided in the learning material"* [15]. Constructive activities include activities such as drawing a concept map, making notes on what is understood, asking questions, comparing and contrasting cases, designing plans, making hypotheses and causal relations, and generating predictions.

3. Active instruction: For the instrument, active instruction is assessed in individual activities in which the students are engaged during or outside the class, such as making presentations, asking or answering questions during class, reviewing content before class, and solving problems on their own.

4. Passive instruction: As the name suggests, this involves activities in which students passively receive information from the instructor, such as when the instructor a) directly gives most of the information for a homework assignment, b) gives a lecture, and c) solves a problem during class. In these activities, students receive information directly from the instructor, leaving out activities when the content comes from a different source such as textbooks and other resources.

B. Strategies for using in-class activities. This section includes the instructor's actions in explaining (the instructor is the main actor) and facilitating (placing the student as the main actor) an in-class activity to minimize the students' resistance. This section contains two subscales.

5. Explanation: The *instructor* plays a central role in explaining the expectations and goals of the activity. The instructor also emphasizes to the student the importance of completing the activity and any impact it has on their grades.

6. Facilitation: The instructor's actions promote the *students*' participation and engagement in the activity. This subscale includes encouraging students to participate, giving appropriate time to complete the assignment, walking around the room in case any assistance is needed, and asking for feedback.

C. Students' responses to instruction. In an attempt to measure students' responses to a variety of instructional practices, this section includes some subjective values that the student assigns to the activity based on cognitive, affective, or emotional value, and behavioral engagement, as well as the rating that students give to the instructor or the course. This section is composed of five subscales (Table I) which are described as follows:

7. Value is related to the students' investment in their learning, interest, or utility of the activity. It prompts cognitive engagement.

8. Positivity measures the students' affective value to the instructor's actions or emotional value to the activity, classroom environment, or the course.

9. Participation indicates the students' behavioral engagement during an in-class activity. As [16] states, participation "*is a measure of behavioral engagement. It ranges from the most enthusiastic, participatory students who attend the tasks vigorously, to students who*

are more passive and give up easily, to those who are actively resistant and disruptive" [16]. The items corresponding to this subscale include both positive and negative elements of students' participation, such as, acceptance, enthusiasm, activeness or open resistance, passivity, nonverbal resistance, and partial compliance.

10. Distraction contains items that indicate students' lack of ability to stay focused or to engage in the activity, distracting themselves or peers during the learning process.

11. The evaluation gathers the students' overall ratings to the instructor as well as to the course. The items of this subscale are direct measures of course quality and instruction, and the students' recommendation of the instructor to another student.

The Student Response to Instructional Practices [7] survey addresses a wide range of elements that allow us to know and evaluate the various types of instruction, whether active or non-active. It investigates the emotional, social, and cognitive aspects of the students exposed to multiple types of teaching. These characteristics of the test have allowed us to carry out an in-depth study in our institution during a time we are experiencing a significant curricular innovation. In the next section, we describe the process carried out to translate the questionnaire into Spanish.

Spanish translation of the StRIP questionnaire

The following section describes the translation process of the Student Response to Instructional Practices questionnaire into the Spanish language (translated version in Appendix). We based our method on the guidelines for translating a survey into a different language [17]. Figure 1 shows the model for the questionnaire translation process. First, we organized an expert committee of five researchers who were familiar with the subject matter. Second, two members of the expert committee translated the instrument into Spanish, separately. The research team made sure both experts were fluent in English. Then, they met to compare and discuss the translated draft of the instrument and constructed a first version of the questionnaire (*the forward translation*). Third, another member of the expert committee took this first translation and back-translated the instrument (i.e., translated it back from Spanish into English, the *backward translation*). These steps ensured the precision of the translation. This member of the expert committee was also fluent in English. After this step, the three members of the expert committee who had translated the instrument (forward or backward) gathered together to discuss unclear wording, style, and format. Then, this latest version in Spanish was presented to the entire expert committee to be analyzed and refined.

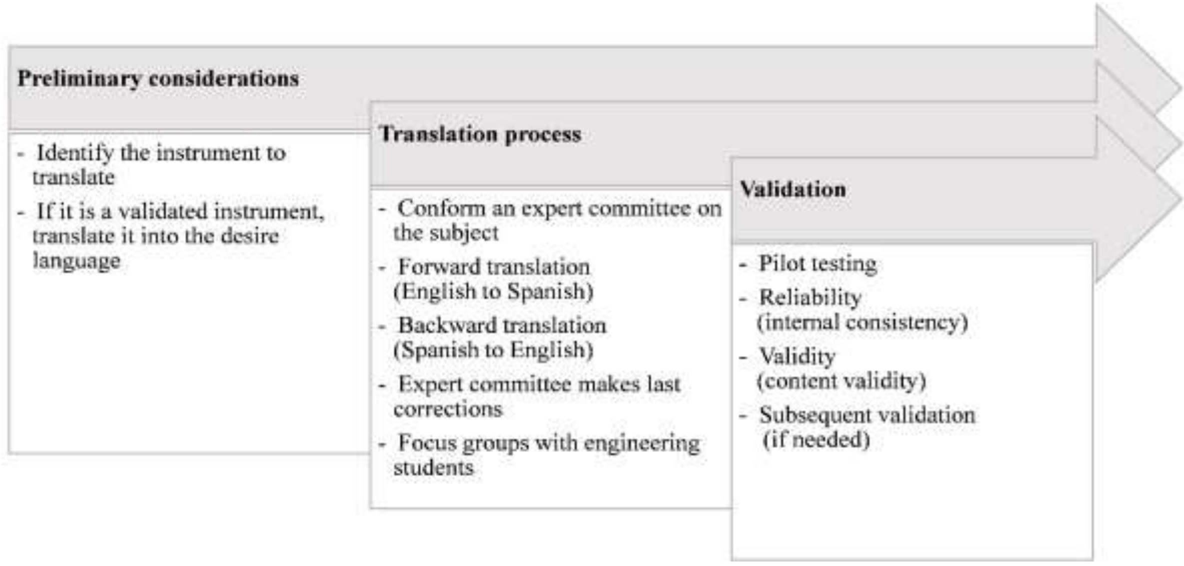

Figure 1. The process of translating the StRIP questionnaire translation into Spanish, adapted from [17].

The final version approved by the expert committee was discussed in two focus group sessions, one in Santiago and another in Viña del Mar. The participants were engineering students who volunteered to participate. In the sessions, these students answered the questionnaire and made annotations about any words or sentences they did not understand or were unsure about the meaning. In each of these sessions, the facilitator timed the students' responses to the instrument to have a time parameter for the pilot implementation. The facilitator waited until all the students finished before opening the discussion. The group facilitator addressed each section of the questionnaire to identify commonalities of student observations or questions. At the end of this task, the researchers who had facilitated both focus groups reviewed the annotations and reached a final Spanish version of the StRIP. This final version of the instrument included content and format and was implemented in the pilot testing as explained in the next section.

Data collection and analysis: Pilot testing

To validate the Spanish translation of the instrument, we ran a pilot test with a sample of 346 students who were in various semesters in the Engineering curricula. Before the implementation, we requested permission from the university administration to apply the survey to the students. We needed the instructors' agreement to implement the questionnaire since we were taking time from his/her class. One limitation of this study is that only some groups (classes) participated due to the teachers' availability or class time constraints during the collection period. It was intended that the students who participated were from various semesters and programs. Then, the questionnaires were administered in the last 20 minutes of the class. The authors of this work were responsible for assisting each group, explaining the instructions on how to respond, distributing the questionnaire to each student, and monitoring the time and the order of implementation. Finally, the responses were recorded in a spreadsheet and analyzed using the IBM SPSS® software.

Internal Consistency Reliability

The data collected from pilot testing served to evaluate the internal reliability (using Cronbach's alpha test). The coefficient alpha is commonly used to measure the internal consistency of the scales of a questionnaire. If the items are scored as continuous variables (strongly disagree to agree strongly), the alpha provides a coefficient to estimate the consistency of scores. The higher the score, the more reliable the generated scale is. According to [7] and [18], a coefficient of 0.6 or higher is acceptable to determine that a scale has internal consistency. Thus, for purposes of this study, we considered that the internal consistency of the questionnaire is strong if Cronbach's alpha is higher than 0.60. Scores for each subsection of the instruments are presented and discussed below.

Validity

The validity of a questionnaire is determined by analyzing whether the questionnaire content relates to what it is intended to measure. The content validity is the extent to which the items of the questionnaire represent all the possible questions [17] [18]. To validate the Spanish version of the StRIP questionnaire, we implemented the *Fehring model* [19]. This model consists of a selected panel of experts who determine the relevance of the topic and the areas to be evaluated using a Likert scale survey. The experts assign scores, and the proportions of those scores in each of the scale categories are used to arrive at the content validity index (CVI). Each of these particular indices is averaged; those with an average that does not exceed 0.8 are discarded. Finally, the instrument is edited definitively, considering the value of the CVI according to the parameter mentioned above. The Spanish version of the StRIP questionnaire maintained the same number of items as the original.

Results and Discussion

The students' responses to the questionnaire were analyzed to evaluate its internal reliability, using Cronbach's alpha test. In Table II, we report the results for each subscale of the survey.

TABLE II
CALCULATED CRONBACH'S ALPHA (α) IN THE SPANISH VERSION OF THE StRIP QUESTIONNAIRE, BY SUBSCALES

Section	Types of instruction (α)		Strategies for using in-class activities (α)		Students' response to instruction (α)	
Subscales	1. Interactive	.676	5. Explanation	.776	7. Value	.813
	2. Constructive	.741	6. Facilitation	.714	8. Positivity	.543
	3. Active	.748			9. Participation	.643
	4. Passive	.525			10. Distraction	.611
					11. Evaluation	.841

Table II summarizes the alpha coefficients obtained for each of the subscales. The subscales Passive (from the section Types of instruction) and Positivity (from the students' response to instruction section) are below the recommended benchmark of 0.60 [7] [18]. These low values motivated us to review the subscales with low-alpha coefficient items to refine the quality of the instrument translation. Since the Cronbach's alpha coefficient for the entire questionnaire was .920, indicating a strong internal consistency of our translated instrument, we decided to keep subscales 4 and 8 as part of the survey. However, we are preparing further investigations to have subsequent validations of the Spanish version of the StRIP. Moreover, the content validity test [19] applied to the translated version of the questionnaire was also successful, all the statement items had an average score of 0.8 or higher. This value means that the items of the Spanish StRIP are representative of the content that they are intended to measure.

In the analysis of the original instrument [7], the alpha coefficients obtained for each subscale were: Interactive, 0.80; Constructive, 0.77; Active, 0.73; Passive, 0.65; Explanation, 0.80; Facilitation, 0.71; Value, 0.87; Positivity, 0.72; Participation, 0.77; Distraction, 0.73; and Evaluation, 0.72. Even though Passive was over the benchmark, it was the lowest coefficient obtained among the subscales. This low value suggests that it is a subscale under a conflict that should be reevaluated.

Conclusions

This article has described the process of translation and the validation of an instrument to measure student responses to instructional practices (StRIP). This tool has three main sections: 1) types of instruction, 2) strategies for using in-class activities, and 3) student responses to instruction. Each section has subscales (there are eleven in total) that characterize essential aspects to consider when students take part in an activity. Our focus was on constructing a valid version of the StRIP in Spanish. According to the methodology applied to validate the translated instrument, we obtained an alpha coefficient of 0.920 for the entire questionnaire, indicating that the version of the StRIP in Spanish is internally consistent. This consistency will allow us to reach the objective of making longitudinal measurements that help us monitor the curricular innovation and teaching practices in the School of Engineering of the Universidad Andres Bello. Although we did not obtain the desired alpha coefficient in a couple of the subscales, we believe that with the appropriate corrections, this will be a robust assessment instrument enabling us to achieve our objective of longitudinal measurements.
In conclusion, the translated version of the StRIP into Spanish is a valid instrument. It passed the reliability and content validity tests, assuring confidence that it can be applied in future formal implementations to understand better students' responses to instructional practices in Spanish-speaking classrooms.

Future research

In our future research, we plan to apply the instrument to larger samples and other locations. Given the curricular innovation that has been taking place in the last couple of years at the Universidad Andres Bello, we plan to pursue a longitudinal study to assess students' responses over time and analyze the changes in teaching methodologies implemented by the faculty of the School of Engineering.

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References

[1] M. Christie and E. D. Graaff, "The philosophical and pedagogical underpinnings of Active Learning in Engineering Education," *Eur. J. Eng. Educ.*, vol. 42, no. 1, pp. 5–16, 2017.

[2] P. Shekhar, M. Demonbrun, M. Borrego, C. J. Finelli, M. Prince, C. Henderson, and C. Waters, "Development of an observation protocol to study undergraduate engineering student resistance to active learning," *Int. J. Eng. Educ.*, vol. 31, no. 2, pp. 597–609, 2015.

[3] A. Kirn and L. Benson, "Engineering Students Perceptions of Problem Solving and Their Future," *J. Eng. Educ.*, vol. 107, no. 1, pp. 87–112, 2018.

[4] S. Tharayil, M. Borrego, M. Prince, K. A. Nguyen, P. Shekhar, C. J. Finelli, and C. Waters, "Strategies to mitigate student resistance to active learning," *Int. J. STEM Educ*., vol. 5, no. 1, Dec. 2018.

[5] S. L. Eddy, M. Converse, and M. P. Wenderoth, "PORTAAL: A Classroom Observation Tool Assessing Evidence-Based Teaching Practices for Active Learning in Large Science, Technology, Engineering, and Mathematics Classes," *CBE Life Sci. Educ.*, vol. 14, no. 2, 2015.

[6] T. R. Hinkin, "A Brief Tutorial on the Development of Measures for Use in Survey Questionnaires," *Organ. Res. Methods*, vol. 1, no. 1, pp. 104–121, 1998.

[7] M. DeMonbrun, C. J. Finelli, M. Prince, M. Borrego, P. Shekhar, C. Henderson, and C. Waters, "Creating an Instrument to Measure Student Response to Instructional Practices," *J. Eng. Educ.*, vol. 106, no. 2, pp. 273–298, 2017.

[8] C. K. Y. Chan, Y. Zhao and L. Y. Y. Luk, "A Validated and Reliable Instrument Investigating Engineering Students' Perceptions of Competency in Generic Skills," *J. Eng. Educ.*, vol. 106, no. 2, pp. 299–325, 2017.

[9] E. Bergsmann, J. Klug, C. Burger, N. Först, and C. Spiel, "The Competence Screening Questionnaire for Higher Education: Adaptable to the needs of a study programme," *Assess. Eval. High. Educ.*, vol. 43, no. 4, pp. 537–554, 2018.

[10] T. R. Frame, S. M. Cailor, R. J. Gryka, A. M. Chen, M. E. Kiersma, and L. Sheppard, "Student Perceptions of Team-based Learning vs. Traditional Lecture-based Learning," *Am. J. Pharm. Educ.*, vol. 79, no. 4, p. 51, 2015.

[11] M. L. Moliner, T. Guraya, P. Lopez-Crespo, M. Royo, J. Gamez-Perez, M. Segarra, and L. Cabedo, "Acquisition of transversal skills through PBL: a study of the perceptions of the students and teachers in materials science courses in engineering," *Multidiscip. J. Educ. Social Technol. Sci.*, vol. 2, no. 2, p. 121, 2015.

[12] A. Dominguez, M. E. Truyol, and G. Zavala. "Faculty Development Program on Active Learning for Engineering Faculty in Chile: Sharing Step," in 2018 ASEE Annu. Conf. & Expo. Available: https://peer.asee.org/30509.

[13] A. Dominguez, M. E. Truyol, and G. Zavala. "Professional Development Program to Promote Active Learning in an Engineering Classroom," Int. J. Eng. Educ., vol. 35, no. 2, pp. 424–433, 2019.

[14] A. Dominguez, M. E. Truyol, and G. Zavala. "Students' Perception of Teaching Practice in an Active Learning Environment," in 2019 ASEE Annu. Conf. & Expo. Available: https://peer.asee.org/33315

[15] M. T. H. Chi and R. Wylie, "The ICAP Framework: Linking Cognitive Engagement to Active Learning Outcomes," *Educ. Psychol.*, vol. 49, no. 4, pp. 219–243, 2014.

[16] S. Chasteen. "Measuring and education. improving students' engagement." Science geek girl. Explorations and inspirations in science https://blog.sciencegeekgirl.com/2014/11/02/measuring-and-improving-students-engagement/ (accessed Dec. 15, 2019).

[17] S. Tsang, C. F. Royse, and T. A. Sulieman, "Guidelines for developing, translating, and validating a questionnaire in perioperative and pain medicine," *Saudi J. Anesth.*, vol. 11, no. 5, pp. 80-89, 2017.

[18] W. Creswell, *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research*, 4th ed. Boston: Pearson, 2012.

[19] E. M. Urrutia, A. S. Barrios, N. M. Gutierrez, & C. M. Mayorga. "Optimal method for content validity," *Rev. Cuba. Educ. Med. Super.*, vol. 28, no. 3, pp. 547–558, 2015.

Appendix

Encuesta de opinión sobre la práctica docente

Nombre: ____ RUT: ______________

Profesor/a: ____

Sexo: (M) (F) Ramo: ________________________________

Carrera: ____

Instrucciones: Lee cuidadosamente cada pregunta y enunciado. Marca con una "X" la respuesta que consideres adecuada a tu caso. Nota: *Esta es una encuesta de opinión, no hay respuestas correctas o incorrectas.*

1) En este curso, cuando el profesor/a te pidió realizar una actividad en clase (ej. resolver problemas en grupo, discutir conceptos con tus compañeros, entre otras), ¿con qué frecuencia reaccionaste de la siguiente forma?	1. Casi nunca (<10% del tiempo) 2. Raramente (~30% del tiempo) 3. En ocasiones (~50% del tiempo) 4. Frecuentemente (~70% del tiempo) 5. Muy frecuentemente (>90% del tiempo)				
a. No me gustó la actividad.	1	2	3	4	5
b. En la actividad no participé de manera real.	1	2	3	4	5
c. Puse el mínimo esfuerzo en la actividad.	1	2	3	4	5
d. Tuve una actitud positiva hacia el profesor.	1	2	3	4	5
e. Me esforcé al máximo para realizar un buen trabajo.	1	2	3	4	5
f. Distraje a mis compañeros durante la actividad.	1	2	3	4	5
g. Fingía que participaba en la actividad.	1	2	3	4	5

h. Sentí que el esfuerzo de realizar la actividad valió la pena.	1	2	3	4	5
i. Participé activamente (o intenté hacerlo).	1	2	3	4	5
j. Conversé con mis compañeros sobre otros temas que no se relacionaban con la actividad.	1	2	3	4	5
k. Sentí que el profesor era empático conmigo.	1	2	3	4	5
l. Pude apreciar que el realizar la actividad tenía un valor para mí.	1	2	3	4	5
m. Sentí que el tiempo dedicado a la realización de la actividad fue beneficioso.	1	2	3	4	5
n. Disfruté realizar la actividad.	1	2	3	4	5
o. Hice otras cosas en lugar de realizar la actividad (ej.: ver sitios web que no respondan a una tarea en específico, o usar las redes sociales por interés puramente personal).	1	2	3	4	5
p. Expresé al profesor mis críticas que tenía sobre la actividad.	1	2	3	4	5
q. Pasé muy rápido y de manera muy superficial por la actividad.	1	2	3	4	5
r. Consideré evaluar de manera negativa al profesor del curso.	1	2	3	4	5
s. Me quejé con mis compañeros sobre la actividad.	1	2	3	4	5

2) En este curso, cuando el profesor/a te pidió realizar una actividad en clase (ej. Resolver problemas en grupo, discutir conceptos con tus compañeros, entre otras.), ¿con qué frecuencia el profesor/a hizo lo siguiente?	1. Casi nunca (<10% del tiempo) 2. Raramente (~30% del tiempo) 3. En ocasiones (~50% del tiempo) 4. Frecuentemente (~70% del tiempo) 5. Muy frecuentemente (>90% del tiempo)				
a. Explicó claramente qué esperaba que yo realizara en la actividad.	1	2	3	4	5
b. Explicó claramente el propósito de la actividad.	1	2	3	4	5
c. Explicó cómo la actividad se relacionaba con mi aprendizaje.	1	2	3	4	5
d. Pidió mi opinión y/o la de mis compañeros acerca de la actividad.	1	2	3	4	5
e. Usó actividades que presentaban el correcto nivel de dificultad (ni muy fácil ni muy difícil).	1	2	3	4	5
f. Se movió por la sala de clases para ayudarme o ayudar a mi grupo con la actividad si era necesario.	1	2	3	4	5
g. Su actitud involucró a los estudiantes en la actividad.	1	2	3	4	5
h. Me dio una cantidad adecuada de tiempo para involucrarme en la actividad.	1	2	3	4	5

3) Indica la frecuencia con la cual llevaste a cabo las siguientes acciones durante este curso. Tomando en cuenta que, en promedio, en el semestre se llevan a cabo *30 clases*.	1. Casi nunca (<10% del tiempo) 2. Raramente (~30% del tiempo) 3. En ocasiones (~50% del tiempo) 4. Frecuentemente (~70% del tiempo) 5. Muy frecuentemente (>90% del tiempo)				
a. Escuchar al profesor explicando el contenido de manera expositiva.	1	2	3	4	5
b. Pensar diferentes soluciones para un problema determinado.	1	2	3	4	5
c. Buscar información adicional no proporcionada por el profesor para completar las tareas.	1	2	3	4	5
d. Trabajar en grupos para completar tareas u otros proyectos.	1	2	3	4	5
e. Realizar presentaciones individuales en la clase.	1	2	3	4	5
f. Ser calificado por mi participación en clase.	1	2	3	4	5
g. Estudiar contenido del curso con compañeros fuera de la clase.	1	2	3	4	5
h. Asumir la responsabilidad de estudiar y aprender con otro material por mi cuenta.	1	2	3	4	5
i. Discutir conceptos con mis compañeros durante la clase.	1	2	3	4	5
j. Realizar y justificar supuestos cuando no se provee toda la información.	1	2	3	4	5
k. Obtener la mayor parte de la información necesaria para resolver las tareas directamente del profesor/a.	1	2	3	4	5
l. Ser calificado en base al desempeño de mi grupo.	1	2	3	4	5
m. Revisar conceptos antes de la clase mediante lecturas, videos, etc.	1	2	3	4	5
n. Resolver problemas en grupo durante la clase.	1	2	3	4	5
o. Resolver problemas individualmente durante la clase.	1	2	3	4	5
p. Responder preguntas del profesor o profesora durante la clase.	1	2	3	4	5
q. Preguntar al profesor o profesora durante la clase.	1	2	3	4	5
r. Tomar la iniciativa para identificar qué es lo que necesito aprender.	1	2	3	4	5
s. Observar al profesor o profesora resolviendo problemas.	1	2	3	4	5
t. Resolver problemas que tienen más de una respuesta correcta.	1	2	3	4	5
u. Realizar actividades prácticas (usar equipamiento, material, sensores, etc.) en grupo durante la clase.	1	2	3	4	5

4) Indica la frecuencia con la cual TE GUSTARÍA llevar a cabo las siguientes acciones, considerando que un curso fuera diseñado tomando en cuenta TU OPINIÓN. Toma en cuenta que, en promedio, en el semestre se llevan a cabo *30 clases*.	1. Casi nunca (<10% del tiempo) 2. Raramente (~30% del tiempo) 3. En ocasiones (~50% del tiempo) 4. Frecuentemente (~70% del tiempo) 5. Muy frecuentemente (>90% del tiempo)				
a. Escuchar al profesor explicando el contenido de manera expositiva.	1	2	3	4	5
b. Pensar diferentes soluciones para un problema determinado.	1	2	3	4	5
c. Buscar información adicional no proporcionada por el profesor para completar las tareas.	1	2	3	4	5
d. Trabajar en grupos para completar tareas u otros proyectos.	1	2	3	4	5
e. Realizar presentaciones individuales en la clase.	1	2	3	4	5
f. Ser calificado por mi participación en clase.	1	2	3	4	5
g. Estudiar contenido del curso con compañeros fuera de la clase.	1	2	3	4	5
h. Asumir la responsabilidad de estudiar y aprender con otro material por mi cuenta.	1	2	3	4	5
i. Discutir conceptos con mis compañeros durante la clase.	1	2	3	4	5
j. Realizar y justificar supuestos cuando no se provee toda la información.	1	2	3	4	5
k. Obtener la mayor parte de la información necesaria para resolver las tareas directamente del profesor/a.	1	2	3	4	5
l. Ser calificado en base al desempeño de mi grupo.	1	2	3	4	5
m. Revisar conceptos antes de la clase mediante lecturas, videos, etc.	1	2	3	4	5
n. Resolver problemas en grupo durante la clase.	1	2	3	4	5
o. Resolver problemas individualmente durante la clase.	1	2	3	4	5
p. Responder preguntas del profesor o profesora durante la clase.	1	2	3	4	5
q. Preguntar al profesor o profesora durante la clase.	1	2	3	4	5
r. Tomar la iniciativa para identificar qué es lo que necesito aprender.	1	2	3	4	5
s. Observar al profesor o profesora resolviendo problemas.	1	2	3	4	5
t. Resolver problemas que tienen más de una respuesta correcta.	1	2	3	4	5
u. Realizar actividades prácticas (usar equipamiento, material, sensores, etc.) en grupo durante la clase.	1	2	3	4	5

5) Por favor, califica el nivel de acuerdo con las siguientes afirmaciones (para este curso en particular).	1. Completamente en desacuerdo 2. En desacuerdo 3. Ni de acuerdo ni en desacuerdo 4. De acuerdo 5. Completamente de acuerdo				
a. En general, este fue un excelente curso.	1	2	3	4	5
b. En general, el profesor/a fue excelente.	1	2	3	4	5
c. Recomendaría este profesor/a a otros estudiantes.	1	2	3	4	5

Recuerda: Cuando se dice "actividad en clase", se refiere a resolver problemas en grupo, discutir conceptos con tus compañeros, entre otras.

6) ¿En cuántos de tus cursos de la universidad el profesor/a te pidió que hicieras una actividad de este tipo en clase, al menos una vez a la semana? Selecciona sólo una casilla.

a. En todos mis cursos de la universidad.	☐
b. En casi todos mis cursos de la universidad.	☐
c. En aproximadamente la mitad de mis cursos de la universidad.	☐
d. En algunos de mis cursos de la universidad.	☐
e. En ninguno de mis cursos de la universidad.	☐

Comentarios:

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