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Evaluation of Dialogical Learning in Higher Education: Psychometric Validation of a Questionnaire

Mª del Carmen Pegalajar Palomino
University of Jaén, Spain, *mcpegala@ujaen.es*

Diana Amber Montes
University of Jaén, Spain, *damber@ujaen.es*

Estefanía Martínez Valdivia
University of Jaén, Spain, *evaldivi@ujaen.es*

Higher Education must assume the commitment to provide quality education, as proposed by the UN in the 2030 Agenda. In this sense, dialogic learning stands out as a methodological strategy that promotes participation, communication and autonomous learning. This work aims to describe the design and validation process of an instrument that analyzes the university student's assessment of educational experiences based on dialogic learning. Taking the principles of dialogic learning as a reference for the design of the instrument, its content validity has been ensured by a panel of experts (n=9) through the Delphi method and the application of a pilot test to students of the Degree in Primary Education at the University of Jaén (n=132). For construct validity, the univariate normality of each of the items has been verified, as well as the application of the exploratory factor analysis model based on principal components and Varimax rotation and Pearson correlation analysis. Reliability analysis uses Cronbach's alpha coefficient and the two-half method. Results show an instrument with high reliability rates and positive internal consistency; it is made up of four factors, which are: contributions to learning, dialogue and communication skills, diversity and social inclusion, and dialogic reflection. It is a psychometrically robust tool, being an appropriate and necessary instrument to evaluate the impact of dialogic learning on university students, responding to some of the recommendations proposed by the United Nations to advance towards the achievement of the Sustainable Development Goals.

Keywords: higher education, learning, teaching methods, test validity, psychometrics

INTRODUCTION

University, since the creation of the European Higher Education Area, has been committed to ensuring that graduates acquire the skills and tools necessary to respond to current social and labor demands. Furthermore, it aims for university teaching to be participatory and inclusive, in accordance with social diversity (Gutiérrez-Rodríguez,

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2019) and to promote reflection, creativity and critical thinking (Bezanilla et al., 2019; Latorre-Cosculluela et al. , 2020).

For its part, the United Nations General Assembly (2015), in its formulation of the seventeen Sustainable Development Goals (SDGs), expressly refers to the commitment to "provide quality, inclusive and equal education at all levels" (p. 8). This translates at the classroom level into the encouragement of active and participatory methodologies that give the students a voice (Crisol-Moya et al., 2020; Forndran & Zacharias, 2019; Jiménez et al., 2020; Ortega-Ruipérez & Correa-Gorospe, 2024), making them participate in their own learning , enhancing their autonomy and favoring the development of useful skills for future professional performance, as well as to face new social challenges (Deniz, 2022; Sánchez-Marín et al., 2019).

As a result, multiple teaching methodologies are beginning to emerge and even take root in university curricula, with a high methodological variety (Suárez & Amber, 2022). From this new approach, teachers have a fundamental role in the articulation of the teaching processes, providing students with tools, resources and learning situations that allow them to develop the ability to learn to learn.

Among the student-centered methodologies, which aim to enhance participation, communication and autonomous learning in a framework of educational inclusion, is dialogic learning. This is nourished by Freire's postulates based on communication and relational symmetry among participants, who interact as equals, without hierarchies, from an egalitarian dialogue that favors reflection and the expression of critical thinking and promotes social transformation through learning (Freire, 1970). According to Gómez et al. (2020), "interaction with other agents intensifies the understanding of equality of differences and tolerance in the clash of ideologies and allows expanding the possibilities of personal and social transformation" (p. 8). This pedagogical method seeks to overcome social inequalities among participants, recognizing the social impact of communicative methodologies and their benefit for all people involved (Gómez et al., 2019; Howe et al., 2019). Therefore, following Aubert et al. (2010), dialogic learning is implemented through egalitarian dialogues, through interactions that recognize the cultural intelligence of all participants.

Dialogic learning and the methodologies adhering to this approach are based on seven basic principles initiated by Flecha (1997) in the context of adult education, which have subsequently been outlined and specified by Duque et al. (2009) or Valls & Munté (2010) and exported to other learning contexts. A variety of dialogic educational practices are currently being implemented in classrooms at different educational stages (assemblies, dialogic reading and discussion groups, consensual development of standards, participation in committees, etc.). Among the methodologies based on dialogic learning (Flecha, 1997), for example, dialogic gatherings stand out given the great reception they have and which support successful practices in Higher Education. This methodology helps improve the practical skills of teachers in training and prepares them as communicators and researchers for their future teaching performance (Camús et al., 2022; Martínez-Valdivia et al., 2021). The implementation of this dialogic practice also favors the involvement and interest of students (Martínez-Valdivia et al., 2021) and

fosters critical and reflective capacity (Laorden-Gutiérrez & Foncillas-Behamonte, 2021).

Despite limitations inherent to educational innovation, such as the need for training of the agents involved and the tendency towards methodological continuity (García-Carrión et al., 2020; Kilinc et al., 2017), the dialogic approach in the classroom is currently present at all educational levels and stages, in numerous disciplines and areas of knowledge and in different scenarios, as shown by the diversity of works based on didactic experiences of this type (Marauri et al., 2020; Méndez & Arteaga, 2018; Vrikki et al., 2018).

Although experiences about dialogic learning in educational practice are becoming more frequent, the literature does not include an instrument that allows us to know what the students' perception of this methodology is and that helps to assess compliance with the seven principles of dialogic learning, according to the involved in the dynamics.

After a bibliographic review of questionnaires published in recent years on this topic, some instruments stand out to calibrate some of the dimensions of dialogic learning. For example, Martínez & González (2018) publish a questionnaire to measure the fit between university training and the transversal skills required by the labor market. Alonso & Brussino (2018) focus on psychosocial aspects closely related to the interactive processes required by dialogic learning. For their part, Campos et al. (2021) and Gallego & Rodríguez (2014) base their work on the communicative dimension to assess the oral communication competence perceived by the students. Other authors are closer to the global evaluation of the method, such as Budnyk et al. (2020), whose work assesses the effectiveness of communicative training of future teachers for the organization of dialogic learning. For their part, Mercer & Howe (2012) evaluate the relationship between dialogic learning and critical thinking.

Therefore, the interest of this research lies in the need to design and validate an instrument that allows faculty and research staff to inquire about the perceptions of students about the methodology of dialogic learning in higher education.

METHOD

Design

This is a cross-sectional, non-experimental and descriptive study, whose objective is to design and validate a questionnaire focused on the analysis of the perception of university students towards the development of experiences based on dialogic learning.

The design of an “ad hoc” questionnaire has been chosen as an instrument for collecting information, due to its ability to provide information quickly and easily access the selected sample (Guerrero et al., 2022).

The construction of this type of tools constitutes an essential factor for the development of research (Hidalgo-Cajo & Gisbert-Cervera, 2021). It is a self-perception questionnaire, understood as a way to approach the reality of the student's thinking about dialogic learning from its own perspective, taking as reference various evidence on its validity (American Educational Research Association et al., 2014).

Instrument procedure and design

The design and validation of the questionnaire has been carried out taking into account different phases:

1. Preliminary design of the instrument using the principles of dialogic learning proposed by Aubert et al as a reference framework (2009).
2. Validation of the content of the questionnaire through a panel of experts, using Delphi method. Through this methodology, experts have independently evaluated the questionnaire based on a validation scale designed "ad hoc" according to the following criteria: degree of relevance of each item to the object of study (content) and degree of precision and adequacy in the structure and wording of the questions (form). To do this, a Likert-type scale between 1 and 4 is used (where 1=bad and 4=excellent).
3. Redevelopment of the questionnaire initially designed based on the experts' evaluations. The consensus criterion among the evaluators has been made based on a frequency analysis for each of the responses, with 75% or more being considered acceptable (Keeney et al., 2011).
4. Analysis of the construct validity and reliability of the questionnaire based on a pilot test. Access has been made to 2nd year students of the Degree in Primary Education at the University of Jaén enrolled in the subject "Psychopedagogical Bases of Special Education", having previously planned a didactic experience based on dialogic learning strategies for the development of some of the theoretical-practical contents proposed in its teaching guide.
5. Design of the final version of the questionnaire. The final questionnaire is made up of four blocks: a first introductory part in which the objective of the research and estimated time for its completion are explained, ensuring the voluntary nature as well as the confidentiality and anonymity of the data collected. In addition, information is provided to recipients about the ethical code that governs said work, in accordance with the ethical guidelines of the Declaration of Helsinki. The second section is focused on the collection of sociodemographic data of the sample such as: gender, age, degree, course and subject in which the dialogic learning experience has been developed. The third block of the questionnaire includes a total of 23 items capable of analyzing students' perceptions towards the development of dialogic learning experiences; these respond to a Likert-type scale with five response alternatives (1=totally disagree and 5=totally agree).

Participants

Content validity of the instrument has been analyzed by a panel of experts. Initially, 15 university professors specializing in the subject under study have been invited to evaluate and analyze the data collection instrument. Finally, there were 9 teachers who confirmed their intention to collaborate voluntarily in the questionnaire validation process. They have been selected taking as reference different criteria such as: experience in the design and validation of questionnaires as data collection instruments and research lines related to the topic under study.

Experts belong to the Universities of Granada (n=2), Córdoba (n=1), Jaén (n=3), Málaga (n=1) and the Catholic University of Murcia (n=2). These are doctoral

professors with professional experience of between 10-20 years, who present as common research lines: University Teaching, Higher Education and Active Methodologies.

For the pilot test, a sample of second-year students of the Degree in Primary Education at the University of Jaén was used based on a non-probabilistic convenience sample (n=132). The sample was selected based on the involvement of the teaching staff and the ease with which the research team could access these students, having ensured their representativeness.

Specifically, these were students enrolled in the subject "Psychopedagogical Bases of Special Education". Prior to completing the questionnaire, students participated in a dialogic learning experience to develop some of the theoretical-practical content of the subject. In addition, recommendations made by Carretero-Dios and Pérez (2005) were considered, who established that between five and ten subjects should respond for each item in a questionnaire.

In this sample, 61% were women, compared to 39% men, with an average age of 21 years. However, the disadvantage of this sample selection is its representativeness, which makes it difficult to generalise results. In addition, it poses a greater risk of bias in the research process, since the selection of participants is based on their availability or interest in the research.

Analysis of data

Content validity of the instrument has been verified by a panel of experts, using the Delphi method. Subsequently, results have been exported to the SPSS Statistical Software Program (v. 28), which has made it possible to verify the internal structure and construct validity of the questionnaire through an Exploratory Factor Analysis (verification of normality assumptions, principal components matrix and rotation Varimax) and Correlation Analysis (Pearson); in this way, it has been verified whether the instrument measures the theoretical construct correctly. Finally, the reliability of the instrument has been examined using the Cronbach's Alpha method and the split-halves method, which has allowed us to know the degree of coherence of the data obtained.

FINDINGS

Analysis of content validity

Evaluation proposed by experts for the initial version of the questionnaire reveals very positive results. It is shown that 17 of the 24 items included in the initial version of the questionnaire are rated by 88.8% of the experts as "excellent" in terms of form and content. This confirms that the questions included are appropriate, clearly worded to facilitate understanding by the recipients of the questionnaire, and relevant according to the object of study of this research.

On the other hand, the reformulation of 6 items has been proposed, assuming that they could lead to confusion among respondents, requiring greater clarity and terminological precision in their definition. Furthermore, one of the items included in the initial version of the questionnaire has been eliminated, as it refers to redundant issues raised in other questions.

Analysis of construct validity

The data obtained from the application of the questionnaire to the pilot sample allow an analysis of the internal structure of the instrument. Firstly, descriptive statistics and asymmetry (measures the degree of symmetry of the distribution) and kurtosis values (degree of sharpness and flatness of a distribution) of each of the items have been calculated, with the intention of checking of checking the morphology of the data distribution and univariate normality; that is, whether a statistical distribution can be accepted as following the normal distribution (Table 1).

Results obtained show Mean values (M.) between 4.85 (items 2) and 4.63 (item 6), with the Standard Deviation (S.D.) being less than 1 for all items. Asymmetry and kurtosis values for each of the questionnaire items show scores higher than expected according to the normality criteria, exceeding values within the +/-1.5 threshold (Pérez & Medrano, 2010). This could determine an asymmetric distribution of the results, although the univariate normality of the data is demonstrated according to Kline (2011) or Pérez et al. (2013), who propose normality values of asymmetry less than 3 and kurtosis less than 10. For their part, Finney and DiStefano (2006) indicate maximum values of 2 for asymmetry and 7 for kurtosis to determine that the variables of a questionnaire present normal distributions.

Table 1
Descriptive analysis

Items	M.	S.D.	Asymmetry	Kurtosis
1	4.83	.39	-2.258	4.334
2	4.85	.35	-2.026	2.139
3	4.77	.44	-1.605	1.374
4	4.68	.63	-2.212	5.034
5	4.71	.52	-1.653	1.892
6	4.63	.59	-1.631	2.851
7	4.74	.52	-2.272	6.259
8	4.69	.52	-1.543	1.506
9	4.64	.54	-1.206	.490
10	4.68	.59	-1.957	3.869
11	4.78	.48	-2.188	4.124
12	4.65	.59	-1.805	3.274
13	4.78	.46	-2.142	3.974
14	4.79	.44	-2.052	3.528
15	4.78	.42	-1.742	1.913
16	4.74	.50	-1.834	2.580
17	4.65	.57	-1.681	3.259
18	4.68	.56	-1.605	1.639
19	4.69	.51	-1.429	1.107
20	4.70	.47	-1.155	-0.76
21	4.73	.46	-1.308	.365
22	4.68	.57	-1.926	3.980
23	4.74	.52	-1.993	3.166

For its part, Kaiser-Meyer-Olkin (KMO) index is a measure of sample adequacy used in principal component analysis, with the intention of evaluating whether the data are

suitable for performing the analysis. Specifically, KMO shows a value of .866, while Bartlett's Sphericity test also shows a significant value of 1713.732 (gl=253; p= .000). Thus, it is confirmed that there are relevant relationships between the variables under study, so that it is feasible to continue with the Exploratory Factor Analysis.

Factor extraction method was applied using principal components and Varimax rotation, with the intention of defining the underlying structure of the construct under study of the questionnaire. In this way, 4 factors have been obtained that explain 62.87% of the variance. The first factor explains 44.07% of the total variance, while the rest of the components present a significantly lower explained variance than the first: 7.4% for the second factor, 6.1 for the third and 5.1 for the fourth factor (Table 2).

Table 2
Factor extraction

Factor	Initial Eigenvalues			Sums of charges squared of the extraction		
	Total	% variance	% accumulated	Total	% variance	% accumulated
1	10.137	44.074	44.074	10.137	44.074	44.074
2	1.723	7.493	51.568	1.723	7.493	51.568
3	1.416	6.157	57.725	1.416	6.157	57.725
4	1.184	5.150	62.874	1.184	5.150	62.874

The assignment of each item to a factor follows criteria that include the consideration of loadings greater than .35 (Bandalos & Finney, 2018) or meeting the required minimum of 3 or 4 items per factor (Ferrando & Anguiano, 2010). Results obtained demonstrate how, for each of these factors, items present appropriate values that range between .781 (maximum value) and .424 (minimum value). Table 3 shows the initial matrix of rotated components, which determine the factor loadings for each of the items according to factors:

1. Factor 1 is called “Contributions to learning” and includes 8 items with significant factor loadings ranging from .424 to .767, which best explains the variance of the instrument. This is the most significant component for the construct to be investigated. To this end, it includes items that attempt to examine the possibilities of dialogic learning for teaching instrumental knowledge to university students: 10. Facilitates collaboration between students to improve learning for all; 12. Allows individual difficulties to be transformed into learning opportunities for all; 17. Brings the theoretical content of the subject closer to the student's context; 18. Promotes student motivation for learning the subject; 19. Responds to the learning demands and needs of the student; 20. Improves the student's knowledge of the subject content; 21. Promotes the student's personal development; 22. Improves the student's academic and professional development.
2. Factor 2 is called “Dialogue and communication skills” and includes 7 items with factor loadings with values greater than .562. It focuses on understanding the university student’s assessment of learning communication skills through dialogic discussions, which are a necessary tool to respond to the needs of today’s society. To this end, this component includes among its items: 1. It allows all participants to have the opportunity to express their opinion; 2. It encourages all interventions to be listened to with respect; 7. It contributes to improving the student's communication

skills; 8. It encourages the acquisition of competencies to respond to the needs of today's society; 9. It promotes the development of skills related to the critical analysis of information; 11. It creates an environment of active participation in the classroom; 16. It allows the student to be the protagonist of his or her learning.

3. Factor 3 is called “Diversity and social inclusion” and includes 4 items with factor loadings with values greater than .602. This component aims to examine the student's ability to develop learning that allows the participation of all based on items such as: 13. Promotes different opinions among participants; 14. Allows each student to participate in the activity, regardless of their individual characteristics; 15. Encourages each student to understand the individual characteristics of all participants as an enriching element; 23. Encourages overcoming inequalities among participants.
4. Factor 4 is called "Dialogic reflection"; it includes 4 items with values between .494 and .781. It focuses on the analysis of the student's abilities to reflect on certain personal issues that may affect their future academic and professional activity, based on items such as: 3. It enables agreements to be reached based on the reflections of students and teachers; 4. It promotes student reflection on issues related to their future teaching profession; 5. It allows the sharing of personal experiences among participants; 6. It facilitates the understanding of complex concepts related to the subject.

Table 3
Rotated component matrix

Items	F1	F2	F3	F4
1. Allows all participants the opportunity to express their opinion		.584		
2. Ensures that all interventions are listened to with respect		.669		
3. Enables agreements to be reached based on the reflections of students and teachers				.651
4. Promotes student reflection on issues related to their future teaching profession				.494
5. Allows sharing of personal experiences among participants				.750
6. Facilitates the understanding of complex concepts related to the subject				.781
7. Contributes to improving the student's communication skills		.778		
8. Promotes the acquisition of skills to respond to the needs of society today		.562		
9. Promotes the development of skills related to the critical analysis of information		.584		
10. Enables collaboration between students to improve everyone's learning	.467			
11. Create an environment of active participation in the classroom		.599		
12. It allows individual difficulties to be transformed into possibilities for learning for all	.424			
13. Promotes different opinions among participants			.616	
14. Allows each student to participate in the activity, regardless of their individual characteristics			.749	
15. It helps each student understand the individual characteristics of all participants as an enriching element			.726	
16. Allows the student to be the protagonist of their learning		.659		
17. Brings the theoretical content of the subject closer to the student's context	.629			
18. Promotes student motivation for learning the subject	.749			
19. Responds to the learning demands and needs of the student	.767			
20. Improves the student's knowledge of the subject content	.620			
21. Promotes the student's personal development	.568			
22. Improves the student's academic and professional development	.647			
23. Promotes the overcoming of inequalities between participants			.602	

Furthermore, the degree of correlation between the dimensions of the questionnaire has been examined based on the Pearson Correlation analysis, taking as reference the range proposed by Hernández et al. (2014) (Table 4). Results show that all the factors in the questionnaire present significant relations. Correlations between dimension 1 "Contributions to learning" and dimension 2 "Dialogue and communication skills" have obtained the highest correlation values (r= .742). For its part, correlations between dimension 3 "Diversity and social inclusion" and dimension 4 "Dialogical reflection" have obtained lower values (r= .490).

Table 4
Correlations between dimensions

Dimensions	D1. Contributions to learning	D2. Dialogue and communication skills	D3. Diversity and social inclusion	D4. Dialogical reflection
D1	1.000	.742	.657	.684
D2	.742	1.000	.636	.593
D3	.657	.636	1.000	.490
D4	.684	.593	.490	1.000

Reliability analysis

To analyze the reliability of the questionnaire, a method based on Cronbach's Alpha Coefficient was used at a global level and for each factor.

Results reveal an excellent level of reliability in the questionnaire, since the coefficient is close to the value 1, considered the perfect correlation. Furthermore, a two halves method has been applied, also obtaining quite positive results, since for the first part a value of .894 has been obtained, while for the second the value obtained is .897.

These data are justified by the contributions of authors such as Barrios & Cosculluela (2013) for whom adequate reliability values should range between .70 and .95. Values close to 1 may imply redundant items that do not provide relevant information about the object of study that is to be measured with the instrument. For their part, authors such as Hair et al. (2018) or Taber (2018) point out that the minimum acceptable is .70, so values higher than this data express an adequate relationship between the questions in the questionnaire.

DISCUSSION AND CONCLUSIONS

Results have shown that the instrument validated in this work serves the purpose for which it was designed. It allows analysis of the student's perception of the methodology used in the dialogic learning experiences in which they participate. It is an instrument built on a theoretical basis based on the seven principles of dialogic learning, such as: egalitarian dialogue, cultural intelligence, transformation, instrumental dimension, creation of meaning, solidarity and equality of differences. Its origin being the INCLUD-ED project (2011) developed by the European Commission.

The questionnaire is reliable and valid for the objective of the research. It is a scale made up of four main factors that try to respond to the objective for which it has been designed.

Factor “Contributions to learning” coincides with the research objective carried out by Simpson (2015, 2016) where the relevance of the pedagogical value of this methodology in Higher Education is presented.

For its part, “Dialogue of communication skills” factor values the promotion of learning communicative competence in students, taking into account both the development of listening and communication. However, as proposed by Gràcia et al. (2020), systematic training of this type of competence is not promoted at the curricular level.

“Diversity and social inclusion” factor assesses the student's ability to develop learning based on the importance of the integration of all students. This implies raising awareness among students about equality and inclusion in different contexts. Furthermore, it allows us to work in accordance with quality education for all, this being one of the great objectives in any educational system around the world (Ainscow, 2020).

Finally, “Dialogical reflection” factor examines the skills that students develop to reflect on personal and professional issues, thus improving their learning. Research such as that carried out by Canabal et al. (2017) highlight the importance of training students so that they can be trainers who contribute to the reflective development of the students they teach. Therefore, training for the development of critical thinking contributes to having critical professionals (Fernández-Fernández et al., 2016; Özcan, 2020).

In short, it can be stated that this instrument is appropriate and necessary to assess the impact that dialogic learning has had on university students, understood as an active and innovative methodology that promotes meaningful student learning. With this type of research, we contribute to the pedagogical change that Higher Education is experiencing in recent years, to achieve improvement in educational quality (UNESCO, 2021), thus moving away from traditional teaching through other active methodologies (Crisol-Moya et al., 2020; Forndran & Zacharias, 2019).

This instrument makes it easier for the teacher to assess the students' evaluation of the implementation of innovative methodologies that involve dialogic learning. This means a practical implication in the educational policy since it leads to the improvement of the quality of education. Thus contributing to the philosophy put forward in the European Higher Education Area. Among its consequences is the learning of competencies and skills that are significant for the development of today's society. Achieving that participatory and inclusive teaching of the student body is promoted (Gutiérrez-Rodríguez, 2017), along with critical thinking, reflection and creativity of students (Bezanilla et al., 2019; Latorre-Cosculluela et al., 2020).

In addition, Higher Education must move towards achieving the Sustainable Development Goals established by the United Nations in the 2030 Agenda. Among other actions, it recommends curricular sustainability as an educational practice, where methodologies predominate that lead to the achievement of Goal 4 focused on “providing an education of quality, inclusive and egalitarian at all levels” (CRUE, 2022; De Hann, 2010; Geli et al., 2019; Miñano & García, 2020). To this end, United Nations (2017) establishes some methodological guidelines to comply with the SDGs where

dialogic learning would be one of the most suitable (Danaher et al., 2021; Martínez-Valdivia et al., 2021).

As for the limitations of this study, we can point out the cultural bias that its design may entail, since it covers a specific sample located in a single Spanish university. For this reason, we could highlight the need to carry out a broader analysis based on a probabilistic sampling that would allow generalization of the sample and eliminate possible sampling biases.

As a future line of research, it is possible to propose the design of subsequent studies in which the translation and validation of this data collection instrument into other languages could be considered, in order to be used in other international higher education institutions. This would improve the instrument, contributing to the reduction of cultural biases that it could have.

Furthermore, this instrument can be extrapolated and adapted from Higher Education to other educational stages in which dialogic learning is implemented as a teaching methodology, such as Primary Education, Secondary Education and especially adult education, due to the adequacy of this methodology with the fundamental principles of andragogy, which are based on dialogue and communication (Bubolz-Lutz et al., 2022). Likewise, it could be useful not only in formal education contexts, but also to analyze and assess the implementation of this methodology in non-formal education projects and initiatives. In addition, it seems appropriate to highlight the need to design and validate other instruments that allow us to know the assessment towards dialogic learning of teachers who implement this methodology in order to obtain a more global vision of this learning process.

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