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# Training of health science professors to support the education of high-ability university students

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Teacher training for high ability students represents a critical need that has been neglected. In this context, it is essential to implement programs that demystify high abilities and provide teachers with effective tools to inspire and challenge these students. The aim of this study was to evaluate the impact and satisfaction of a course-workshop offered to university professors for the educational attention of students with high abilities. For this purpose, a mixed methodology was used; in the quantitative part, two approaches were combined: a quasi-experimental design with a non-equivalent control group, and a pre-experimental design. In the qualitative part, the content of open-ended questions was analyzed. Quantitative results show significant differences in the interaction and timing of the intervention in the experimental group ( $p = 0.000$ ). Likewise, a positive level of achievement and approval was observed in each of the subjects taught, obtaining an average of 41.12 out of 47 total points. In addition, a satisfactory evaluation of the course-workshop offered was reported, since 95.2% said that they agreed fairly or strongly agreed with the contents, 96.8% agreed fairly or strongly agreed with the didactic material, and 90.47% rated the performance of the instructors as excellent. The lexical analysis yielded three classes in relation to the most significant learning acquired during the course, while the comments and suggestions for improvement were grouped into four classes. The findings of this study highlight the importance of developing teacher training programs based on a clear understanding of high abilities and allow expanding knowledge in this field of study.

## KEYWORDS

high abilities, university students, faculty training, myths, program, evaluation

## 1 Introduction

A persistent issue in the literature concerning high abilities is the deficiency in professors training across all educational levels in this field, despite their pivotal role in the academic achievement of the most gifted students (Bochkareva et al., 2018; Cross et al., 2018).

Several studies at the pre-university level, such as the one conducted by Rost (2016), underscore this concern. The author, in a longitudinal study spanning nearly 30 years and

involving 7,023 students and 390 professors from Germany, concluded that professors lack the necessary competencies to differentiate the abilities of these students.

These findings align with those reported by [Sajedifard and Shahgoli \(2020\)](#), indicating negative or indifferent perspectives among professors regarding these students and the specialized education they require. Furthermore, the authors acknowledged the presence of barriers hindering their effective practices, such as time constraints, energy limitations, and class size.

In Mexico, [Valadez et al. \(2019\)](#) conducted a study to detect the level of knowledge related to an educational intervention proposal aimed at students with high abilities, among both classroom and support professors. While limited knowledge was observed among classroom professors, support professors, who bear greater responsibility in the evaluation process, exhibited a more positive understanding.

This situation fosters myths and misconceptions about the most gifted students, which may be unsurprising given the multitude of existing concepts and explanatory models ([Borges et al., 2009](#)), often employed misapplied by teaching staff ([Pérez et al., 2020](#)). Furthermore, myths surrounding high-ability students extend beyond academic aspects to encompass their physical and individual characteristics, personal and social adaptation, as well as the nature and relationship of giftedness, with the latter being more prevalent ([Pérez et al., 2017](#)).

Some myths that fall into these categories include the belief that high intellectual ability is completely innate or that, on the contrary, it requires hard work to develop. In addition, it is widely believed that these students will always have outstanding academic performance and assured success in society. It is also considered that they can reach their full development on their own and that they belong exclusively to a high economic class ([Gutiérrez, 2022](#)).

In this context, it is important to highlight that, during teacher training, insufficient attention has been paid to the highly capable student body ([Kieboom, 2015](#)). Regarding pre-university levels, studies such as the one conducted by [Vreys et al. \(2018\)](#) highlight that most teachers (95%) are untrained or poorly oriented, and have had to learn mainly through daily practice in the classroom and to a lesser extent from the accompaniment of experts. This situation is not alien to the university context, as there is still a great deal of confusion about high abilities, which leads to numerous misconceptions about them ([Silió et al., 2020](#)).

Therefore, there is an urgent need for programs that contribute to demystify students with high abilities and provide tools to teachers for the development of better educational practices.

Several studies involving and evaluating specialized programs on high abilities for teachers report positive effects after their implementation (e.g., [Bangel et al., 2010](#); [Vidergor and Eilam, 2011](#); [Dixon et al., 2014](#); [Vreys et al., 2018](#)), such as the acquisition of significant knowledge about the characteristics and needs of this student body, which contributes to the reduction of myths, as well as to the development of better school and extracurricular educational interventions.

Although university studies related to high abilities still lack comprehensive research, existing findings agree on the inadequacy of professors training to nurture a more precise and realistic understanding of the implications of possessing high abilities ([Silió et al., 2020](#)). This lack of preparedness hampers the provision of an

educational response tailored to the needs of this group, characterized by ongoing challenges, a diverse range of resources, a stimulating and creative environment, as well as a strong mastery of content ([Conejeros-Solar et al., 2013](#)).

Among the studies reported in the specialized literature is the one conducted by [Silió et al. \(2020\)](#). In this study, university professors were invited to define high abilities from their perspective. Their answers highlighted as characteristic features of these students their abilities, the way they learn differently from other people and the “quotient” (a common mistake, since the correct psychological term is “coefficient”).

On the other hand, the research by [Matheis et al. \(2020\)](#) developed with future Australian teachers enrolled in bachelor’s and master’s degree courses in teaching showed that they perceived high-ability students as more intelligent but also as having more socio-affective difficulties than students of average ability, in addition to evidencing gender stereotypes.

It is encouraging to see a growing interest in scientific outreach events addressing the relationship between the university and high abilities, as well as the role of faculty. Examples of this interest include the International Congress of the National Association for the Study and Intervention in Giftedness (ANEIS), the 19th ECHA Conference Expanding Horizons. The Odyssey of Talents & Gifts (ECHA), the International Conference on Intervention Perspectives in High Intellectual Capacities at the University of La Laguna (ULL), and the Conference on Attention to Students with High Abilities at the University of Guadalajara (UdeG).

Despite the efforts made, it is evident that they still fall short ([Oliveira et al., 2020](#)), especially considering that inclusive education in universities has tended to prioritize populations with some form of disability ([Marulanda-Páez and García-Cepero, 2018](#)), which is relevant for providing differentiated education and thus promoting the comprehensive development of the most capable students. Hence, the objective of this study was to assess the effectiveness and satisfaction of a workshop provided to university faculty in improving educational support for high-ability students.

## 2 Materials and methods

### 2.1 Methodology and design

A mixed methodology was used. Regarding the quantitative methodology, the effectiveness of the program was evaluated by means of a quasi-experimental design with a non-equivalent control group, where the independent variable was the training offered to the teachers through a course-workshop and the dependent variable was the teachers’ knowledge of high abilities. In addition, the effectiveness of the program was evaluated by assessing the satisfaction of the teachers participating in the course-workshop. A qualitative methodology was also incorporated to analyze the content of open-ended questions.

### 2.2 Participants

A total of 135 professors engaged in teaching across diverse undergraduate programs at the Health Sciences University Center

(CUCS) of the University of Guadalajara participated in the study. Among them, 70 voluntarily enrolled in a high-ability training course, constituting the experimental group, while the remaining professors comprised the control group. Table 1 outlines their key characteristics.

## 2.3 Instruments and materials

### 2.3.1 Attendance and course completion protocol

The evaluation of the quality of the workshop was conducted through two strategies:

1. The number of professors who attended, remained, and completed the workshop was identified, as well as those who passed it. Additionally, the count of those who opted to participate as mentors in an extracurricular enrichment program was determined.
2. Satisfaction was evaluated by means of a questionnaire designed *ad hoc*, consisting of 13 questions with a Likert-type frequency response format and two open-ended questions.

### 2.3.2 High abilities representation questionnaire

The questionnaire consists of 34 statements presented on a four-point Likert scale, ranging from “strongly disagree” to “strongly agree” (Pérez et al., 2020). These statements assess perceptions of the most common myths and stereotypes about high abilities, both in educational settings and in a broader context, as described in the literature. The estimated time to complete the questionnaire is approximately 10 min. It presents a reliability of 0.899, and according to the study by Pérez et al. (2020) its

unidimensionality is confirmed, since the construct validity indicates a single factor that explains 0.27503% of the variance. Likewise, the items show appropriate discrimination indices, with values ranging between 0.226 and 0.537, which suggests that the correlation of the items with the rest of the questionnaire is acceptable.

The questionnaire has been designed following the Item Response Theory, as can be found in the study by Pérez et al. (2020). In general terms, the myths addressed focus on (1) representations of interpersonal relationships and social problems; (2) representations of personality and cognitive characteristics; (3) representations of the influence of contextual and family variables on high intellectual abilities; (4) representations of educational responses; and (5) representations of performance in high intellectual abilities.

## 2.4 Procedure

Firstly, the teaching staff at CUCS was offered the course-workshop entitled “Educational Attention to High-Ability Students in the University Context.” This workshop has a duration of 20 h and is presented in Massive Open Online Course (MOOC) format. Prominent specialists with international recognition in the field, from Spain, Germany, Colombia, Chile, and Mexico, have supported its development. The primary goal is to provide faculty with training on detecting and addressing high-ability university students. The workshop is divided into three modules covering eight fundamental topics (see Table 2).

Additionally, each topic was developed following the didactic sequence outlined in Table 3.

TABLE 1 Characteristics of the participating faculty.

	Participants	Average age	Highest level of education
<b>Experimental group</b>			
Men	20	39.29 years	Bachelor's: 7 Master's: 5 Doctorate: 8
Women	50	39.16 years	Technical: 1 Bachelor's: 15 Master's: 11 Doctorate: 23
Total	70	39.16 years	
<b>Control group</b>			
Men	31	39.61 years	Bachelor's: 4 Master's: 20 Doctorate: 7
Women	34	39.73 years	Technical: 1 Bachelor's: 5 Master's: 14 Doctorate: 14
Total	65	39.46 years	

TABLE 2 Course-workshop contents for faculty.

Module	Topics
Module 1. <i>What are high abilities?</i>	1. Myths, realities, and characteristics of high abilities
	2. The importance of detecting and identifying high abilities
Module 2. <i>Students with high abilities and their specific needs.</i>	3. Students with dual exceptionalities
	4. Educational response
	5. The role of the teaching staff
Module 3. <i>Educational strategies</i>	6. Mentorship and high abilities
	7. Curriculum flexibility and differentiated education
	8. Creativity, innovation, and high abilities

Source: Prepared by the authors.

TABLE 3 Didactic sequence of a course-workshop session.

Strategies	Description
1. Video capsule	These 15-min sessions are led by an instructor and delve into topics associated with high abilities.
2. Reference materials	Open-access digital resources such as scientific articles, videos, and infographics are provided to further explore the topic.
3. Evaluation form	Automated test-type questions are used to assess the knowledge acquired during the session.

Source: Prepared by the authors.

Each of the topics contributes to eradicate myths and false beliefs about high abilities, addressing them specifically from the beginning of the course “Myths, realities and characteristics of high abilities” and in a cross-cutting manner throughout the course-workshop by means of the strategies considered.

Furthermore, as part of the course-workshop materials, there is a repository of digital resources categorized according to each module comprising the course.

The call to participate in the course-workshop was issued by the high abilities research group at the Institute of Psychology and Special Education of the University of Guadalajara. This call was disseminated through the Teaching Training Unit of the Academic Services Coordination of the CUCS. It was specified that participation would not be related to performance indicators as teachers. Additionally, the benefits to be gained were detailed, including:

1. Receiving training through a specialized course-workshop for educational attention to high-ability students in the university context.
2. Once trained, those who wished could participate as mentors for high-ability students in a comprehensive mentoring program to be conducted at a later stage.

65 teachers began and concluded the course-workshop, who formed the experimental group, while the same number of teachers joined the control group. Prior to the study, all teaching staff provided informed consent, emphasizing their voluntary participation. Measures were taken to uphold their autonomy in a respectful and secure setting, with full respect for their right to withdraw from the study at any point.

Both the experimental and control groups were invited to complete the High Abilities Representation Questionnaire before the start of the course-workshop. Subsequently, the experimental group underwent training from November 2023 to January 2024. Both groups were matched on the basis of mean age and teaching in undergraduate health sciences education programs. After each session, they were prompted to complete questionnaires designed specifically to evaluate their acquired knowledge. Post-intervention, both groups were asked to respond to the High Abilities Representation Questionnaire to gauge any shifts in their perceptions. Additionally, the experimental group was asked to complete the Satisfaction Questionnaire.

This study was conducted in accordance with the guidelines of the International Ethical Guidelines for Health-related Research Involving Humans, as suggested by the Council for International Organizations of Medical Sciences (CIOMS, 2016); the Federal Law on the Protection of Personal Data Held by Private Parties (Diario Oficial de la Federación, 2010) of Mexico; the ethical principles of psychologists outlined in the Code of Conduct of the American Psychological Association (2017); and with the approval of the Ethics and Research Committees of the Health Sciences Center of the University of Guadalajara (Opinion CI-05923) (Dictamen CI-05923).

## 2.5 Data analysis

To evaluate potential changes in acquired knowledge and the reduction of myths related to high abilities, a repeated measure ANOVA was conducted. The within-group variable was the moment

of data collection (before and after the course), while the between-group variables were the control group and the experimental group. This analysis was performed using SPSS version 25.

Furthermore, course satisfaction was evaluated using frequency measures. Additionally, program participation indicators, such as attendance and dropouts, were considered.

To examine participants’ verbalizations in open-ended questions, the phenomenological discourse analysis method (Reinert, 2001) was employed. This lexical analysis was conducted using IRAMUTEQ software (Interface de R pour les Analyses Multidimensionnelles de textes et de Questionnaires), which allows for the identification of word distribution within a statement and subsequent detection of semantic fields (classes), represented through dendrograms.

## 3 Results

### 3.1 Reduction of myths and stereotypes regarding high abilities

To assess whether workshop participation influenced the reduction of myths and stereotypes regarding high abilities among teaching staff, the scores of the pretest and post-test High Abilities Representation Questionnaire were compared for both the experimental and control groups. Descriptive statistics are outlined in Table 4.

An ANOVA with a split-plot design was conducted to determine if there were differences in the reduction of myths and stereotypes about high abilities between groups at two evaluation points. Assumptions of variance homogeneity were assessed, with the Box-M test yielding a significant result ( $F = 23.550, df = 3, 2,949, p = 0.00$ ). Additionally, variance homogeneity was verified using the Levene test, with the following results: for the pretest [Levene’s Test (1,12) = 8.30,  $p = 0.005$ ] and for the post-test [Levene’s Test (1,12) = 0.88,  $p = 0.348$ ]. Table 5 presents the results of the test statistics ( $F$ ), degrees of freedom, and associated  $p$  values. Effect sizes for these contrasts and their corresponding power are also included.

TABLE 4 Descriptive data of the high ability proxy questionnaire by group.

Group	N	Pretest		Posttest	
		Mean	S.D	Mean	S.D
Experimental	65	73.80	16.68	62.42	13.97
Control	65	70.83	11.45	71.74	10.70

TABLE 5 High ability representation questionnaire.

Effects	Mean square	F (1, 61)	p-value	Partial eta squared	Observed power
Group	656.03	2.51	0.115	0.019	0.350
Error	260.87				
Time (Pre-post)	1783.69	18.03	0.000	0.124	0.988
Interaction	2555.38	24.83	0.000	0.162	0.999
Error	98.878				

The results show significant differences in the interaction of the experimental group over time. While the control group does not modify its knowledge. As shown in Figure 1, there is a noticeable decrease in the group of teachers who have followed the course. The mean of the experimental group is lower in the posttest measure, while in the control group it is higher. This lower mean score in the posttest of the experimental group confirms the reduction of myths compared to the control group. Table 5 shows the power of the interaction between intra- and inter-group factors.

Significant differences in the interaction of the experimental group over time can be recognized according to each of the areas that make up the questionnaire of representation of high abilities. Regarding the representation of interpersonal relationships and social problems, the myths that significantly decreased are related to difficulties in relating and communicating with others (item 14), social and personality resources for their full development (item 15), as well as false beliefs about the ability to exercise leadership (item 12).

In relation to the representations of personality and cognitive characteristics, the association of intelligence with social class and sex (item 11), and the belief that this population does not need special help (item 16) significantly decrease. Likewise, with respect to the representations of the influence of contextual and family variables on high intellectual abilities, a significant decrease is observed in attributing high ability to the high social class that has sufficient materials to respond to their needs (item 24).

The representations of educational responses show low scores in terms of prioritizing the educational attention of this population (item 19) as well as its detection (item 31). Finally, within the framework of

the representations of performance in high intellectual abilities, a significant drop is identified in the educational level achieved (item 3) and the grades obtained (item 13).

### 3.2 Attendance and completion of the course

#### 3.2.1 Program outcomes

In term of program outcomes, 70 teachers initially enrolled in the workshop-course, of which 65 consistently attended, completed, and passed it. All the teachers who successfully finalized the course chose to engage as mentors in a comprehensive program for university students with high abilities.

#### 3.2.2 Formative assessment

The results of the evaluations conducted at the end of each topic can be found in Table 6.

#### 3.2.3 Evaluation of participant satisfaction

The evaluation of the satisfaction of the participants who made up the experimental group was carried out through quantitative and qualitative measures. Specifically, the quantitative assessment involved rating the course content, teaching materials, and instructor performance using a Likert scale of frequency. The results of these evaluations are detailed in Tables 7, 8.

Likewise, the experimental group was also evaluated qualitatively by means of two open-ended questions: What was the most significant thing you learned during the course? and Comments and suggestions.

The lexical analysis of responses to the question about the most significant learnings acquired during the course yielded three categories. The first can be termed as Knowledge acquired about high abilities, the second as Importance of identifying and attending to students with high abilities, and the third as Curricular flexibilization, with category 3 encompassing categories 1 and 2, which are directly connected (see Figure 2).

*Class 1. Knowledge acquired about high abilities:* This accounted for 33.3% of the analysis, referring to the diverse knowledge and theoretical perspectives acquired by professors for addressing high abilities in the university context.

*Class 2. Importance of identifying and supporting highly able students:* With an analysis comprising 35%, it underscores the imperative to identify highly able students to ensure they receive an educational response tailored to their needs.

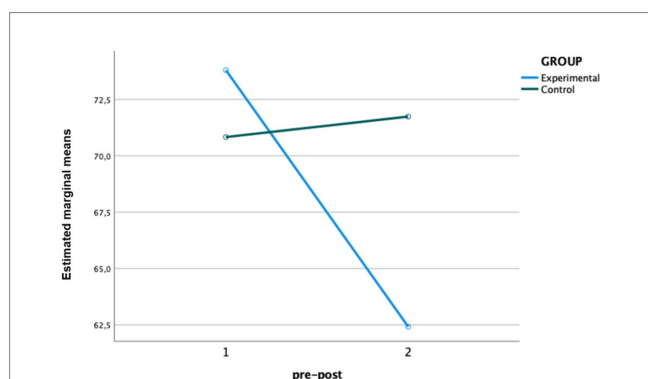


FIGURE 1 The average score of myths and stereotypes at different time points for the two groups.

TABLE 6 Assessment of the acquired learnings in each of the reviewed topics.

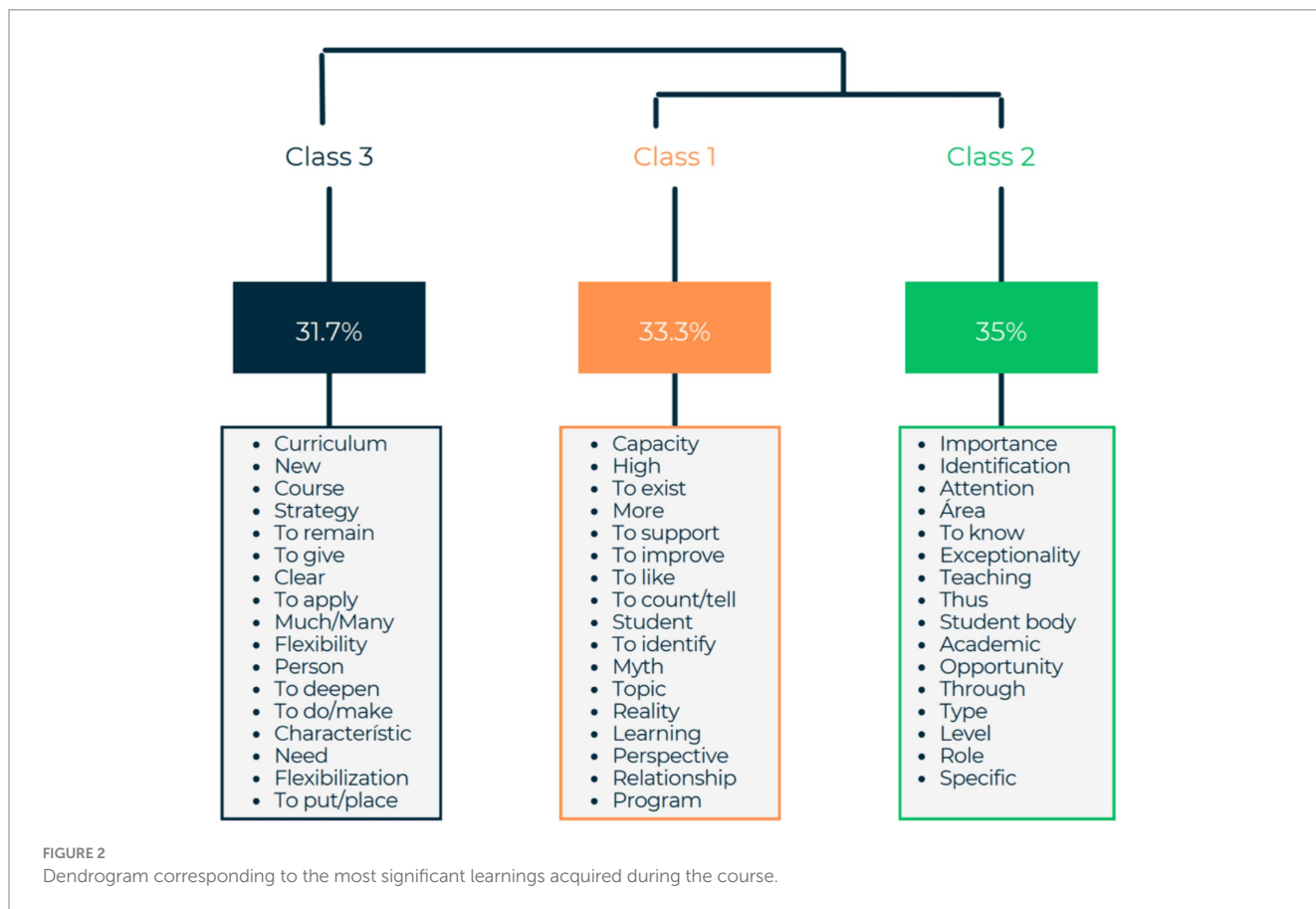
Modules	Topics	Total points	Average mean value (Range)	Mean value (Range)
Module 1	Myths, realities, and characteristics of high abilities	8	6.28	6–8
	The importance of detection and identification of high abilities	9	8.54	9–9
Module 2	Students with dual exceptionality	4	3.57	4–4
	Educational response	5	4.68	5–5
	The role of the teaching staff	8	7.04	7–8
Module 3	Mentorship and high abilities	5	4.68	5–5
	Curriculum flexibility and differentiated education	8	6.33	7–8

TABLE 7 Assessment of participants' satisfaction with the course content and training materials.

Evaluated category	Response frequencies			
	Not at all	Only a little	To some extent	Very much
<b>Course content</b>				
Meeting expectations			17.5%	82.5%
Comprehensive coverage of subjects			33.3%	66.7%
Sequence of content			17.5%	82.5%
Clarity of information presented			30.2%	69.8%
Adequate exercises and practices		4.8%	31.7%	63.5%
<b>Teaching materials</b>				
Relevant and organized teaching materials			14.3%	85.7%
Diversified teaching aids		3.2%	19%	77.8%

TABLE 8 Assessment of participants' satisfaction with the instructors.

Evaluated category	Response frequencies		
	Poor	Average	Excellent
<b>Instructors</b>			
Communication with the group		22.2%	77.8%
Feedback		12.7%	87.3%
Instructors' expertise in the topic			100%
Work dynamics		3.2%	96.8%



Class 3. Curricular flexibility: A total of 31.7% was analyzed, which refers to the recognition of curricular flexibility as an educational approach to adapt the school curriculum to the

individual needs of highly able students (Table 9 shows some examples of the responses grouped in the three class).

TABLE 9 Examples of answers grouped in the classes in relation to the most significant learning acquired during the course.

Class 1. Acquired knowledge on high abilities	
(Percentage of content grouped: 33.3%)	
S34	<i>The shift in my perspective on high abilities, coupled with acquiring the necessary tools to empower students exhibiting these abilities, enabling them to develop and bolstering their confidence and skills.</i>
S40	<i>I lacked clarity concerning the extensive diversity within the realm of high ability. Undoubtedly, this is a topic that should be prioritized on the agenda of all of us dedicated to education.</i>
S22	<i>I gained clarity regarding the myths about highly able pupils. I, too, harbored misconceptions about them, not fully understanding why, beyond identification, it was necessary to support them.</i>
Class 2. Importance of identifying and supporting students with high abilities	
(Percentage of content grouped: 35%)	
S19	<i>The importance of early identification of highly able students, along with the need to individualize the teaching-learning process through curriculum flexibility.</i>
S31	<i>The relevance of continuing to provide for the highly able population at higher levels is crucial, ensuring they have sufficient opportunities and are not left to their fate.</i>
S26	<i>The significance of identification of students with high abilities who may have other exceptionalities.</i>
Class 3. Curricular flexibility	
(Percentage of contents grouped together 31.7%)	
S3	<i>The topic of curricular flexibility was very significant, as it provides guidelines for working not only with gifted but with all students. This opens a new educational perspective that I want to implement.</i>
S52	<i>It is essential to prioritize the needs of our students and reflect on the role and responsibility we have toward the group, especially with those who require curricular flexibility.</i>

The lexical analysis of the responses given to the question related to comments and suggestions for improvement on the course revealed four classes. The first can be called “Course Excellence,” the second “Interest and Enjoyment in the Course,” the third “Acknowledgments,” and the fourth “Congratulations for the Course Developed,” with class 4 encompassing class 3, which, in turn, includes classes 1 and 2 that are directly connected (see Figure 3).

**Class 1. Course excellence:** Accounting for 20.9% of the analysis, this class reflects the positive evaluation by participating professors regarding the course’s development, acknowledging its high quality.

**Class 2. Interest and satisfaction with the course:** The interest shown by attendees regarding the course development, methodology employed, and instructors in charge was analyzed (27.9%).

**Class 3. Acknowledgements:** The 18.6% were analyzed in terms of gratitude or appreciation for the training received.

**Class 4. Congratulations on the course developed;** A total of 32.6% was analyzed (Table 10 shows some examples of the responses grouped in the four class).

## 4 Discussion

The purpose of this study was to evaluate the impact of a workshop course designed for university professors on the educational support provided to high-ability students within the university context. As highlighted, the existing literature on the role of university professors in supporting students with high abilities is limited (Kieboom, 2015; Vreys et al., 2018; Woo et al., 2024). Furthermore, topics related to high abilities are seldom integrated into mainstream university teacher training programs, leaving both current and aspiring educators without the necessary tools to identify and cater this population. This deficiency is compounded by the absence of policies that advocate for the education of the most gifted students (Parra-Martinez, 2021), resulting in a lack of training that could help dispelling inaccurate ideas surrounding this population (Silió et al., 2020).

Misconceptions about high abilities in academic, social, emotional, physical, and personal domains, as well as about their nature, lead untrained faculty to rely on their personal experiences and beliefs. This lack of understanding hinders their ability to identify and support the educational needs of these students, thus limiting their potential (Szymanski and Shaff, 2013; Barrenetxea-Mínguez and Martínez-Izaguirre, 2020).

Previous research, such as that carried out by Kaplan and Garner (2018) and Parra-Martinez (2021), indicates that dispelling these myths through teacher training programs or interventions can have positive effects on faculty attitudes. In this sense, the findings referred to in this study corroborate this trend by demonstrating that the training received by the teachers participating in the experimental group leads to significant changes in interaction and momentum.

On the other hand, the indicators used to assess the outcomes of the course show a high completion and approval rate, as well as a significant interest from professors in participating in a mentoring program for university students in the field of health sciences. From their disciplinary areas, professors provide diverse topics that enrich the students’ educational process beyond the curriculum, such as genetic engineering, artificial intelligence, entrepreneurship and innovation, and patent development, among others.

Regarding the effectiveness of the course, participant satisfaction was evaluated using both quantitative and qualitative measures. Quantitative measures indicate a high level of satisfaction with the content and instructional materials, as most aspects evaluated in these categories were rated as “mostly agree” and “totally agree.” However, items 5—“Practical and sufficient exercises” and 7—“Diversified instructional supports” received lower ratings, indicating “low” satisfaction. These aspects represent areas for improvement that should be considered in future editions of the course.

Participant satisfaction with the instructors was predominantly rated as “excellent.” This was attributed to the instructors’ profound expertise in the subject matter, their adeptness in facilitating effective class dynamics, and their skill in offering constructive feedback.

In terms of qualitative measures, significant learnings during the course included “gaining knowledge about high abilities,” “understanding the importance of identifying and supporting these students,” and recognizing the need for “curricular flexibility.” Moreover, feedback and suggestions for course improvement included acknowledging its “excellence,” expressing “interest and satisfaction,”

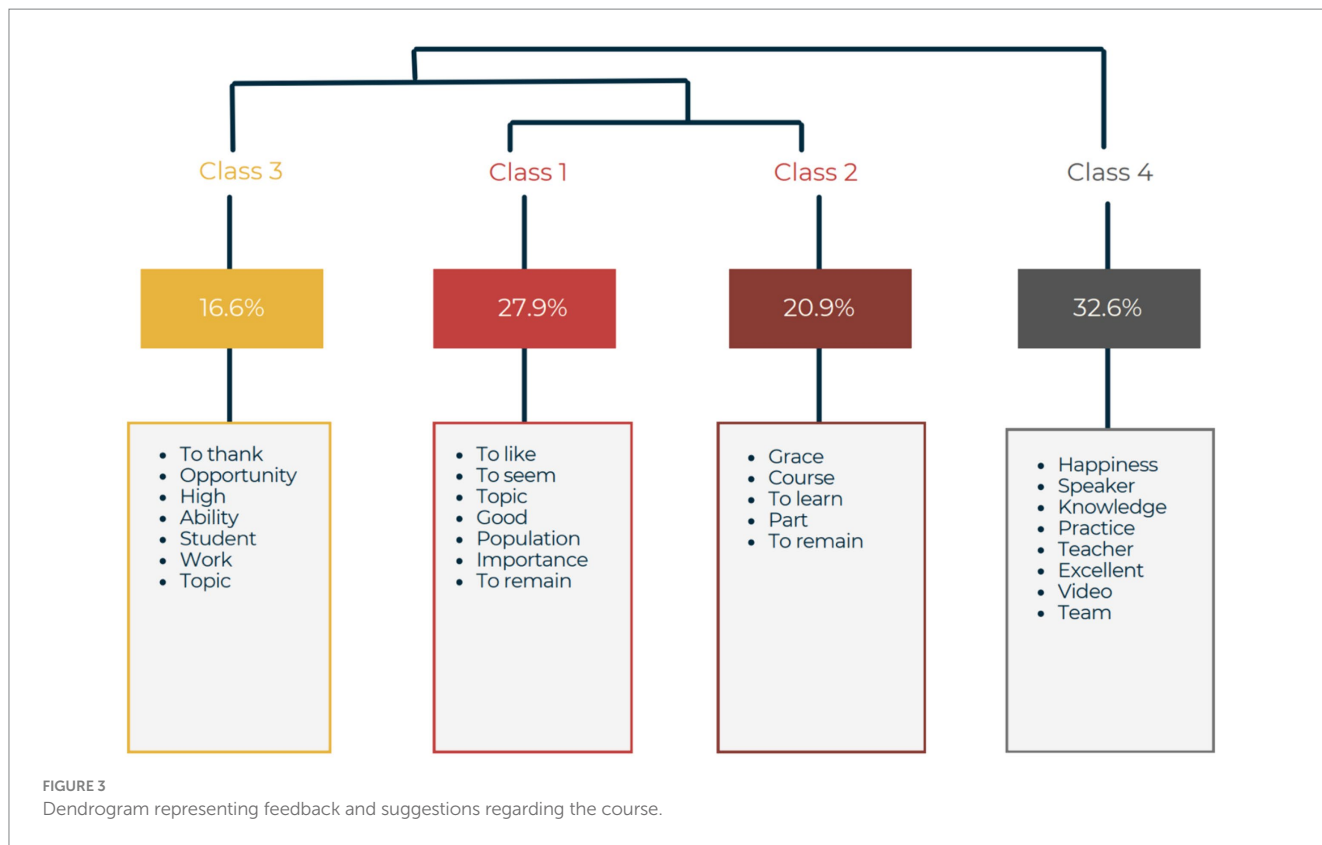


TABLE 10 Examples of responses grouped in classes in relation to comments and suggestions on the course.

<b>Class 1. Course excellence</b>	
(Percentage of content grouped: 20.9%)	
S23	<i>This course is outstanding; its organization and development are highly engaging. I found it to be a good approach to identifying young people with High Abilities and emphasizing the importance of providing them with learning spaces and environments for their optimal development within each of our class groups.</i>
S58	<i>Excellent course with speakers of great knowledge and effective teaching tools.</i>
S52	<i>Excellent systematization of content, presentations, and materials.</i>
<b>Class 2. Interest and satisfaction with the course</b>	
(Percentage of content grouped: 27.9%)	
S11	<i>I really enjoyed the course content and I appreciated the accessibility for future reference. Additionally, it is very well-organized and easy to follow; the self-paced aspect is one of the highlights of the course.</i>
S19	<i>I loved the collaboration with experts from other countries. Both the local instructors and guest speakers provided a richness of knowledge.</i>
S28	<i>It was an excellent way for me to delve into a topic that interests me greatly. The speakers' profound expertise and passion for sharing their knowledge and experiences were palpable throughout.</i>
<b>Class 3. Acknowledgements</b>	
(Percentage of content grouped: 18.6%)	
S15	<i>I would like to express my sincere thanks to the organizers for granting me with this invaluable learning opportunity. It has been a significant investment in my professional development and I deeply appreciate the positive impact it will have on my work practice.</i>
S38	<i>I am immensely thankful for the chance to participate in this training and I am eager to collaborate with high abilities' students. I not only view it as a necessity but also an institutional commitment.</i>
S60	<i>Thank you for sharing this innovative course with us.</i>
<b>Class 4. Congratulations on the course developed</b>	
(Percentage of content grouped under this category: 32.6%)	
S53	<i>Congratulations your ongoing innovation in academic preparation courses.</i>
S44	<i>I loved it! Congratulations to the team of experts!</i>
S57	<i>Congratulations, I look forward to seeing the project's progression!</i>



extending “gratitude,” and offering “congratulations.” Hence, it is evident that both the quantitative and qualitative assessments indicate a notably high level of satisfaction among the faculty regarding the training provided.

The success of the program is largely attributed to the deep interest shown by the faculty in training in this field, as well as their mastery of the platform used for the workshop-course and the effective application of Information and Communication Technologies (ICT). Additionally, the methodological and theoretical support of the program, along with the collaboration of specialists in the field, significantly contributed to its effectiveness. These combined factors have led to positive results, as reflected in the course evaluation, which rates it as of great interest and quality.

A crucial aspect for evaluating the program’s quality is the assessment of the knowledge acquired in each of the topics covered. This evaluation has revealed a high level of achievement and approval in all sessions, indicating a solid understanding by the participants. Furthermore, the immediate feedback provided to the faculty during the formative assessment process has been essential for its continuous improvement.

Despite having a wide variety of resources, both material and human, as well as infrastructure, unfortunately, universities have not been able to effectively fulfill their role in serving students with high abilities and developing their talents. In this regard, disparities persist among universities regarding standards and policies related to students with high abilities, as well as in their implementation by faculty to enhance the capacities of these students (Abunasser and Al Ali, 2022).

The outcomes of this study highlight the importance of establishing teacher training processes based on a clear understanding of high abilities, addressing both their cognitive, social, and emotional aspects, as well as the methods of identification and corresponding intervention strategies. These results support, in line with other research (Kaplan and Garner, 2018; Parra-Martinez, 2021), the crucial role of teacher training programs and professional development in effectively meeting the educational needs of students with high abilities (Parra-Martinez, 2021).

Furthermore, the findings of this research contribute to expanding knowledge about teacher training in the university context and allow for a closer approach to developing a teaching profile for students with high abilities around the knowledge acquired in the topics, their identification and attention, and curricular flexibility. This aspect is supported by the study conducted by Conejeros-Solar et al. (2013), who also establish the use of personal resources, deep knowledge of their characteristics and learning, appropriate didactic management, the use of strategies that stimulate higher-order thinking skills, and an attitude of openness, maturity, and willingness to accompany them in the development of their potentials.

A limitation of this study lies in the sampling method used. By opting for convenience sampling and having a small number of participants belonging only to one Higher Education Institution, the extrapolation of results to other university environments and contexts is hindered. Therefore, it is suggested to expand the sample size and include the participation of professors affiliated with various universities in future research. This measure would allow for more robust and applicable conclusions not only in the Mexican context but also in other countries.

Bearing in mind that myths are not only cognitive, but may also involve an affective/emotional component that influences attitudes toward the development of talent in university students, and that this may make it difficult to eradicate them with information alone, it is suggested that specialists in the subject consider these aspects. In this way, a change in attitudes and, ultimately, in behaviors can be guaranteed.

In addition, since this research was conducted in a natural setting and teachers chose to participate voluntarily in both the experimental and control groups, discrepancies in the composition of both groups were observed. This resulted in secondary variations in the gender and maximum level of education of the participants.

There is a need for more knowledge about what high intellectual abilities are, but this knowledge is taught in various postgraduate courses in different parts of the world, and it is important to know about them. However, these courses are very specialized and the idea that all university faculty should specialize in this area is somewhat utopian. Therefore, the aim of the course-workshop offered is to inform teachers about high intellectual abilities in a short period of time so that teachers specialized in disciplinary areas in the field of health sciences acquire a realistic knowledge of what it means to have or not have high abilities.

Finally, based on the findings of this study, whose effectiveness has been proven despite having been carried out in a specific educational context, it would be very interesting for other higher education institutions and universities to replicate these training experiences for their teaching staff. This would improve their skills in the identification and care of students with high abilities, thus contributing to ensure a more inclusive and enriching education for all students.

## Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation as long as they do not involve the use of sensitive data.

## Ethics statement

The studies involving humans were approved by Ethics and Research Committees of the Health Sciences Center of the University of Guadalajara (Opinion CI-05923) (Dictamen CI-05923). The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

## Author contributions

JFF-B: Writing – review & editing, Writing – original draft. ER-N: Writing – review & editing. MDV: Writing – original draft, Writing – review & editing. DC: Writing – review & editing. ÁB: Writing – review & editing.

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## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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