DOI: 10.26387/bpa.2024.00008

Towards a student-centered education: Validation of the Italian version of the Conceptions of Learning and Teaching questionnaire

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ABSTRACT. Il presente studio osservazionale e multicentrico ha lo scopo di tradurre e validare la versione italiana del questionario *Conceptions of Learning and Teaching* (*COLT-IT*). Lo studio ha coinvolto 394 docenti afferenti a 13 diverse Scuole mediche italiane. Le analisi statistiche eseguite, rispetto alla versione originale dello strumento, hanno portato all'eliminazione di uno dei tre fattori e di 11 dei 18 item. Il COLT-IT risulta quindi essere composto da 7 item e due fattori che hanno confermato i nomi originali di Teacher centredness (TC) e Appreciation of active learning (AL). Il COLT-IT è uno strumento valido, affidabile e di facile somministrazione, utile a sostenere nel panorama della medical education internazionale la transizione da un modello formativo tradizionale centrato sul docente ad un modello attivo centrato sullo studente.

SUMMARY. Many medical schools have transitioned from traditional teacher-centred education to active student-centred education. The Conception of Learning and Teaching (COLT) questionnaire investigates teachers' conceptions of learning and teaching in student-centred medical education. This observational and multicentred study aims to validate the Italian version of the Conceptions of Learning and Teaching (COLT-IT) questionnaire and assess the Italian medical educators' learning and teaching conceptions. To develop the COLT-IT, a back-translation was performed. The COLT-IT and socio-demographic questionnaires were electronically distributed to educators across 13 Italian medical schools. Analyses included explorative factor analysis (EFA), confirmatory factor analysis (CFA), and reliability analysis. A total of 394 medical teachers completed the survey. Although the EFA suggested retaining three factors, statistical conditions led to the exclusion of eleven of the original eighteen items and one factor. The CFA confirmed the bi-dimensional structure of the COLT-IT. The two-factor scale retained the original naming of subscales: Teacher centredness (TC) and Appreciation of active learning (AL). Approximately 50% of participants exhibited high levels of AL, while scores in the TC subscale were more varied. No differences emerged based on gender, age, or the geographical location of the medical school. The 7-item COLT-IT is a reliable, valid, robust, and easy-to-administer tool for promoting and monitoring the implementation of a student-centred approach in medical education.

Keywords: *Cooperative learning, Higher education, Teacher attitudes*

INTRODUCTION

In contemporary society medical students are requested to develop sound technical and clinical medical knowledge as well as effective communication and relational skills (Dent, Harden & Hunt, 2017). In response to these evolving demands, many medical schools have transitioned from the traditional teacher-centred education (TCE) to student-centred education (SCE) (McLean & Gibbs 2010). TCE places teachers and lecturers at the centre of the learning process, with students functioning as passive knowledge repositories (Harden, Sowden & Dunn, 1984). On the other hand, SCE is characterized by a greater attribution of responsibility to students, who become active elements of their own learning processes, while teachers take on the role of facilitators of these processes (Attard, Di Iorio, Geven & Santa, 2010). This paradigm shift has led to the introduction of innovative teaching methods in many medical curricula, including problem- and case-based learning (McLean, 2016; Nundy, Kakar & Bhutta, 2022), team-based learning (Michaelsen, Sweet & Parmelee, 2011), communication skills training (Rotthoff et al., 2011), and medical humanities (Wald, McFarland & Markovina, 2019).

Research indicates that SCE is associated with numerous advantages and positive outcomes for students and teachers in healthcare (Hopper & Brake, 2018). Compared to TCL, SCE has proven to enhance academic motivation, satisfaction, and confidence and fostering deeper learning in students (Covill & Cook, 2019; Grijpma, Mak-van der Vossen, Kusurkar, Meeter & de la Croix, 2021). Furthermore, it has been linked to improved team working abilities, effective communication (Li, Wang, Zhu, Zhu & Sun, 2019; Sulaiman, Shahimi & Zakaria, 2021), clinical reasoning (Ulfa, Igarashi, Takahata, Shishido & Horiuchi, 2021), critical thinking (Xhomara, 2022), patient-centredness (Bombeke et al., 2010) and greater problem-solving performances (Kim, Song, Lindquist & Kang, 2016). Despite these promising benefits, SCE is not widely implemented at the university level yet (McLean & Gibbs, 2010). A critical issue associated with the implementation of the SCE is represented by teachers' explicit and implicit conceptions of learning and teaching (Postareff, Lindblom-Ylänne & Nevgi, 2008). Learning and teaching conceptions encapsulate teachers' attitudes and beliefs regarding the learning and teaching processes, though these may not be directly manifested in their teaching strategies, which represent teachers' observable didactic behaviours (Pajares, 1992). Nevertheless, changes in teaching strategies can only occur when shifts in teachers' conceptions and attitudes toward education take place (Trigwell & Prosser, 1996). Despite the evolving landscape of education, many lectures and academics remain attached to traditional curriculum, making it challenging to persuade them to adopt innovative teaching methods (Kember, 2009). Therefore, assessing teachers' conceptions becomes imperative to design interventions and strategies aimed at promoting SCE.

Several instruments assessing educators' teaching and learning conceptions are available, including: 1) the *Learning Inventory* (Bolhuis & Voeten 2004); 2) the *Approaches to Teaching Inventory* (Trigwell, Prosser & Waterhouse, 1999); 3) the Motivat*ion Strategies for Learning Questionnaire* (Postareff, 2007); 4) the *Inventory of Teaching Patterns* (Donche, De Maeyer & Van Petegem, 2007); 4) the *Teaching Perspectives Inventory* (Pratt & Collins, 2001) and 5) the *Conceptions of Learning and Teaching* (Jacobs et al., 2012). Among these tools, the *Conceptions of Learning and Teaching* (*COLT*; Jacobs et al. 2012) has been specifically developed to investigate teachers' conceptions of learning and teaching in the context of the student-centred medical education. Notably, there are no other validated instruments measuring teachers' conceptions of learning and teaching available in Italian. The availability of the Italian version of COLT (COLT-IT) represents a promising instrument that can provide valuable insights for promoting and monitoring the implementation of more student-centred teaching in the Italian educational context. This could help bridge the gap with the international context and establish a standardised Italian pathway for medical training (Carvalho, Dane & Whicker, 2021; Jacobs et al., 2014).

AIMS

This study aimed to achieve three primary objectives: 1) translate and validate the Italian version of the COLT (Jacobs et al. 2012); 2) verify its psychometric properties; 3) assess conceptions of learning and teaching in a diverse sample including lecturers, professors, laboratory tutors and clinical mentors (healthcare professionals who work in hospital and clinical structures) from various Italian medical schools.

In validating the Italian version of COLT, our expectations included confirming the three-factor structure of the tool

and finding no significant differences in the data across medical schools in different Italian regions. Additionally, we anticipated observing a higher inclination towards teacher-centeredness in our sample compared to an appreciation for active learning.

MATERIALS AND METHOD

Materials

Self-report questionnaires collected participants' socio-demographic and professional information (gender, age, university, academic role, seniority) and their conceptions of learning and teaching in medical education. The latter was measured with the Italian translation of the COLT (Jacobs et al. 2012). The original COLT was built using the Delphi method starting from the multifactorial structure of the *Learning Inventory* (Bolhuis & Voeten, 2004) and a confirmatory factor analysis (CFA) was performed to analyse the data. It consists of 18 items evaluated on a 5-point Likert scale (1 = completely disagree; 5 = completely agree). The questionnaire presents three subscales: 1) the Teacher centeredness (TC) scale (8 items, Cronbach's α = .73) evaluates the teacher's orientation in considering teaching as a transmission of knowledge with student in a passive position; 2) the Appreciation of active learning (AL) scale (5 items, Cronbach's α = .57) evaluates the appreciation of the constructivist vision of learning based on a conceptual change of students and 3) the Orientation to professional practice (P) scale (5 items, Cronbach's α = .63) evaluates teachers' conceptions regarding the integration of future professional practice during the years of undergraduate medical education. In order to develop the Italian translation and adaptation of the COLT, a back-translation process was performed (Brislin, 1986) using four bilingual translators.

Method

The present research is an observational, multicentred and non-randomized study. Participants were recruited electronically through a convenient snowballing non-probabilistic sampling method. The Italian Society of Medical Education (SIPeM) and the Permanent Italian Conference of the Directors of Undergraduate Medical Schools invited 13 Medical Degree Program Directors via institutional emails to share the survey link among their lectures and professors.

The invited medical schools were selected to ensure equal distribution between the Northern and the Southern regions of the country.

Ethical approval

The study was approved by the Ethics Committee of the University of Milano - Bicocca (Protocol number 0109004/19 of 12/12/2019).

Strategy of data analyses

The dataset was preliminarily tested performing an analysis of multivariate outliers using the Mahalanobis' distance (set at $p<.001$) (Leys, Klein, Dominicy & Ley, 2018). The data analyses were based on the standard procedure for instrument development (Matsunaga, 2010). An exploratory factor analysis (EFA) was initially performed using the factor analysis method (FA) to extract the factors followed by orthogonal rotation of factors using Varimax rotation. As questionnaire items are ordinal variables and given that the FA model assumes that manifest variables are linear combinations of continuous common factors, the weighted least squares method (WLS) (Muthén, 1984) for factor analysing ordinal variables was used. This method assumes an unobservable normally distributed continuous variable underlies each observed ordinal variable in the population. The number of factors to be retained was guided by parallel analysis (PA) (Horn, 1965). Only the items that met statistical conditions of primary (less than |.45|; Comrey & Lee, 1992) and secondary loadings (greater than |.20|) were retained. The output obtained from the EFA was used as a baseline to perform subsequent psychometric analyses.

Then, a confirmatory factor analysis (CFA) was performed (Gagne & Hancock, 2006) using the diagonally weighted least squares (DWLS) estimation specifically designed for ordinal data. To evaluate the goodness of fit of the model tested in the CFA, the following indexes were calculated: χ^2 ($p>.05$), Root Mean Square Error of Approximation (RMSEA) (acceptable<.10, good<.08, very good<.05), Standardized Root

Mean Square Residual (SRMR<.05), Comparative Fit Index (CFI>.90) and Tucker-Lewis Index (TLI>.90) (Morin, Marsh & Nagengast, 2013). The assumption of uni-dimensionality of the model (M1) was initially tested (Judd, Jessor & Donovan, 1986). This analysis was performed to evaluate the discriminant validity and to compare the goodness-of-fit indices of a single-factor measurement model with a model consisting of all the instrument's characteristics (Judd et al., 1986). Following the indications provided by the EFA, two other CFA models were performed to achieve good model adaptability indexes (M2 and M3).

The psychometric properties of the COLT-IT were then analysed. To acquire a quantitative representation of the Italian medical teachers' student-centeredness or teacher-centeredness, the χ^2 analysis was performed to evaluate the possible differences in the answer distributions for geographical location of the medical school (North and South), gender (female and male), and age (less equal 55 and over 55).

RESULTS

Participants

A total of 401 medical teachers completed the survey, out of which seven multivariate outliers were identified and subsequently excluded. The final sample comprised 394 participants, which is considered a good sample size for validation procedures, where 21.9 participants per item are recommended (Suresh & Chandrashekara, 2012). The participants aged between 27 and 73 years (M = 55.67; SD = 9.31) and their seniority extended from a minimum of 1 year to a maximum of 45 (M = 22.18, SD = 10.45). Table 1 reports the socio-demographic characteristics of the participants.

Exploratory factor analyses (EFA)

An EFA was conducted from the data collected from the 394 participants. We checked that each item had at least one polychoric correlation greater than |.30|. The Kaiser-Meyer-Olkin (KMO) test was .82, indicating that the sample was adequate. The Bartlett's test results statistically significant (χ^2 = 3106.735; p = .000), indicating that the relationship among the variables was strong and the data were suitable to conduct an EFA.

The PA suggested to consider three factors (Cattell, 1966). An accepted rule of thumb is to consider 5 to 10 cases per parameter (Kline, 2011). Accordingly, three-factor model in this study required a minimum sample size of 45 or 90. In this analysis, to obtain a simpler solution with an easier interpretation of its result, a Varimax rotation was performed. Two criteria were used to select items to be retained: each item must not have the primary loading less than |.45| (Comrey & Lee, 1992) and the high secondary loading greater than |.20|. Only the items that met the two conditions simultaneously were included in the analysis. After the items inclusion/exclusion process a two-factor model emerged. The two factors were named as follows: Factor 1, Teacher centeredness (TC) included four items (items 1-2-4-5) and showed factor loadings ranging from .54 to .61; Factor 2, Appreciation of active learning (AL) included three items (items 10-13-18) with a factor loading from .61 to .89 (see Table 2).

As for the variance explained by the two factors, 26% of the variance was explained by TC and 16% by AL, totalling an explained variance of 42%.

Confirmatory factor analyses (CFA)

The hypothesis of uni-dimensionality of the model (M1) was preliminarily tested. The analyses of goodness of fit indexes revealed a general poor fit between the model and empirical data [$\chi^2_{(135)} = 1502.10, p = .000$, TLI = .735, CFI = .766, RMSEA = .165, p = .000, SRMR = .151] and suggested to reject the hypothesis of a single latent factor. Then, the three-dimensional model (M2) was tested as indicated by the questionnaire original version (Jacobs et al., 2012). Results of CFA reveal that also M2 is characterized by numerous goodness-of-fit indices far from the acceptability threshold [$\chi^2_{(132)} = 747.49, p = .000$, TLI =. 878, CFI = .895, RMSEA = .112, p = .000, SRMR = .112] (see Figure 1). Considering the EFA results, a two-dimensional model (M3) was tested. The factor 1 and 2 have a low correlation (.04). Results of CFA suggested the acceptability of the factorial model underlying the two-dimensional model M3: $\chi^2_{(13)}$ = 17.56, p = .174, TLI = .991 CFI = .994, RMSEA = .031, p = .804, SRMR = .045. In particular, the saturation values of all items were medium-high ranging from λ = .51 to λ = .88 (see Figure 2). The theoretical interpretation of the COLT-IT factors supported

Table 1 – Socio-demographics characteristics of the participants

	Total sample (N = 394)	
	N	%
Gender		
Female	170	43
Male	223	57
Academic role		
Full professor	115	29.2
Associate professor	166	42.1
Researcher	103	26.1
Research fellow	3	.8
Lecturers	7	1.8
University geographical location		
North Italy (N = 9)	199	50.6
South Italy (N = 4)	194	49.4

the maintenance of the original naming: Teacher centredness (TC) and Appreciation of active learning (AL).

Reliability, convergent validity, and descriptive statistics of COLT-IT

The convergent validity of the measurement model has been assessed by the average variance extracted (AVE) and the composite reliability (CR). The discriminant validity was assessed by the heterotrait-monotrait ratio (HTMT) of the correlations (Henseler, Ringle & Sarstedt, 2015). CR values between .7 and .9 are considered satisfactory (Nunnally, 1978). In this analysis it was .84. For constructs with categorical items, ordinal coefficients alpha was calculated (Zumbo, Gadermann & Zeisser, 2007). They were .67 for TC and .78 for AL. The AVE is calculated from polychoric correlation matrix. It was .34 for TC factor and .56 for AL factor. AVE values greater than .50 indicate that, on average, the construct explains more than half of the variance of its indicators. AVE values less than .50 indicate that the error in the items is greater than the variance explained by the construct. In order to clearly discriminate between two factors, the HTMT should be significantly smaller than 1. If the value of the HTMT is higher than 1, there is no discriminant validity. In this study HTMT between TC factor and AL factor was .14 showing a good discriminant validity.

Descriptive statistics are reported in Table 3. No significant differences in the answer distributions of the two COLT factors emerged for geographical location of the medical school, gender, and age, supporting the empirical adoption of the COLT-IT.

Table 2 – Results of EFA: two dimensions composed of 3 and 4 items respectively were accepted

Items	*F1*	*F2*	*F3*	*Communalities*	*Primary>|.45|*	*Secondary<|.20|*
COLT_1	**.54**	.04	.13	.31	.54	.13
COLT_2	**.59**	−.02	−.10	.36	.59	−.10
COLT_3	.70	.31	−.07	.59	.70	.31*
COLT_4	**.61**	.00	.05	.37	.61	.05
COLT_5	**.58**	.15	.18	.39	.58	.18
COLT_6	.49	.09	.33	.36	.49	.33*
COLT_7	.62	−.21	.16	.45	.62	−.21*
COLT_8	.37	−.34	.02	.25	.37*	−.34*
COLT_9	−.29	.58	−.02	.42	.58	−.29*
COLT_10	.08	**.61**	.18	.41	.61	.18
COLT_11	.13	.59	.27	.44	.59	.27*
COLT_12	.08	.55	.22	.36	.55	.22*
COLT_13	−.03	**.66**	.18	.47	.66	.18
COLT_14	.08	.26	.60	.43	.60	.26*
COLT_15	.11	.42	.81	.84	.81	.42*
COLT_16	.16	.55	.52	.60	.55	.52*
COLT_17	.28	.64	.27	.56	.64	.28*
COLT_18	−.04	**.89**	.14	.81	.89	.14

Note. * the item not meet the condition and was excluded.

DISCUSSION

This psychometric validation study aimed at validating the Italian version of the *Conceptions of Learning and Teaching* (*COLT-IT*) instrument and at exploring its dimensions in a group of Italian medical teachers. The findings support the use of the 7-item COLT-IT, which comprises two dimensions: Teacher-centredness (TC) (4 items) and Appreciation of active learning (AL) (3 items).

The results of this study revealed a reliable, valid, and solid questionnaire, which loaded onto two factors rather than the three identified in the original validation work (Jacobs et al., 2012). Although the results of PA initially suggested retaining three factors, the statistical criteria for retaining items led to the exclusion of eleven items (original items 3, 6, 7, 8, 9, 11, 12, 14, 15, 16, 17) and subsequently the elimination of one factor. The CFA confirmed the bi-dimensional structure of the questionnaire. Notably, a bi-dimensional structure has also

Figure 1 – CFA results of the original three-dimensional model of measurement of COLT (M2)

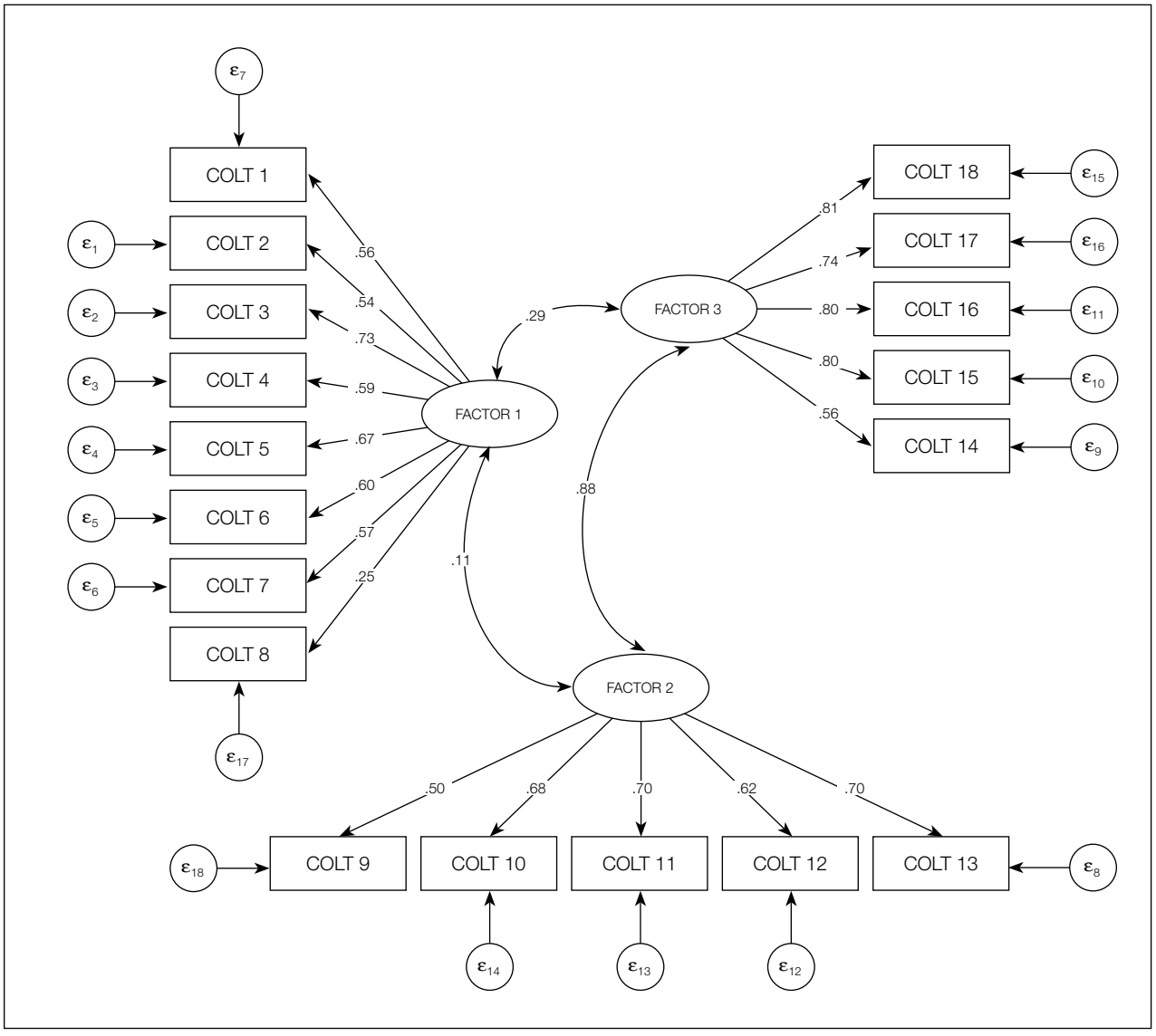

Figure 2 – CFA results of final two-dimensional model of measurement of COLT (M3)

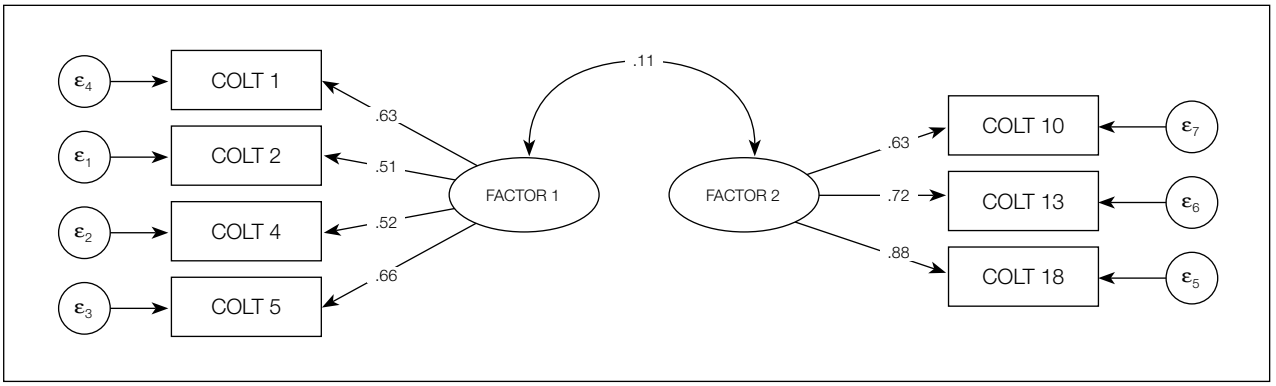

Table 3 – Demographic characteristics and psychometric proprieties of the COLT-IT subscale: Teacher centredness (TC) and Appreciation of active learning (AL)

	Teacher centerdness (TC)											*Appreciation of active learning (AL)*										
	1		2		3		4		5			1		2		3		4		5		
Variables	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*p-value*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*p-value*
Area											.070											.238
North	6	3.2	20	10.8	42	22.6	62	33.3	56	30.1		0	.0	5	2.7	20	10.8	73	39.2	88	47.3	
South	6	3.2	20	10.8	33	17.7	45	24.2	82	44.1		3	1.6	8	4.3	27	14.5	63	33.9	85	45.7	
Gender											.887											.929
Males	4	2.5	15	9.4	33	20.8	49	30.8	58	36.5		1	.6	7	4.4	21	13.2	56	35.2	74	46.5	
Females	7	3.3	25	11.7	42	19.7	58	27.2	81	38.0		2	.9	6	2.8	27	12.7	79	37.1	99	46.5	
Age											.972											.373
≤55	5	3.4	18	12.2	29	19.6	43	29.1	53	35.8		0	.0	8	5.4	20	13.5	54	36.5	66	44.6	
>55	7	3.2	22	10.0	45	20.5	63	28.6	83	37.7		2	.9	5	2.3	26	11.8	81	36.8	106	48.2	

been reported in the COLT version for postgraduate students (Pacifico et al., 2021). The theoretical interpretation of the two-factor scale supported retaining the original naming: Teacher centredness TC and Appreciation of active learning AL. Despite the exclusion of 11 items and the disparities observed with both the original COLT and the validation by Pacifico and colleagues (2021), it is noteworthy that the two factors of the COLT-IT exhibit high consistency, as evidenced by the Cronbach's alpha indices, which are higher than those reported in previous validations.

The absence of the original factor in the COLT-IT is notable. This factor represents the teacher's belief regarding the integration of future professional practice during undergraduate medical education. Over the past few decades, Italian medical programs have undergone significant innovation and reform aimed at professionalising teaching (Consorti, 2018). However, despite these efforts, most Italian medical schools have remained predominantly theoretical-oriented compared to their counterparts in other European countries (Snelgrove et al., 2009). Hence, the absence of the P factor in the COLT-IT appears to align with this cultural tendency. The P factor items appear to be misunderstood by Italian medical educators, who may not fully-grasp the concept of learning to serve practice. Instead, Italian medical teachers tend to prioritise the professionalization of medical education by implementing innovative active teaching methods centred on students, aimed at enhancing students' soft skills such as problem-solving, team-working, and critical thinking (Familiari, Violani, Relucenti & Heyn, 2013). It is possible that Appreciation of active learning (AL) among Italian teachers conceptually overlaps with their Orientation to professional practice (P). This hypothesis is supported by the high correlation between these two factors observed in the second model tested in the CFA. Moreover, similar overlapping between the AL and P has been found in the COLT version for postgraduate students, where the authors combined the P and AL factors in the A-P factor (Pacifico et al., 2021). In Pacifico's study, out of the 5 items originally in the P factor, three were removed (items 15, 17 and 18), and the remaining two (items 14 and 16) loaded on the combined factor A-P. Interestingly, in our study, items 15 and 17 were also removed. However, in contrast to Pacifico's findings, items 14 and 16 were removed in our study and did not shift to the AL factor, while item 18 did shift to AL. This discrepancy between our results and those of Pacifico may be attributed to differences in the target population. Specifically, item 18 ("Discussing topics with each other helps students to learn how to deal with different points of view, so as to gain a deeper understanding") was removed in Pacifico's study due to its significant disturbance. The author suggested that for residents, "the emphasis at this point is on actual activities that induce learning and not on theoretical discussion" (Pacifico et al., 2021).

It is however, possible that the absence of the P factor and the exclusion of eleven items in our study and the overlapping of the factor P and factor AL in Pacifico's study could also be attributed to the EFA used in this study, which differed from the original questionnaire development process where a Delphi method employed (Jacobs et al., 2012). Further studies conducted in different cultural and learning contexts are necessary to validate this hypothesis. As for the 5 items originally belonging to the AL factor, three items have been removed in our analysis (item 9, 11 and 12). In Pacifico and colleagues (2021), only item 9 was removed. This difference in results with Pacifico's one may be linked to the different study population. Item 11 ("Small group learning motivates students to study") and item 12 ("I think it is more important for students to be able to analyse and critically appraise subject matter than to memorise facts") describe educational activities that in the Italian context are traditionally seen as both more appropriated and feasible for residents rather than undergraduate students (Consorti, 2018).

When comparing the eight items of the original TC factor, four items were removed in our study (items 3, 6, 7, and 8), whereas in Pacifico's study, only one item was removed (item 8). One possible explanation for this difference is once again related to variations in the study populations.

Items 3 ("Students learn best when the learning process is guided by an expert who has an overview of the field of interest"), 6 ("As a teacher, I have to indicate clearly what is important and what is less important for the students to know"), and 7 ("I think that as an expert in my field, I am eminently suitable to transmit my knowledge to students and that students should not have to look up that knowledge for themselves") express strong positions regarding learning and teaching, which may be traditionally associated with practical and clinical competencies rather than theoretical knowledge.

Analysing the distribution values of the COLT-IT dimensions, it was observed that nearly half of the Italian medical teachers scored high on the AL factor, with no significant differences based on gender, age, or medical

school geographical location. Conversely, the distribution of agreement with the TC factor was more varied, possibly reflecting the ongoing educational paradigm shift characterising Italian medical schools. No difference emerged for gender, age, or medical school geographical location. Interestingly, the absence of gender and age differences diverge from existing data indicating a tendency for female teachers to prefer active teaching (Norton, Richardson, Hartley, Newstead & Mayes, 2005), while male teachers tend to favour teacher-centredness (Jacobs et al., 2015). Previous studies have also shown that more teaching experience, often associated with age and academic status, is linked to a more student-centred approach (Jacobs et al., 2015; Sadler, 2012). Furthermore, teachers' conceptions of learning and teaching have been proven to be influenced by several contextual (e.g. type of medical school, curriculum, department management, leadership style) and personal factors (e.g. agency, work engagement, motivation, content expertise (Jacobs et al., 2014, 2015, 2016, 2020). As the present study did not explore these factors, further investigations are warranted to analyse the personal, professional, and cultural variables associated with Italian medical teachers' conceptions of learning and teaching.

Practice implications

The availability of this concise questionnaire can cater to both research and education assessments. The COLT-IT enables the measurement, systematization, and dissemination of didactic innovation efforts within Italian medical schools. Furthermore, the COLT-IT can serve as a valuable tool for promoting and monitoring the educational paradigm shift to a more SCE, informing faculty development strategies. It also provides an opportunity to bridge reduce the gap with the international context and establish a uniform Italian path to medical training (Familiari & Consorti, 2013).

Strenghts, limitations and future directions

The present study has several limitations that warrant acknowledgment. Firstly, although we have evaluated the convergent validity using the average variance extracted, it would be appropriated to evaluate it with other correlated constructs including patient-centredness, self-efficacy, and burnout. Secondly, this study relied solely on self-report measures. Utilising an ecological study design characterised by external observation of teachers' didactic practices could provide additional insights into the validity of the COLT-IT. Additionally, the absence of other validation studies of the COLT restricts both the statistical and cultural discussion surrounding its implementation and interpretation.

Furthermore, we opted to conduct exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) on the same sample instead of dividing the population into two groups. This decision was made to avoid a significant reduction in the sample size. Dividing the sample into two groups would have resulted in too few subjects per item. A similar approach was taken by Pacifico and colleagues (2021), who had a comparable sample size to ours. These limitations should be considered when interpreting the findings of this study.

While recent research (Jacobs et al., 2020) has supported the validity of using COLT internationally, this study represents the first validation of the COLT in a different language. A notable strength of this study is the demonstration that the COLT-IT is a concise questionnaire with optimal statistical characteristics. The availability of such a questionnaire, consisting of only 7 items and easy to administer, has the potential to encourage increased research in this area.

Future qualitative and quantitative studies are recommended to delve deeper into the external validity of the COLT-IT and to explore teachers and students' opinions regarding the implementation of a student-centred approach in Italian medical schools. Additionally, the COLT-IT could be used to investigate variables associated with teaching attitudes, enabling the implementation of targeted faculty development and training strategies. In a broader context, further translation and validation studies would facilitate the assessment of cultural factors' impact on teachers' conceptions of teaching and learning.

CONCLUSION

The Italian 7-item version of the COLT emerges as a valid, reliable, and sensitive instrument for evaluating teachers' conceptions of learning and teaching. Italian medical schools stand to benefit from its use in monitoring and promoting the educational paradigm shift towards a more

SCE, thereby informing strategies for faculty development. Notably, this study represents the first validation of the COLT in a different language, and its availability may catalyse expanded international research on teachers' conception of learning and teaching, as well as on faculty development strategies.

Declaration of interest statement: The Authors have no relevant financial or non-financial conflicts of interest to report. They are the only ones responsible for the content of this article. **Acknowledgments:** The Authors express their sincere gratitude to all lecturers, professors, laboratory tutors, and clinical mentors who generously participated in this study. Special thanks are extended to the Italian Society of Medical Education (SIPeM) and the Permanent Italian Conference of the Directors of Undergraduate Medical Schools for their precious assistance in data collection. Additionally, we would like to extend our appreciation to Prof. Antonella Lotti for her valuable contribution to the lively scientific reflection.

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