

<https://doi.org/10.23913/ride.v14i28.1816>

Scientific articles

La autoevaluación como instrumento para desarrollar el aprendizaje autónomo en los alumnos de posgrado

Self-assessment as an instrument to develop autonomous learning in postgraduate students

Autoavaliação como instrumento para desenvolver a aprendizagem autônoma em estudantes de pós-graduação

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Resumen

El objetivo de esta investigación fue implementar la autoevaluación como instrumento para desarrollar el aprendizaje autónomo en los alumnos de posgrado. La metodología que se utilizó fue cuantitativa, y su diseño transversal y no experimental, mientras que el alcance fue exploratorio y descriptivo. Como técnica de investigación se utilizó el estudio de caso y la muestra fue probabilística y estratificada. Los resultados obtenidos guían y facilitan el proceso de autoevaluación de los alumnos de posgrado para desarrollar el aprendizaje autónomo que incide positivamente en su aprendizaje. A la vez, la pertinencia de los resultados obtenidos radica en la valoración de los logros del alumnado en sus habilidades metodológicas, de operacionalización, de



divulgación y digitales, sobre la base de la autoevaluación como mecanismo para desarrollar su capacidad reflexiva y autocrítica. Los resultados expuestos también promueven moderadamente la comprensión de la complejidad de la autoevaluación y su relación con el proceso de aprendizaje. Se concluye, por tanto, que la autoevaluación es una herramienta adecuada, puesto que se ajusta a las características de madurez de los alumnos de posgrado para reconocer sus fortalezas y debilidades en su aprendizaje, al mismo tiempo les permite conocerse al autoevaluarse. También se concluye que la autoevaluación tiene que formar parte en el proceso de aprendizaje, ya que ayuda a los alumnos a ser autocríticos, reflexivos y los encamina hacia el aprendizaje autónomo por medio del desarrollo de habilidades cognitivas y metacognitivas para autodirigir y autorregular su aprendizaje.

Palabras clave: autoevaluación, aprendizaje autónomo, autorregulación, metacognición, posgrado.

Abstract

The objective of this research was to implement self-assessment as an instrument to develop autonomous learning in postgraduate students. The methodology used was quantitative. Its design was cross-sectional and non-experimental. The scope was exploratory and descriptive. The case study was used as a research technique. The results obtained guide and facilitate the self-assessment process of postgraduate students to develop autonomous learning that positively affects their learning. At the same time, the relevance of the results obtained lies in the assessment of the student's achievements in their methodological, operationalization, dissemination, and digital skills, based on self-assessment as a mechanism to develop their reflective and self-critical capacity. The exposed results also moderately promote the understanding of the complexity of self-assessment and its relationship with the learning process. It is concluded that self-assessment is an appropriate tool since it is by the maturity characteristics of postgraduate students to recognize their strengths and weaknesses in their learning, at the same time it allows them to know themselves when self-assessing. It is also concluded that self-assessment must be part of the learning process since it helps students to be self-critical, and reflective and leads them towards autonomous learning through the development of cognitive and metacognitive skills to self-direct and self-regulate their learning.

Keywords: Self-assessment, autonomous learning, self-regulation, metacognition, postgraduate.

Resumo

O objetivo desta pesquisa foi implementar a autoavaliação como instrumento para desenvolver a aprendizagem autônoma em estudantes de pós-graduação. A metodologia utilizada foi quantitativa e seu desenho foi transversal e não experimental, enquanto o escopo foi exploratório e descritivo. O estudo de caso foi utilizado como técnica de pesquisa e a amostra foi probabilística e estratificada. Os resultados obtidos orientam e facilitam o processo de autoavaliação dos alunos de pós-graduação para desenvolver uma aprendizagem autônoma que afeta positivamente a sua aprendizagem. Ao mesmo tempo, a relevância dos resultados obtidos reside na avaliação do aproveitamento dos alunos nas suas competências metodológicas, de operacionalização, de divulgação e digitais, assentes na autoavaliação como mecanismo para desenvolver a sua capacidade reflexiva e autocrítica. Os resultados apresentados também promovem moderadamente a compreensão da complexidade da autoavaliação e sua relação com o processo de aprendizagem. Conclui-se, portanto, que a autoavaliação é uma ferramenta adequada, pois se ajusta às características de maturidade dos pós-graduandos para reconhecer seus pontos fortes e fracos em sua aprendizagem, ao mesmo tempo que permite que eles se conheçam por meio da autoavaliação. Conclui-se também que a autoavaliação tem que fazer parte do processo de aprendizagem, pois ajuda os alunos a serem autocríticos, reflexivos e direciona-os para uma aprendizagem autônoma através do desenvolvimento de competências cognitivas e metacognitivas para se autodirigir e autorregular seu aprendizado.

Palavras-chave: autoavaliação, aprendizagem autônoma, autorregulação, metacognição, pós-graduação.

Reception Date: August 2023

Acceptance Date: February 2024

Introduction

Assessments as instruments aim to function not only as indicators in student learning (Chen and Bonner, 2020) but also as a form of feedback to students in their learning process (McIver and Murphy, 2023). However, sometimes the evaluation is perceived only as an administrative procedure that has to be carried out (Nieminen, 2021), on some occasions, without providing the necessary relevance to this very important substantive function.

The evaluation bases its importance on feedback for both students and teachers (Rickey *et al.*, 2023) since it represents an opportunity to improve learning in both senses: from the teacher to the student and vice versa (Peinado, Montoy and Cruz, 2021; Yan and Carless, 2022). In this process, an evaluator, an evaluated person, and the type of evaluation used to intervene. The



evaluator is the person who issues a specific estimate, based on the learning status of the evaluated person, while the evaluated person is the person who receives the assessment through an instrument designed for this purpose, finally, the type of evaluation is the means that will be used to measure the learning of the evaluated person.

In addition to the above, evaluation can be classified into three types: hetero-evaluation, when the teacher evaluates the student; co-evaluation, when a student evaluates another student with the supervision of the teacher as a mediator, and self-evaluation, in which the student evaluates himself, also with the supervision of the teacher (Yan, 2020). The present research emphasizes the latter to determine how the student perceives their own learning, which also serves to develop autonomous learning in graduate students. Next, autonomous learning is briefly discussed, and then self-assessment, the two central topics in this investigation.

Autonomous Learning

Broadly speaking, two elements make up autonomous learning. The first of them is autonomy, which, in a broad sense, means acting according to one's beliefs, interests, and values (Černochová and Selcuk, 2020). The degree of autonomy associated with self-regulation of behavior is, in turn, of great importance for performance, persistence, well-being, and even for regulating motivation (Paradowski and Jelińska, 2023; Basri, 2023). Consequently, confidence in deciding encourages students to engage in independent behaviors.

The second is metacognition, which can be conceptualized as the reasoning of one's own thought process to make decisions and redirect those that have already been made. In short, it is the organization of learning through planning (Černochová and Selcuk, 2020), that is, the ability to be reflective about what is learned, what is known, and what is needed to know or learn. Metacognition is made up of three phases. In the first, the results that are expected to be obtained are predicted by planning how they will be achieved. In the second, the development of the activities is organized and directed in which the necessary changes are introduced to achieve the proposed results. Third, the evaluation of the objectives is carried out as they are achieved or, failing that, the required changes are made (Kwarikunda *et al.*, 2022; Stebner *et al.*, 2022). In short, metacognition is a complex organizational process that happens while learning.

In any case, students can carry out metacognitive processes when they undertake a task, solve a problem, or make a decision. Sometimes they do it spontaneously with mechanized, non-reflective, or previously planned knowledge. This can lead to favorable results, but it makes it

impossible for them to be attentive to change. Likewise, if this is transferred to a learning scenario, there is a risk of obtaining the same result, but through a more laborious and complicated path.

On the other hand, the term *autonomous learning* has been conceptualized from different perspectives. Some authors like Uus *et al.* (2022) consider that it refers to taking the initiative, defining one's own learning needs, setting goals, deciding on sources, as well as choosing, applying, and making appropriate changes. For Kinsella *et al.* (2023) autonomous learning is multidimensional since it encompasses the ability to regulate thoughts and behaviors, as well as the ability to establish a sense of self-knowledge.

For their part, Rahman *et al.* (2022) and Peinado (2021) establish that autonomous learning in students is influenced by the encouragement of teachers and, also by the ability of students to exercise their own autonomy with the skills and willingness to put it into practice. Returning to what was mentioned in the lines above, autonomous learning is achieved by reflecting on the cognitive process itself, as well as applying actions to complete it.

Self-assessment of learning

A previous step in the self-assessment of learning is self-regulation, which has two aspects: the first is cognitive and metacognitive; The second is affective-motivational. In the first, basic cognitive functions are processed to higher-order metacognitive functions. Logical, critical, and reflective thinking skills, analysis, synthesis, planning, organizing, and controlling the execution of activities, as well as regulating attention and concentration are developed (Uus *et al.*, 2022). In the second aspect, metacognitive self-knowledge functions are carried out to recognize strengths and areas for improvement (Yan and Carless, 2022). This involves motivation, autonomy, self-confidence, discipline, frustration tolerance, resilience, and self-esteem. As can be seen, two dimensions are constituted to form a transcendent element in self-evaluation.

On this topic, Rickey *et al.* (2023) identifies seven types of student self-assessment activities: a) self-documentation; b) reflection; c) express metacognitive processes; d) testing and review; e) setting objectives; f) self-diagnosis; and g) interactional self-assessment. For Nieminen (2021) student self-assessment is promoted as a formative assessment practice that drives learning and self-regulation, which also encourages student reflection and self-direction.

Carroll (2020) establishes that self-assessment forms a criterion as a mechanism to develop an evaluative appreciation and the individual's ability to attend to and respond to feedback about their learning, while Alt and Raichel (2021) indicate that self-assessment mainly implies that students make assessments about their achievements and the results of their learning since it can

be used as a formative assessment method. In contrast, Li *et al.* (2023) state that student self-assessment highlights the importance of honestly recognizing strengths and weaknesses, which facilitates learning and progress in a self-regulated manner.

On the other hand, Fletcher (2022) refers to the fact that student participation in self-assessment is a co-regulatory process focused on the development of students' skills within their development and training. This means that students who self-evaluate effectively often learn better and create awareness of their learning, which helps them as a truly self-critical instrument (Yan *et al.*, 2020) because it helps them develop their ability to make evaluative assessments, reflective, and prudent (McIver and Murphy, 2023). In addition, it leads them to improve their levels of self-direction and motivation in learning.

Additionally, self-assessment processes in learning interact dynamically for both teachers and students (Rickey *et al.*, 2023). These interactions cover the entire breadth of purposes in the evaluation, from its planning to its final feedback (Chen and Bonner, 2020). For this reason, promoting student self-assessment must be a joint effort between students and teachers (Fletcher, 2022; Peinado, Montoy & Cruz, 2021). In other words, autonomous learning through autonomy and metacognition is a complex self-regulation process that guides and helps the student in their learning, hence self-assessment is a means or tool to develop it.

In this way, self-assessment as a metacognitive tool consists of organizing what is going to be done, controlling its execution, and evaluating the results, for which self-knowledge must be considered as an additional ingredient to recognize strengths and weaknesses. This is mainly based on providing the student with a guide with which they discover their abilities and develop as a person, regardless of the knowledge acquired. Therefore, self-assessment becomes a very personal point of view of the student, which invites them to consider the interests and attitudes of each one of them.

Student self-assessment is also a central aspect of evaluation that has been studied from various approaches, although it still plays a minor role in evaluations that value test results over critical reflection. Usually, students are immersed in the same type of evaluations by teachers who report on their performance. For teachers, it is a way to observe the progress and knowledge acquired or assimilated by the students. However, it is rare for teachers to implement assessments that allow students to understand whether learning is taking place. In other words, a process is needed that allows students to become aware of the skills and abilities acquired and reflect on their learning in a self-critical and autonomous way. Therefore, it is important to inquire about self-assessment, as well as its characteristics, practices, and its relationship with learning.

Considering what was explained above, the following research question was formulated: By implementing self-assessment as an instrument, can autonomous learning be developed in postgraduate students? To answer this question, it was necessary to produce real situations for student reflection, identifying and analyzing related information, and then culminating in examining and interpreting the perception of their learning. In congruence with the above, the objective of this investigation was to implement self-assessment as an instrument to develop autonomous learning in graduate students.

Method

The methodology used in this research was quantitative and was used to explain the causes of changes through objective measurement and statistical analysis. Regarding the design, it was transversal and non-experimental, as well as transversal, since the data were collected from a group of people at a single specific time. Likewise, it was non-experimental because it was based on events that occurred in reality without any direct intervention.

Regarding the scope, it was exploratory and descriptive: the first was aimed at determining which were the relevant concepts of the phenomenon that was investigated, while the second was focused on thoroughly characterizing the phenomenon studied channeled towards the central variables (Guerrero and Guerrero, 2020; Hairstyle, 2020). With this design, the self-assessment trends of research skills in postgraduate students and their impact on autonomous learning were specified.

As a research technique, the case study was used to identify relationships between variables and establish the specific characterization of the phenomenon studied. Case studies, by definition, examine and analyze in depth the interaction of the factors that cause changes, which serves to contribute to the knowledge of individuals, groups, and phenomena in organizations (Peinado, 2023).

Participants

The population under study was made up of students from the Postgraduate Program in Advanced Technology of the Technological Research and Innovation Center of the National Polytechnic Institute, located in Mexico City, Mexico (Peinado, 2023). The population was 60 students enrolled in the January-June 2023 semester. The sample was probabilistic and stratified. It was structured with 31 students: 24 master's students and 7 doctoral students, of which 58% were male and 48% female. It is prudent to specify that gender was only established as a characteristic

of the sample. Furthermore, in this article, the masculine “student” was used to make it more fluid to read, without gender prejudice.

Research instrument

The research instrument was a questionnaire based on the Likert scale. The judgment of three experts was also used to optimize the criteria of sufficiency, clarity, coherence, and relevance in its writing (Zamora *et al.*, 2020). For reliability, Cronbach's alpha coefficient was calculated, and the value of 0.94 was obtained, which was interpreted as an appropriate indicator that ensured the certainty and quality of the instrument (Barbera *et al.*, 2021; Rodríguez-Rodríguez and Reguant-Álvarez, 2020). Likewise, it was chosen to measure research skills as parameters to quantify the students' self-assessment, since they affect their acquired knowledge and skills and are directly related to their learning. Based on the above, research skills were classified into four categories: I) methodological skills, II) operationalization skills, III) dissemination skills, and IV) digital skills. There were 25 items, and they were measured through five response levels, from completely satisfied (five) to neither satisfied nor dissatisfied (one). Its coding is shown in table 1.

Table 1. Coding of responses

No.	Response levels	Worth	Code
1.	Totally satisfied	5	R1
2.	Partially satisfied	4	R2
3.	Neither satisfied nor dissatisfied	3	R3
4.	Partially dissatisfied	2	R4
5.	Totally dissatisfied	1	R5

Source: self-made

Data collection

To gather the data, a list of the student's emails was created. Subsequently, they were invited to respond to the online questionnaire via an electronic link. In total, 31 students responded: 24 master's degrees and 7 doctoral students. The application of the questionnaire was carried out from January to June 2023. To reduce the level of subjectivity of the responses in the survey, they were anonymous. It is appropriate to mention that the participants were informed in advance of the purpose of the study, how the information collected would be used, as well as the purpose of the research. Participants had the option to decline to participate in the study. Additionally, they were informed about the privacy and confidentiality of their information, so no sensitive data was collected. This was done with prior notice in the questionnaire, before beginning to answer it.

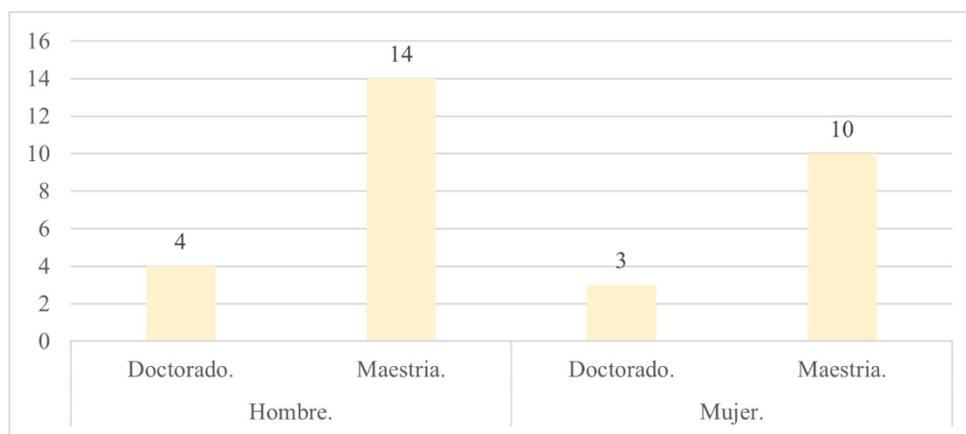
Statistical analysis

After obtaining the data from the online questionnaire, the information was entered into the SPSS computer program (Statistical Package for the Social Sciences) with which descriptive and inferential statistics were used to carry out the statistical inquiry (George and Mallery, 2021; Rodríguez-Rodríguez and Reguant-Álvarez, 2020). Similarly, percentages were obtained, and the interpretation of the results was carried out with which the corresponding tables and graphs were prepared. The findings are presented below.

Results

In the first stage of the investigation, the characteristics of the students who participated in the study were determined. Regarding the proportion by program and gender, 77% had a master's degree and 23% had a doctorate. Their gender distribution was 58% men and 48% women. This information is presented in figure 1.

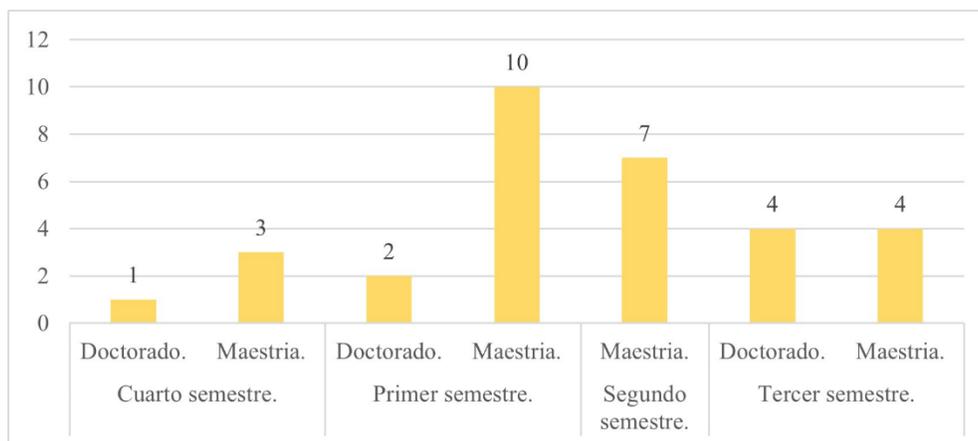
Figure 1. Proportion by program and gender



Source: self-made

Regarding the semester they were studying, in the master's degree, 32% were in the first semester, 23% in the second, 13% in the third, and 10% in the fourth. In the doctorate, 6% were in the first year, 13% in the third year, and 3% in the fourth year. These data are presented in figure 2.

Figure 2. Distribution by semester

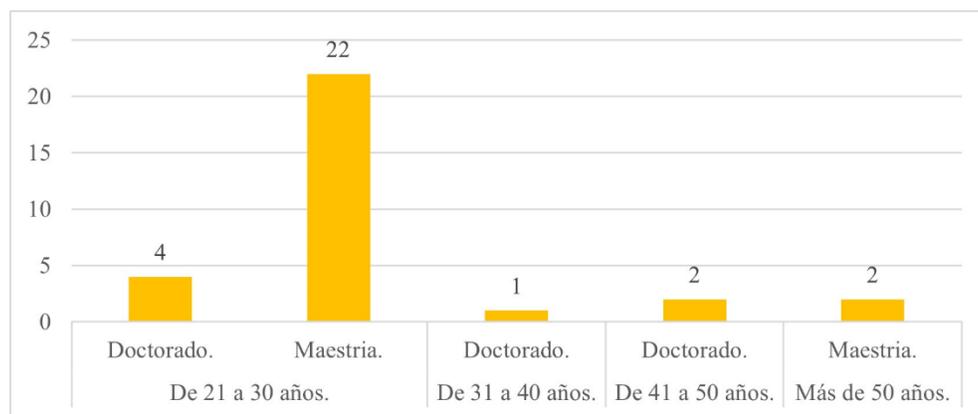


Source: self-made

It is worth mentioning that the proportion by program and gender, as well as the distribution by semester, are data that help illustrate the configuration of the research.

About the age of the participants, was established by four intervals. The first of them was 21 to 30 years old with a percentage of 84%. The second was 31 to 40 years old with a percentage of 3%. The third was 41 to 59 years old with a percentage of 6%. Finally, more than 50 years with a percentage of 6%. These quantities are shown in figure 3.

Figure 3. Age intervals



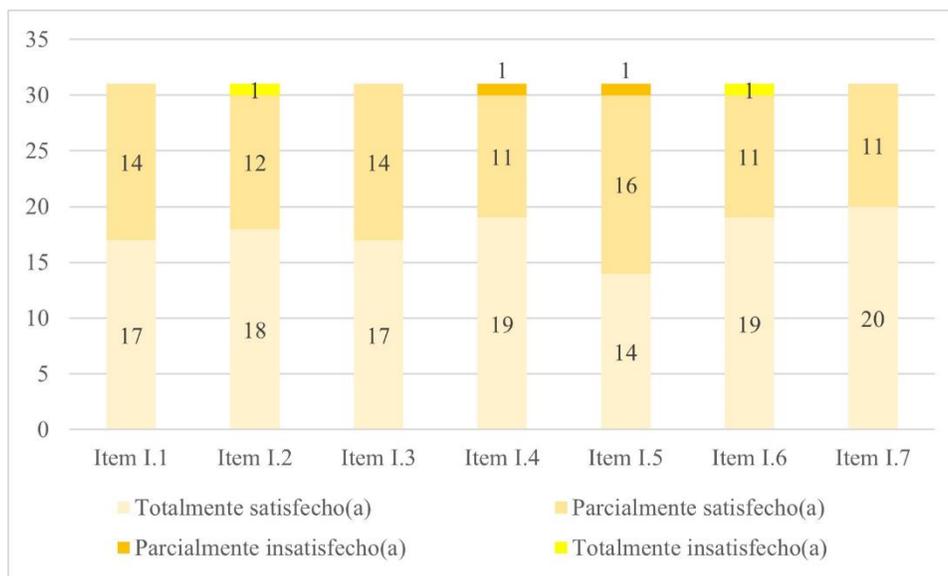
Source: self-made

According to Carroll (2020), the population selected to apply self-assessment involves considering their maturity to be self-reflective and critical about their learning. In this investigation, the age of the master's and doctoral students was considered as a factor that positively influenced the research.

After establishing the characterization of the participating students, the next stage was to quantify the students' responses. The first category examined was methodological skills. 57%

stated that they were completely satisfied, 41% partially satisfied, 0% neither satisfied nor dissatisfied, and, finally, partially dissatisfied as well as totally dissatisfied. with 1%, respectively. The data for these percentages are shown in figure 4.

Figure 4. Self-assessment of methodological skills

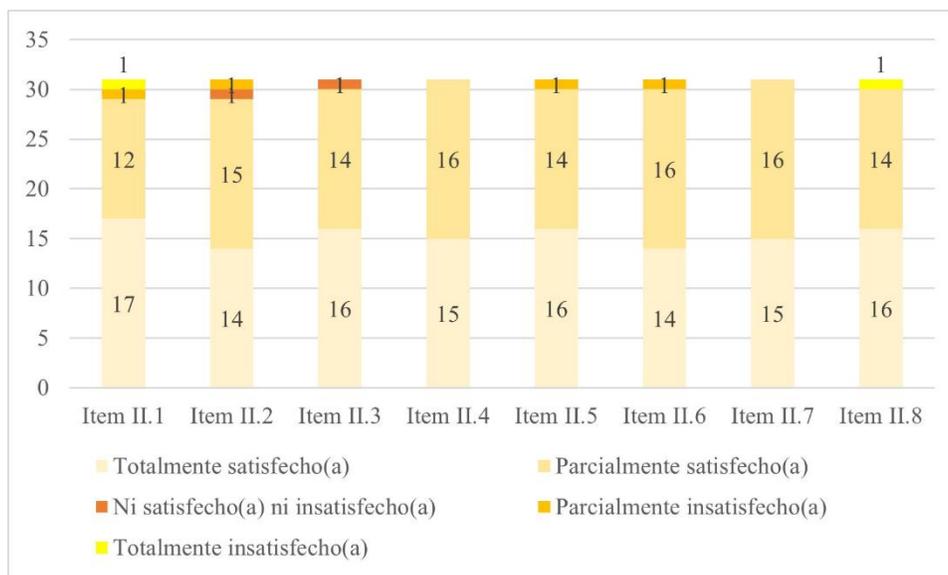


Source: self-made

The results obtained in the self-assessment of methodological skills converge with those found by Li *et al.* (2023) and Kinsella *et al.* (2023) concerning promoting students' awareness of their strengths and weaknesses. Likewise, autonomous learning of students is encouraged by facilitating self-knowledge, promoting self-direction, and promoting integration with oneself.

Regarding the self-assessment of operationalization skills, 49% of the students indicated being completely satisfied, 47% partially satisfied, 1% neither satisfied nor dissatisfied, 2% partially dissatisfied and 1% totally dissatisfied. The number of responses per item is shown in figure 5.

Figure 5. Self-assessment of operationalization skills

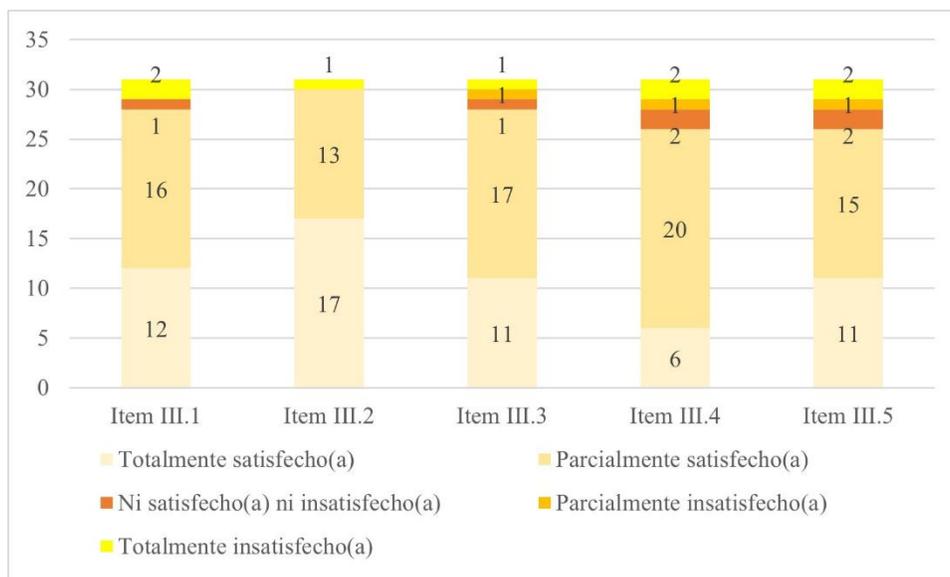


Source: self-made

The results presented in figure 5 confirm what was found by both Fletcher (2022) and Yan and Carless (2022) regarding that with self-assessment students reflect, and make proactive, intentional, and constructive contributions to their own learning so that they make contributions to their own development. In addition, they positively encourage feedback, since it has implications for their learning.

In relation to the self-assessment of dissemination skills, 37% of the students stated that they were totally satisfied, 52% were partially satisfied, 4% were neither satisfied nor dissatisfied, 2% were partially dissatisfied and 5% were totally dissatisfied. The quantities with which these percentages were obtained are seen in figure 6.

Figure 6. Self-assessment of dissemination skills

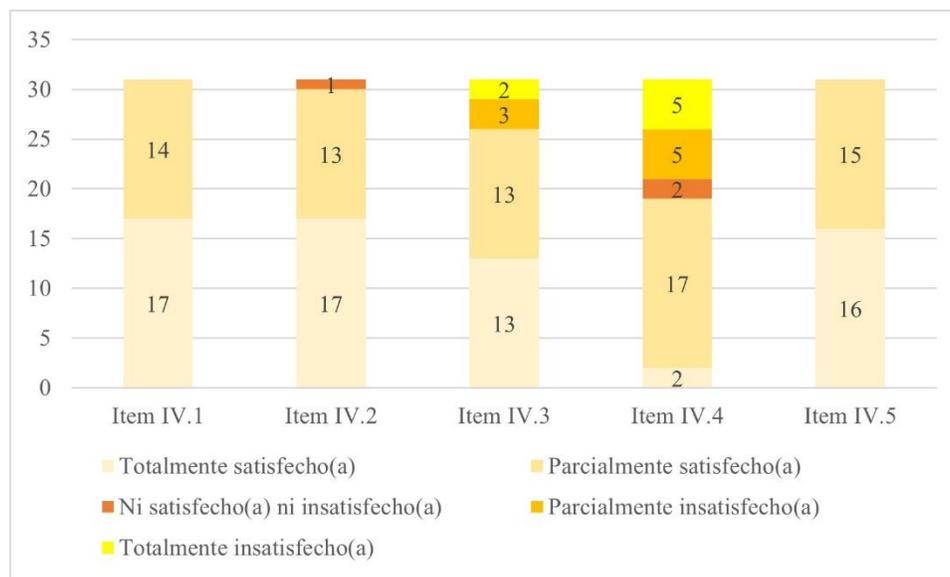


Source: self-made

The results shown in the self-assessment of disclosure skills show a lower level of satisfaction compared to the other categories, which is moderately acceptable. Given this, we agree with what was indicated by Uus *et al.* (2022) referring to the fact that learning has to involve students from the perspective of knowledge, and also from its use to its possible application. This requires that students have skills that involve self-reflection and self-criticism of their own level of learning, since—according to Tran *et al.* (2022), the implementation of these arguments leads to the recognition that one has to learn autonomously to be aware and prepared to make independent decisions and adapt appropriately to real learning situations.

Regarding the self-assessment of digital skills, 42% of the students stated that they were completely satisfied, 46% were partially satisfied, 2% were neither satisfied nor dissatisfied, 5% were partially dissatisfied (a) and 5% were totally dissatisfied. This information is presented in figure 7.

Figure 7. Self-assessment of digital skills



Source: self-made

For the self-assessment of digital skills, comparable results were found with studies of Alt and Raichel (2021) regarding the use of digital tools to facilitate the development of autonomous learning skills by students. In accordance with Černochová and Selcuk (2020) and Peinado (2023), digital skills also imply autonomous learning because they are developed when students solve difficulties they encounter when using tools to collect and analyze information for their research. In this process digital skills allow students to direct their own learning, as students select tools and gather resources to organize, create, and shape their content and learning tasks to learn more effectively and efficiently.

In the third stage, the self-assessment percentages of the items were calculated with the purpose of specifying the percentage of students' responses to each of them. This also allowed for a broader overview of self-assessment. Table 2 shows these figures.

Table 2. Percentages of self-assessment of the items

Categories	Items	R1	R2	R3	R4	R5
I. Methodological skills	I.1. I can perceive problems in my environment.	55%	45%	-	-	-
	I.2. I can formulate a problem statement.	61%	39%	-	-	3 %
	I.3. I master how to structure research questions.	45%	55%	-	-	-
	I.4. I can develop the objectives of an investigation.	61%	35%	-	3 %	-
	I.5. I can propose hypotheses.	45%	52%	-	3 %	-
	I.6. I know how to develop the theoretical framework.	61%	35%	-	-	3 %
	I.7. I understand the usefulness of the theoretical framework.	65%	35%	-	-	-
II. Operationalization skills	II.1. I know how to distinguish the focus of an investigation.	55%	39%	-	3 %	3 %
	II.2. I can distinguish the types of study.	45%	48%	3 %	3 %	-
	II.3. I differentiate research designs.	52%	45%	3 %	-	-
	II.4. I know how to differentiate the types of sampling.	48%	52%	-	-	-
	II.5. I can develop a research instrument.	52%	45%	-	3 %	-
	II.6. I master techniques for data collection.	45%	52%	3 %	-	-
	II.7. I understand how to interpret results.	52%	48%	-	-	-
	II.8. I understand how to write conclusions.	45%	52%	-	-	3 %
III. Outreach skills	III.1. I know how to write research manuscripts.	39%	52%	3 %	-	6%
	III.2. I know how to cite and reference.	55%	42%	-	-	3 %
	III.3. I can be a corresponding author of my works.	35%	55%	3 %	3 %	3 %
	III.4. I can prepare my work in English.	19%	20%	6%	3 %	6%
	III.5. I have the ability to publish my works.	35%	48%	6%	3 %	6%
IV. Digital skills	IV.1. I know how to use digital resources to gather information	55%	45%	-	-	-
	IV.2. I master tools to store information	55%	42%	3 %	-	-
	IV.3. I am able to use reference managers	42%	42%	-	10%	6%
	IV.4. I master quantitative analysis tools	6%	55%	6%	16%	16%
	IV.5. I know how to use digital resources to do research	52%	48%	-	-	-

Source: self-made

The data shown in Table 2 are affirmatively linked to what was established by Alt and Raichel (2021) about promoting students' monitoring and management of their learning to develop their ability to effectively self-assess their skills throughout the course of their learning process.

At the same time, the relevance of these statistical data lay in the assessment of the student's achievements in their methodological, operationalization, dissemination, and digital skills based on self-assessment as a mechanism to develop their reflective and self-critical capacity, which at the same time They are sometimes part of the cognition and metacognition of autonomous learning.

Furthermore, as reported by Rickey *et al.* (2023) and Yan (2020), The results of this type of study provide elements of understanding how students' self-assessment is used to advance the theory and practice of evaluation in education. Another point to note is the one mentioned by Yan *et al.* (2020) in that self-assessment has as its main considerations, improving student participation in the assessment and improving the quality of self-assessment. In this way, the results presented moderately promote the understanding of the complexity of self-assessment and its relationship with the learning process.

Discussion of results

Evaluations have a certain degree of subjectivity when the successes and shortcomings in learning have to be measured. When it is made, generally, the person who receives it attributes responsibility to the person who made it, regarding the willingness he had to issue his assessment, whether positive or negative. There are various associated elements to recognize why the evaluation was good or bad, but in most cases, they are tangents to confront its results consciously, so you have to have maturity and responsibility to accept the evaluation. This is where self-assessment is presented as an instrument of self-analysis, self-reflection, and self-acceptance.

In light of the aforementioned, this research agrees with Carroll (2020) in that the self-assessment was aimed at appropriately selected populations to be self-rated, taking into account their maturity and honesty to be critical of their own learning. In the case of this study, the graduate students live up to this criterion.

However, self-assessment by itself cannot be a reference that completely dictates learning, since other elements must exist. One of them is autonomous learning, which provides the ability to self-regulate and self-direct to learn. Through autonomous learning, students become aware of their decisions to direct, regulate, and self-evaluate their learning. However, for students to achieve this autonomy they need to have the skills and knowledge to participate in learning independently.

Likewise, taking into account the results found in this investigation, the synergies between self-assessment practices and autonomous learning must be taken advantage of to support students' academic growth and instruction (Chen and Bonner, 2020), which leads to an increase in students' levels of self-direction and motivation. In addition, it improves the precision and quality of self-assessment each time it is applied (Rahman *et al.*, 2022), without forgetting that they are valuable instruments in student feedback and their learning process.

According to the above, students regulate their learning to a certain extent, but as they do so, they consciously construct their learning successfully. These students who achieve autonomous learning identify that their academic performance depends largely on their abilities to use and adjust their knowledge effectively. This is a premise that some authors such as Tran *et al.* (2022) and Basri (2023) consider relevant to student learning.

In addition to the above, consistent results were obtained with the works of Fletcher (2022) and McIver and Murphy (2023) concerning the fact that self-assessment intervenes in the critical thinking and reflection of students in a specific way, elements that are interrelated in such a way that they challenge the usual approaches to assessment, that is, through the ability to provide and perceive their own self-criticism about their learning and the need for support to orient themselves. Therefore, self-assessment is a tool to promote student performance (Nieminen, 2021; Chen and Bonner, 2020) that helps to understand how students engage with self-assessment, which becomes an exercise in self-knowledge (Alt and Raichel, 2021; McIver and Murphy, 2023). In short, reflecting on what is learned is essential, as it allows students to observe learning, rethink the following actions objectively, and lead the students to know themselves.

The results of this research confirm the importance of incorporating the cognitive and metacognitive skills to promote self-knowledge, as well as the recognition of strengths and weaknesses that help students develop autonomous learning, self-directing, self-regulating, and self-evaluating. Similarly, it was established by Kwarikunda *et al.* (2022) in their findings that metacognition is a process that allows you to express what you think, as well as organize actions, plan them, evaluate them and, if prudent, rethink them. In fact, by transferring metacognition to a learning environment, students carry out specific activities through a process that requires less difficulty but generates effective and proportionate results.

Similarly, Stebner *et al.* (2022) identified in their study that the transcendence of metacognition influences not only knowing but also doing and being. Furthermore, metacognition encourages reflection, is introspective as it depends to a lesser extent on extrinsic support, skillfully addresses problem-solving, and evaluates the execution of activities, making learning sequenced

and progressive. In less complex words, through self-assessment of learning, autonomous learning is manifested, and its development can be achieved.

Finally, among the limitations of this research, we can mention the sample size, a short intervention period (six months), as well as a control group from two graduate programs. Furthermore, it can be added that the study is not generalizable and is not considered conclusive. However, this does not diminish its importance, since it seeks to expand the field of knowledge on the topics of autonomous learning and self-assessment.

Conclusions

The objective of this research was to implement self-assessment as an instrument to develop autonomous learning in graduate students. To achieve this objective, information, and data were selected, classified, categorized, and explained. The results obtained guide and facilitate the self-assessment process of postgraduate students to develop autonomous learning that positively affects their learning.

Therefore, it is concluded that self-assessment is an appropriate tool for this purpose since it adjusts to the maturity characteristics of postgraduate students to recognize strengths and weaknesses in their learning, which, in addition, allows them to know themselves by self-evaluating. It is also concluded that self-assessment has to be part of the learning process since it helps students to be self-critical, and reflective and directs them towards autonomous learning through the development of cognitive and metacognitive skills to self-direct and self-regulate their learning.

Likewise, self-assessment as a technique can help teachers measure student learning, but at the same time, it is an evaluation and feedback mechanism. In this sense, the inclusion of summative grades should be applied to strengthen the importance of self-assessment in learning. They must even use self-assessment to promote the adequate development of skills and attitudes among students that guarantee their development. Therefore, it is advisable to include self-assessment activities for students not only to get them accustomed to this tool but also to allow them to recognize the level of learning achieved.

In summary, the present study was based on previous research on how to promote self-assessment and autonomous learning. This helped to understand the complexity of self-assessment about the learning process, which favors the theory and practice of evaluation in education.

Future lines of research

A valuable future line of research, which is linked to autonomous learning, is located in the field of metacognition through learning judgments. These judgments are those made by students about how much they learn in the learning actions carried out. Some of these emphasize predicting performance, which helps predict how much is learned and is intended to improve students' self-assessment skills. This and other lines of research related to these topics would help resolve the following questions: how could self-assessment and autonomous learning be adapted to current times? Does self-assessment linked to autonomous learning offer precision in measuring your learning? Can learning be transformed with self-assessment based on autonomous learning?

Thanks

The authors greatly thank the National Council of Humanities, Sciences, and Technologies (CONAHCYT) and the National Polytechnic Institute (IPN) for the support and facilities for carrying out this research. They also appreciate the support provided by the Center for Research and Technological Innovation (CIITEC) and by the Higher School of Commerce and Administration Unidad Santo Tomás (ESCA) of the IPN.

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