



Research

Validation of the Italian version of the clinical teaching preference questionnaire in peer-assisted nursing education

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ABSTRACT

Background: Peer-Assisted Learning (PAL) is an effective pedagogical strategy in nursing education. Valid instruments are needed to assess students' experiences with PAL in the Italian context.

Aim: To validate the Italian version of the Clinical Teaching Preference Questionnaire (CTPQ-IV) and examine its psychometric properties among nursing students.

Methods: A prospective observational study was conducted. The CTPQ-IV was administered to 764 first-year nursing students in simulation laboratories. Data were analyzed using Exploratory Factor Analysis (EFA) with Oblique Oblimin rotation and Confirmatory Factor Analysis (CFA) to test the factor structure.

Results: The majority of participants were female (79.7%) and aged 19–21 years (74.9%). Factor analysis of the 10-item questionnaire revealed a two-factor solution (Peer Supervision and Instructor Supervision), explaining 54.3% of the variance. Factor loadings exceeded ± 0.30 , and internal consistency was satisfactory. The CFA confirmed the factor structure, supporting the construct validity of the instrument.

Conclusions: The Italian version of the CTPQ-IV demonstrated adequate validity and reliability. It represents a practical tool for evaluating PAL in nursing education and supports future educational research.

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Introduction

Peer-Assisted Learning (PAL), particularly peer tutoring (Herinek et al., 2022), is defined as the formalization of an informal process in which students support each other in learning (Williams et al., 2013). In PAL, students acquire skills and knowledge through the active assistance of their peers, a mechanism that has proven particularly effective in educational activities (Shihabuddin et al., 2022; Wong & Shorey, 2022).

PAL has existed for many years (Williams & Reddy, 2016); however, its development in nursing education has been influenced by definitional issues and a lack of consistency (Secomb, 2008). Several terminology-related aspects of PAL, such as “peer teaching,” “peer support,” and “peer mentoring,” contribute to confusion in the field (Carey et al., 2018). Nonetheless, PAL has been widely implemented in nursing education, particularly in simulation-based environments

designed to enhance clinical learning for both junior and senior students (Aljahany et al., 2021). This educational and organizational model facilitates the acquisition of new clinical skills among junior learners, while for senior students, it promotes the development and reinforcement of teaching competencies (Aydin et al., 2022; Dumas et al., 2015; Stables, 2012).

PAL in undergraduate nursing education has yielded significant outcomes. Students have reported improvements in critical thinking, communication skills, and self-confidence (Carey et al., 2018) within clinical settings (Lam et al., 2024; Rossler, 2019). A report by the Council of Deans of Health (2016) in the United Kingdom on the training of future nurses highlighted that students should be equipped to teach others not only through formal tutoring but also informally within clinical environments. The report emphasized that this recommendation should be further explored and identified PAL as a key area in higher education (Council of Deans of Health, 2016).

This educational and organizational model has also been recommended by recent studies advocating for the integration of PAL into

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the curricula of healthcare profession students (Feng et al., 2024). For these reasons, future research should aim to develop a rigorous framework to assess the effects of PAL on student training, as well as the specific skills required for peer tutors (Herinek et al., 2023).

Given the high impact of PAL on nursing education and practice, it is essential to develop measurement tools with strong psychometric properties to assess its implementation (Williams et al., 2013). The scale examined in this study is the Clinical Teaching Preference Questionnaire (CTPQ), developed by Iwasiw and Goldenberg in 1993 to evaluate the effects of PAL on nursing students. These authors utilized peer students to supervise other students at the same academic level while performing surgical dressings. The CTPQ was employed to assess outcomes in simulation-based educational models (Iwasiw & Goldenberg, 1993), where third-year students served as laboratory tutors for first-year nursing students (McKenna & French, 2011). At the end of the educational activities, first-year students completed the CTPQ, providing the psychometric data necessary to examine the scale's dimensionality, validity, and reliability.

A similar process was carried out by Williams et al. in 2013 on a sample of 265 nursing students. These authors also aimed to examine the factorial structure of the CTPQ. Unlike the original study, this research provided preliminary evidence that the CTPQ demonstrates adequate construct validity and internal consistency based on the results of an Exploratory Factor Analysis (EFA). The literature thus supports the CTPQ as an effective tool for measuring students' experiences involving clinical practice components, thereby optimizing learning experiences and their outcomes.

The aim of this work is to provide the literature with an Italian tool to assess the effect of PAL on nursing students. The objective is to validate the Italian version of the CTPQ-IV and test its psychometric properties among students.

Methods

Design

A prospective observational study was conducted using the paper version of the CTPQ-IV translated into Italian.

Setting

PAL was conducted within the simulation laboratories of the Nursing Degree Program at the University of Bologna, in the Romagna area of northern Italy, during the academic years from 2018–19 to 2022–23. During this educational activity, all the care techniques outlined in the curriculum were demonstrated and practiced on manikin simulators. The procedures primarily included catheterization and management of the urinary catheter, evacuative enemas, wound dressings, techniques for administering enteral and parenteral therapy, insertion and management of the nasogastric tube, enteral nutrition, performing ECGs, venous blood draw techniques, patient mobilization, and vital sign monitoring.

Students who participated in the study had the theoretical knowledge necessary for the practical execution of the procedures, which were part of the nursing methodology curriculum.

To ensure that participation was entirely voluntary and free from any perceived obligation, data collection was conducted only after the end of the scheduled teaching activities. This allowed students adequate time to independently consider whether or not to take part in the study. Students who chose not to participate were free to leave the classroom. Moreover, no instructors directly involved in the teaching activities were present during data collection.

Participants were provided with an explanatory statement and informed that participation was voluntary and anonymous. The researchers devoted all the necessary time to answering the

questions of the students who chose to participate in the study. A non-teaching staff member facilitated the process, and the participants completed the questionnaire, which contained a brief set of demographic questions followed by the items of the CTPQ-IV. Students were given all the time they needed to read the information, ask questions, and complete the questionnaire. On average, the time required to complete the survey was approximately 10 to 15 minutes. The informed consent was paper-based, and participants were asked to sign it to be part of the study. The administration procedure followed the guidelines recommended in the literature (Williams et al., 2013).

Participants

All first-year university students enrolled at the campus were eligible to participate. The PAL participants were third-year students selected based on the following criteria: the highest grades in nursing science exams and the highest grades in the clinical internship exams from the first and second years. The eligible peer-assisted students were enrolled in a specially designed course to prepare them for the PAL role.

Instrumentation

CTPQ-IV is a tool consisting of 10 items that measure peer-teaching preferences for nursing students (Iwasiw & Goldenberg, 1993). The levels of agreement were determined using a 5-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = uncertain, 4 = agree, 5 = strongly agree) (Henning et al., 2006; McKenna & French, 2011).

To establish the content validity of the CTPQ-IV, a forward-backward translation procedure was applied, following the criteria outlined by White and Elander (1992). First, the scale was translated into Italian and reviewed by a group of experts (5 nurses with expertise in nursing education and research), who compared the original English version with the Italian version to ensure semantic and cultural consistency of the items. Second, a native English-speaking instructor translated the Italian version back into English blindly. Finally, the translated version and the original version were compared by a native speaker.

Ethical Considerations

Before participating in the study, students were clearly informed about the purpose of the research, the voluntary nature of their participation, and the handling of personal data. A detailed description of the project was provided to allow participants to make an informed decision. Participation was entirely voluntary, and students had the right to withdraw from the study at any time without facing any negative consequences. This policy of voluntary participation is essential to ensure that only those who feel comfortable sharing their experiences take part in the research.

The questionnaires were distributed by non-teaching staff, only after obtaining participants' informed consent and addressing all their questions.

Anonymity was guaranteed throughout the process. Both the data collection procedure and the structure of the database prevented any identification of respondents' answers on the CTPQ-IV. Students were not asked to provide any identifying information. Each completed paper questionnaire was sealed by the respondent in a blank envelope, which was then deposited into a slot box by the student. Upon opening the envelopes, each questionnaire was assigned a progressive numerical code.

The Ethics Committee of the University of Bologna approved the study (Prot. No. 0075997).

Statistical Analyses

For data storage, tabulation, and statistical analyses, the SPSS demo version and Jamovi 2.3.18 were used. Descriptive statistics (i.e., means and standard deviations) were applied to report demographic data and CTPQ-IV scores. A check was carried out to ensure that the data met several key assumptions, including normal distribution, linear relationships between variables, absence of excessive multicollinearity, and homoscedasticity of residuals. Effect sizes were calculated to assess the results, which were considered statistically significant if $p < 0.05$.

The data were analyzed using an Exploratory Factor Analysis (EFA) with factor extraction based on the principal axis factoring method. This approach aims to simplify the data by grouping them into a few core dimensions that effectively represent the original information. Additionally, an oblique Oblimin rotation was applied. This rotation was preferred because it typically results in a simpler and more interpretable factor structure compared to orthogonal rotations such as Varimax (Yamashita, 2023).

A total corrected item correlation was performed to identify items not correlating with the relevant factors. Generally, coefficients should be greater than 0.30 (Pett, Lackey, & Sullivan, 2003), indicating a good item-factor fit. Pearson correlation coefficients were calculated to investigate interrelationships between the CTPQ-IV factors. Internal consistency for the scale was estimated using Cronbach's alpha coefficient.

Table 1
Demographic distributions.

Variable	Category	n	%
Academic year	2018-2019	164	21.5
	2020-2021	159	20.8
	2021-2022	166	21.7
	2022-2023	152	19.9
	2023-2024	123	16.1
Gender	Male	155	20.3
	Female	609	79.7
Age	19-21	572	74.9
	22-25	103	13.5
	26-30	44	5.8
	>30	45	5.9
	Previous peer tutoring experience	Yes	229
	No	534	70.0

Table 2
Position and shape indices, item–total correlation and Cronbach's alpha.

	M±SD	Skewness	Kurtosis	Item-Total Correlation	If item dropped Cronbach's α	KMO (MSA)
1. I feel freer to approach my instructor for help than I do my peers	2.90±1.17	0.17	-0.77	0.17	0.73	0.70
2. My ability to problem solve improves more from instructor teaching than from my peers	2.95±1.03	0.15	-0.40	0.31	0.70	0.68
3. I am less anxious when performing a nursing skill in the presence of my peers than my instructor	4.20±1.02	-1.41	1.50	0.40	0.69	0.84
4. Being taught clinical skills by my peers increases my interaction and collaboration with other students more than when being taught by my instructor	4.05±0.97	-1.13	1.19	0.49	0.68	0.86
5. Being taught clinical skills by my instructor increases my sense of responsibility more than by being taught by my peers	3.05±1.07	0.08	-0.60	0.34	0.70	0.77
6. I learn more from my instructor than my peers	3.06±1.02	0.10	-0.34	0.27	0.71	0.71
7. I can communicate more freely with my peers than with my instructor	4.13±0.98	-1.16	0.88	0.49	0.67	0.83
8. The feedback I receive from my peers is from a student's viewpoint, therefore more honest, realistic, helpful than from my instructor	3.92±1.02	-0.75	-0.02	0.45	0.68	0.88
9. My peers are more supportive to me when I am performing a nursing skill than my instructor	3.47±1.03	-0.24	-0.60	0.46	0.68	0.82
10. I am more self-confident and able to perform independently because of being taught by my peers, more so than by my instructor	3.81±0.95	-0.59	-0.01	0.42	0.69	0.83

Results

The characteristics of the participants were described in relation to age, gender, and prior peer tutoring experience. Of the 764 participants involved in the study, 74.9% ($n = 572$) were aged between 19 and 21 years, and 13.5% ($n = 103$) were aged between 22 and 25 years. 79.7% ($n = 609$) of the participants were female. Seventy percent ($n = 534$) of the participants had no prior experience with peer tutoring. The full distribution of demographic results is presented in Table 1.

Psychometric properties of the instrument

The Cronbach's alpha for the 10 items showed a value of 0.76, with a range between 0.68 and 0.88 across the factors identified in the theoretical structure of the CTPQ-IV. No changes in internal consistency reliability were found after eliminating each item one by one.

The distribution of responses was generally normal, resembling a bell-shaped curve, as indicated by the skewness and kurtosis values. However, for items 1, 2, 5, and 6 (which relate to teacher preferences), a slight tendency toward more positive responses was observed, with mean scores below 3.10 (on a 1 to 5 scale). Despite this minor deviation, no statistical transformations were applied to the data, as the skewness and kurtosis values did not indicate serious violations. Moreover, the statistical methods used for the analysis do not require perfectly normal distributions, as noted by Barbaranelli (2003).

As shown in Table 2, the item-total correlation index exceeds 0.30 for all 10 items, indicating a strong correlation between each item and the overall scale ($p \leq 0.001$). This suggests that each item contributes consistently to the overall measurement of the instrument. The lowest item-total correlation value (0.68) was observed for item 6, which still represents an adequate contribution to the scale. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy showed values ranging from 0.68 to 0.88 across items, with an overall KMO value of 0.81, indicating a good to acceptable sample quality for factor analysis. Finally, the item numbering in the table follows the order recommended in the scientific literature (Williams et al., 2013; Iwasiw & Goldenberg, 1993), ensuring consistency with previous studies.

Factor extraction results

The examination of the 10 items revealed through the Scree Plot (Fig. 1), a two-factor model with eigenvalues greater than 1, which accounted for 54.3% of the total variance (Table 3). Items with factor

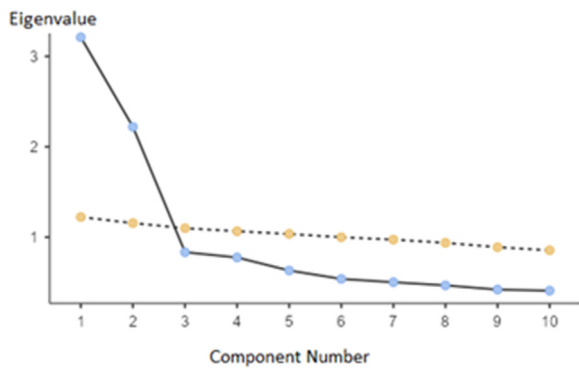


Fig. 1. Scree plot of eigenvalues for the Italian version of the clinical teaching preference questionnaire (CTPQ-IV).

loadings higher than 0.40 with the respective factors were used to characterize the factor solutions.

The data were deemed suitable for factor analysis based on commonly accepted empirical criteria. Specifically, the Kaiser-Meyer-Olkin (KMO) index yielded a value of 0.80, indicating that the variables were sufficiently interrelated to be analyzed together. Additionally, Bartlett's test of sphericity was highly significant ($\chi^2(45) = 2090.52, p < 0.0001$), suggesting that the correlations among variables were adequate to justify the use of factor analysis. Together, these results support the appropriateness of identifying common factors among the variables.

Potential factors were extracted via EFA, followed by oblique Oblimin rotation using three criteria: Kaiser's criterion (eigenvalue > 1) (Cattell, 1966; Kaiser, 1960; Kiers, 1994), cumulative percentage of extracted variance, and parallel analysis (Horn, 1965). Also, in this study, as in previous ones (Williams et al., 2013), no item had a loading > 0.90, suggesting unlikely multicollinearity.

Each of the two resulting factors was descriptively labelled. Factor 1 was labelled "Peer Supervision." There were six items loading on this factor, with loadings ranging from 0.78 to 0.68 (explained variance: 32%). The main item within this factor was: "I can communicate more freely with my peers than with my instructor."

Factor 2 was labelled "Instructor Supervision." There were four items loading on this factor, with loadings ranging from 0.82 to 0.69 (explained variance: 22.3%). The main item within this factor was: "My ability to problem-solve improves more from instructor teaching than from my peers." The questions in factor 2 are framed as advantages for teaching and disadvantages for PAL. To emphasize students' experiences in PAL

using the total CTPQ-IV score, Likert scale scores should be reversed as follows: 5 → 1, 4 → 2, 3 → 3, 2 → 4, 1 → 5 (Supplementary Materials).

The exploratory factor analysis of CTPQ-IV aligns with the CTPQ validation literature and is shown in Table 3.

The corrected item-total correlations ranged from 0.17 to 0.50, with an average of 0.38. The Pearson correlation coefficient for the two factors ranged from $r = 0.33 (p < 0.001)$. Although the literature suggests robust analyses of the correlation coefficient magnitude (Tishkovskaya et al., 2023), these results indicate inter-factor correlation coefficients ranging from moderate to strong.

Parametric calculations between the CTPQ-IV domains and the demographic variables of the sample revealed significant differences for Academic Year and Age with Factor 2, while gender differences were observed for Factor 1 (Table 4).

Confirmatory Factor Analysis

The confirmatory factor analysis (CFA) supported the validity of the questionnaire's structure as observed in the collected data, indicating that the data fit the hypothesized model well (Fig. 2).

The item numbers reported in Table 2 follow the order of the Italian version of the instrument (CTPQ-IV) and thus refer specifically to that version of the questionnaire.

To evaluate model fit, several goodness-of-fit indices were used: the chi-square divided by degrees of freedom (χ^2/df), RMSEA, SRMR, TLI, and CFI. These are standard statistical measures used to assess how well the proposed model aligns with the observed data.

The results indicate a reasonably good fit: $\chi^2(34) = 169, p \leq 0.001$ (a significant result, which is common with large sample sizes), SRMR = 0.05 and RMSEA = 0.07 suggest acceptable fit, while TLI = 0.91 and CFI = 0.93 (both above the 0.90 threshold) indicate good model fit. In summary, the analysis confirms that the proposed structure is meaningful and fits the data well.

Discussion

Peer-assisted learning (PAL) is growing internationally as a useful pedagogical strategy in professional and tertiary education. Ongoing research on peer-assisted teaching and learning is important as teaching institutions continue to integrate PAL into curricula (Feng et al., 2024; Topping, 2005). For this reason, it became necessary to validate a scale in Italian to allow organizations to assess the impact of PAL in university nursing education in Italy.

Table 3
Correlation matrix (EFA oblique rotation).

	Factor 1		Factor 2	
	CTPQ	CTPQ-IV	CTPQ	CTPQ-IV
<i>Peer supervision</i>	$\alpha = 0.92$	$\alpha = 0.82$		
I am more self-confident and able to perform independently because of being taught by my peers, more so than by my instructor	0.98	0.71	-0.14	0.02
My peers are more supportive to me when I am performing a nursing skill than my instructor	0.85	0.75	-0.01	0.02
I can communicate more freely with my peers than with my instructor	0.84	0.78	0.03	-0.01
The feedback I receive from my peers is from a student's viewpoint, therefore more honest, realistic, helpful than from my instructor	0.77	0.72	0.04	0.01
I am less anxious when performing a nursing skill in the presence of my peers than my instructor	0.72	0.72	0.09	-0.07
Being taught clinical skills by my peers increases my interaction and collaboration with other students more than when being taught by my instructor	0.71	0.68	0.09	0.03
<i>Instructor supervision</i>			$\alpha = 0.89$	$\alpha = 0.72$
I learn more from my instructor than my peers	-0.06	-0.01	0.89	0.70
My ability to problem-solve improves more from instructor teaching than from my peers	0.03	-0.02	0.85	0.82
Being taught clinical skills by my instructor increases my sense of responsibility more than by being taught by my peers	0.05	0.13	0.82	0.68
I feel freer to approach my instructor for help than I do my peers	0.03	-0.11	0.71	0.76
Explained variance	57.98	32.00	10.37	22.3

Table 4
CTPQ-IV comparative data.

	Peer supervision		Instructor supervision	
Academic year	<i>M</i> ± <i>SD</i>	<i>F</i> (4,759) = 16.15; <i>p</i> < 0.001	<i>M</i> ± <i>SD</i>	<i>F</i> (4, 759) = 3.03; <i>p</i> = 0.02
2018-19	21.8 ± 4.51		12.3 ± 2.85	
2020-21	24.2 ± 3.86		11.4 ± 3.21	
2021-22	22.7 ± 4.57		12.4 ± 3.07	
2022-23	25.2 ± 3.91		11.9 ± 3.75	
2023-24	24.1 ± 3.94		11.7 ± 2.79	
Age		<i>F</i> (3,760) = 6.89; <i>p</i> < 0.001		<i>F</i> (3,760) = 3.29; <i>p</i> = 0.02
19-21	23.9 ± 4.00		11.8 ± 3.14	
22-25	23.0 ± 4.65		12.5 ± 2.94	
26-30	22.8 ± 5.12		12.2 ± 3.43	
>30	21.2 ± 6.09		12.9 ± 3.70	
Gender		<i>t</i> (762) = -2.55; <i>p</i> = 0.01		<i>t</i> (762) = -0.74; <i>p</i> = 0.46
Male	22.8 ± 4.70		11.8 ± 3.02	
Female	23.8 ± 4.24		12.0 ± 3.22	
Previous experience		<i>t</i> (761) = -0.29; <i>p</i> = 0.77		<i>t</i> (761) = 0.32; <i>p</i> = 0.75
Yes	23.5 ± 4.72		12.0 ± 3.13	
No	23.6 ± 4.20		11.9 ± 3.20	

The psychometric characteristics of the CTPQ-IV showed a two-factor aggregation in the EFA and good internal consistency of the items. In fact, the factorial structure is confirmed by previous validation studies of the original CTPQ (Williams et al., 2013). The sampling limitations reported in the study by Williams et al. (2013) were considered, and the sample size in the CTPQ-IV exceeds 300 students, a number that was also recommended by previous studies (Tabachnick & Fidell, 2007). The structure of the CTPQ-IV is confirmed in the CTPQ, as the first six items determine the first factor, which corresponds to *Peer Supervision*, while the remaining four items determine the second factor, *Instructor Supervision*. The confirmatory factor analysis (CFA) seems to empirically confirm the theoretical structure of the instrument. Therefore, the CTPQ-IV, having valid measurement properties, could be used for educational research in Italy. In fact, the literature, focusing on the need to carefully evaluate the impact of PAL in healthcare education programs (Herinek et al., 2023), suggests

that the instrument could enable Italian universities to assess the quality of teaching activities involving PAL.

Assessing the experience using the CTPQ-IV may facilitate reflective practice among both those receiving support and their peers. In fact, the use of the instrument could offer valuable insights for enhancing future learning experiences related to clinical and care competencies during simulation-based activities (Botelho & Bhuyan, 2021).

The PAL assessment framework using the CTPQ-IV may be seen as an opportunity to encourage students receiving support to adopt self-regulatory and self-reflective behaviors (Achenbach et al., 2023).

However, while literature considers PAL a valid model for learning in healthcare professions, it advises using this approach as complementary to teacher-guided methods (Zhang & Maconochie, 2022).

For this reason, PAL, when employed in simulation-based lab activities, can be an effective pedagogical and organizational choice.

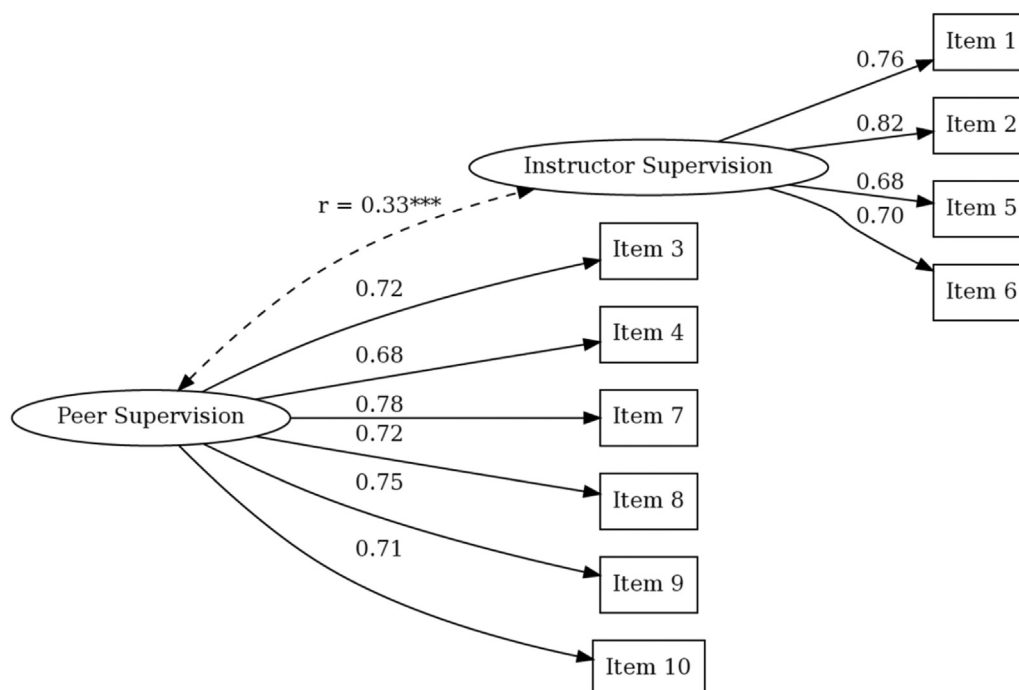


Fig. 2. Two-factor confirmatory factor analysis model of the CTPQ-IV.

However, it should be integrated into the peer's curriculum only after completing the necessary theoretical and practical activities led by the faculty members responsible for the courses.

This sequential approach seems to reduce the gap between theory and practice (Paul et al., 2024).

CTPQ-IV has proven to be a valid tool in the study, also highlighting significant differences in experiences that students have had across academic years. Over the years, the settings in which the data were collected have increasingly integrated simulation activities with the educational activities directly managed by the responsible faculty members. This seems to have increased student satisfaction, as evidenced by the literature (Zhang & Maconochie, 2022).

However, some limitations must be addressed. CTPQ-IV is a self-reported preference scale. Also, it is not designed to measure the effectiveness of PAL in achieving learning outcomes or improving future practice (Williams et al., 2013). These aspects along with the need to find future tools for measuring the effectiveness of teaching in PAL and its impact on clinical practice are still debated in the literature and documented through systematic reviews (Tai et al., 2016).

Conclusion

The results of the factor analyses provide preliminary findings suggesting that the CTPQ-IV has adequate construct validity and reliability. This offers a practical and usable tool for those involved in peer-assisted teaching and learning. Even with a larger sample, the psychometric properties of the CTPQ-IV confirm those of the CTPQ validation study.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

CRedit authorship contribution statement

Ivan Rubbi: Writing – review & editing, Visualization, Formal analysis, Conceptualization. **Barbara Biselli:** Writing – review & editing, Methodology. **Valeria Cremonini:** Writing – review & editing, Methodology. **Arianna Bagnis:** Writing – review & editing, Writing – original draft. **Erica Grisanti:** Writing – review & editing, Data curation. **Katia Mattarozzi:** Writing – review & editing, Methodology. **Stefano Bastianini:** Writing – review & editing, Methodology. **Milena Spadola:** Writing – review & editing, Data curation. **Gianandrea Pasquinelli:** Writing – review & editing, Supervision.

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Supplementary materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.teln.2025.09.004.

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