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# Assessment of the competency of learner-centered teaching of clinical preceptor using the augmented Stanford Faculty Development Program Questionnaire (SFDPQ): a cross sectional comparative study

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## Abstract

**Background** Education is an important part of the work of most doctors. Clinical preceptors act as role models and supervisors. Preceptors' quality of supervision strongly influences the learning quality of clinical interns (Bartlett et al. *BMC Med Educ* 20:165, 2020). To ensure a consistent approach to every preceptorship experience, the competency of clinical preceptors should be assessed to ensure that the desired outcomes are achieved. This study aims to evaluate clinical preceptors' competency in learner-centered teaching, to provide constructive feedback to develop the preceptors' competency and improve supervisory skills and internship quality at Kunming Medical University (KMU) in Kunming of China.

**Methods** This is a cross-sectional study with a quantitative self-administered online questionnaire. The convenience sampling technique was employed. In the undergraduate internship stage of KMU, clinical preceptors ( $N=340$ ) and interns ( $N=487$ ) were invited to use the augmented Stanford Faculty Development Program questionnaire (SFDPQ) (Stalmeijer et al. *Med Teach* 30:e272–e277, 2008), to (self-) assess the preceptor's competency of learner-centered teaching on a five-point scale (1 = strongly disagree, 5 = strongly agree).

**Results** Two hundred twenty-eight preceptors and two hundred thirty-six interns completed the questionnaire correctly. Overall, the assessment was positive, but the preceptors' self-assessment significantly higher than the interns' ( $p < 0.00$ ). The overall mean of each category of preceptors' self-assessment was greater than 4.5, with no difference based on educational qualification. Male preceptors scored significantly higher in two categories than female preceptors. Preceptors under 30 years of age with less than 5 years of teaching experience rated "Teacher's knowledge and attitude" lower than those over 40 years of age with more than 5 years of experience ( $p < 0.05$ ). There were statistically significant differences in the four categories across disciplines ( $p < 0.05$ ). Undergraduate interns rated "Teachers'

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knowledge” as the highest category and “Learning climate” as the lowest, and interns of different genders are evaluated without distinction in all categories of SFDPQ.

**Conclusions** Employing the augmented SFDPQ to evaluate learner-centered teaching competency of clinical preceptors, offers potentially useful information for delivering constructive feedback. Combining self-evaluations with learner evaluation data can contribute to exploring preceptor competency development framework to guide them in targeted learner-centered teaching skill and acquisition and improvement, finally improving the overall quality of internships.

**Keywords** Learner-centered competency, Clinical preceptor assessment, Undergraduate clinical interns, Augmented Stanford Faculty Development Program questionnaire (SFDPQ)

## Background

Students spend the final years of undergraduate medical education for the most part in clinical rotations in hospital settings, offering a potentially powerful learning environment because of its high authenticity and opportunities for active participation in clinical work and integrated learning of history taking, physical examination, clinical decision making and professionalism [1]. Furthermore, with the shift towards competency-based medical education programs, opportunities for participating in the clinical work environment and for performing clinical activities are crucial for medical students’ development [2]. As a result, education was already a major mission at every teaching hospital and its providers who are physicians should be good and effective teachers [3, 4]. Meanwhile, research has shown that high-quality patient care is only feasible if medical students have received high-quality teaching and good supervision in clinical practice [5, 6]. Because the preceptor acts as a role model, supervises, provides guidance and learning experiences, and facilitates the socialization and development of the preceptee into a competent professional [7–9]. Besides, a good internship experience lays a solid foundation for the development of professionalism throughout a practitioner’s career [10].

Therefore, to ensure the quality of clinical internships and to promote competency, doctors need appropriate tools to aid them in selecting and developing effective ways of supervising students to create an effective learning environment. Appropriate assessment of clinical teaching may guide doctors in this [11]. Assessment allows for setting a benchmark for comparison as well as for measuring the effect of change over time [12]. The research has demonstrated that the perspectives of both the students and faculty are equally important to improve the educational experience for both groups [13] and the feedback from students on clinical teachers’ performance can have mixed effects on teaching effectiveness [14].

The clinical faculty of KMU has moved toward innovative learning methods such as learner-centered teaching (LCT) in the clinical internship phrase in recent years. However qualified clinical teachers who are described

as physician role models, effective supervisors, student-based and supportive individuals, assessors, planners, and resource developers [15, 16] were not holistically assessed at KMU.

Assessments need to be effective in informing clinical teachers about all important domains and in identifying individual faculty strengths and weaknesses [17]. The augmented SFDPQ was recommended for the assessment of clinical teaching skills which has strong implications for clinical teachers and faculty development [18]. Considering teacher’s knowledge and attitude are a pivotal facet of clinical teaching [19], plus extra two categories measuring “teacher’s knowledge” and “teacher’s attitude” based on the original SFDPQ and its’ validity and internal consistency reliability have been validated [20, 21]. The Stanford Faculty Development Program Questionnaire was developed at Stanford University School of Medicine based on andragogic learner-centered educational and psychological theories of learning environments [20, 22, 23] and empirical observation of clinical teaching conducted over several decades [24, 25].

This study aims to evaluate clinical preceptors’ competency in learner-centered teaching, to provide meaningful feedback to improve clinical preceptor supervisory skills and internship quality at KMU.

## Research questions

1. What is preceptors’ self-evaluation of clinical preceptors’ competency in learner-centered teaching at KMU?
2. What is undergraduate interns’ evaluation of clinical preceptors’ competency in learner-centered teaching at KMU?
3. What is the difference between the preceptors and interns’ evaluation of clinical preceptors’ competency in learner-centered teaching at KMU?

## Methods

### Conceptual framework

The conceptual framework of this study was the Stanford Faculty Development Clinical Teaching Model [26]. The

Stanford model is organized into seven key topics useful in developing excellence in clinical teaching, including learning climate, control of session, communication of goals, promotion of understanding and retention, evaluation, feedback, and promotion of self-directed learning. Based on this model and andragogic learner-centered [27] educational theories developed the Stanford Faculty Development Program questionnaire (SFDPQ) to evaluate faculty's clinical teaching. The augmented SFDPQ complementary the teachers' knowledge and attitude which are a pivotal facet of clinical teaching. This study chose the Stanford model as it includes nearly all aspects of clinical teaching and has been previously validated, has been widely used for faculty development and evaluation of clinical teaching excellence.

### Study design and participants

This is a cross-sectional study with a quantitative self-administered online questionnaire. The convenience sampling method was adopted. The clinical preceptors ( $N=340$ ) and undergraduate interns ( $N=487$ ) were invited to use the augmented SFDPQ to (self-) evaluate the preceptor's competency of learner-centered teaching on a five-point scale. This study was conducted from March to June in 2023 and adopted non-probability sampling to randomly select the study population from three affiliated hospitals of KMU. The clinical preceptors ( $N=340$ ) from four disciplines (internal medicine, pediatrics, surgery, obstetrics/gynecology) made self-assessments. The undergraduate interns ( $N=487$ ) assessed the clinical preceptors who are in interns' respective clerkship units of the department. All participants were voluntary and gave consent and were enrolled in the study.

### Inclusion criteria

The clinical preceptor was identified through the preceptor list from the hospital undergraduate education department who had substantial involvement in clinical teaching during the study period. The undergraduate interns were in the fifth academic year who rotated through the units of internal medicine, pediatrics, surgery, and obstetrics/gynecology during the study period, were eligible to participate.

### Exclusion criteria

The clinical faculties who were not on the preceptor's list during the study period and the undergraduate interns who were not available during the study period were excluded from the sample.

### Questionnaire, piloting, and distribution

The preceptors' self-evaluation questionnaire was developed that consisted of two sections: section 1 is

participants' demographic data; section 2 is the augmented SFDPQ to assess the competency of learner-centered teaching. The clinical preceptors' demographic data included gender, age, educational qualification, discipline, and teaching experience. The first section of students' questionnaire is demographic data relating to their gender; the second section same as section 2 of preceptors' questionnaire.

The augmented SFDPQ is the second section of the both questionnaires, which contains 9 categories, and 65 items. 9 categories including "Learning climate, Control of session, Communication of goals, Promoting understanding and retention, Assessment, Feedback, Promoting self-directed learning, Teachers' knowledge and attitude". Each category has 7–8 items, making a total of 65 items which were rated on a Likert five-point scale (1=strongly disagree to 5=strongly agree). A score of 5 indicates an excellent demonstration of the corresponding teaching skill. Its English version was translated into Chinese and back-translated into English to check for equivalence of meaning, and also invited experts review.

Also, Piloting of the questionnaire was performed on 5 preceptors and 14 clinical interns to modify, clarify, and understand the questionnaire instructions and items, and revealed reliability of the questionnaire was acceptably good (Cronbach's alpha, 0.84). All participants who met the inclusion criteria were approached in the three hospitals by the Wechat group of the hospital's medical education department. They received an invitation that contained the study's objective and a QR code that led to the questionnaire page.

### Data analysis

All questionnaires were conducted through 'Survey Monkey' online ([www.sojump.com](http://www.sojump.com)). The data was analyzed by descriptive statistics (means), independent samples t-test and One-way Analysis of Variance (ANOVA) to compare the assessments of different groups. Probability value  $p \leq 0.05$  (two-tailed analysis) tests were considered statistically significant association for both tests. All statistical analyses were performed using the Statistical software SPSS 25.0 (IBM Corporation).

## Results

### Participants' demographic characteristics

Out of 340 preceptors surveyed, 228 (including 120 female) valid responses were received (a response rate of 67.05%). The majority of the preceptors were between the ages of 31–40 (44.7%). 56.6% of the preceptors with doctorate Degrees and Master's Degrees. The preceptors participated from several disciplines with internal medicine(49.1%),surgery(32.0%),obstetrics/gynaecology(16.7%)and paediatrics(2.2%). About 68.0% of the

preceptors were under 15 years of teaching experience. 236 out of 487 undergraduate interns(145 female) made valid response (a response rate of 48.46%). The majority were between the ages of 21–22(76.7%).

**Comparison of the overall assessment between preceptors and interns**

Both the preceptors’ and interns’ assessments were positive, but preceptors rated across all categories of the augmented SFDPQ significantly higher than interns ( $p < 0.00$ ). Furthermore, 64 items were statistically significant between preceptors’ and interns’ assessments ( $p < 0.00$ ), except for the “Demonstrated a breadth of knowledge in medicine generally” item which did not show a statistically significant difference ( $p > 0.05$ ) (Tables 1, 2 and 3).

**The clinical preceptors’ self-assessment of the augmented SFDPQ**

The clinical preceptors’ self-assessments were uniformly positive across the augmented SFDPQ and the overall means of each category were more than 4.5. The “Teachers’ attitude” was the highest-rated category(4.71), and the “Teachers’ knowledge” was the lowest-rated category(4.52). The “Expressed respect for learners” was the highest-rated item(4.84) and the “Was willing to say “I don’t know” was the lowest-rated item(4.19) based on the mean (Tables 1, 2 and 3).

**The undergraduate interns’ assessment of the augmented SFDPQ**

Generally, the student’s overall assessment was positive and the overall means of each category were more than 4.0. The “Teachers’ knowledge” was the highest-rated category(4.28) and the “Learning climate” was the lowest

**Table 1** The preceptors’ and interns’ assessment on the 1–3 category of the augmented SFDPQ

Item	Means(SD)		P(Exact sign) 2-sided
	preceptor’	interns’	
<b>Learning climate</b>			
1 Stimulated learner’s interest in the topic	4.59(0.57)	4.17(0.94)	< 0.00
2 Created an atmosphere that encouraged students to admit their limitations.	4.36(0.80)	4.09(1.04)	< 0.00
3 Listened to learners.	4.79(0.42)	3.98(1.10)	< 0.00
4 Encouraged learners to participate actively in the discussion.	4.73(0.50)	4.26(0.86)	< 0.00
5 Expressed respect for learners.	4.84(0.38)	4.05(1.05)	< 0.00
6 Avoided ridicule and intimidation	4.66(0.92)	4.11(1.03)	< 0.00
7 Encouraged learners to bring up problems.	4.80(0.42)	4.26(0.89)	< 0.00
8 Was willing to say “I don’t know.”	4.19(1.26)	3.84(1.15)	< 0.00
<b>Overall mean</b>	4.62	4.09	
<b>Control of session</b>			
1 Made efficient use of teaching time.	4.58(0.58)	4.15(0.92)	< 0.00
2 Called attention to time.	4.69(0.49)	4.14(0.88)	< 0.00
3 Covered all scheduled topics.	4.65(0.59)	4.19(0.85)	< 0.00
4 Set an agenda for teaching sessions.	4.68(0.52)	4.28(0.84)	< 0.00
5 Collaborated with learners in deciding what should be covered during teaching sessions.	4.57(0.63)	4.09(0.99)	< 0.00
6 Avoided digressions.	4.35(0.89)	4.08(0.91)	< 0.00
7 Discouraged external interruptions.	4.59(0.59)	4.23(0.81)	< 0.00
<b>Overall mean</b>	4.59	4.17	
<b>Communication of goals</b>			
1 Stated goals clearly and concisely.	4.73(0.47)	4.26(0.81)	< 0.00
2 Stated relevance of goals to learners.	4.71(0.50)	4.24(0.84)	< 0.00
3 Stated expected level of competence.	4.68(0.49)	4.15(0.94)	< 0.00
5 Asked learners for their goals.	4.54(0.68)	4.12(0.93)	< 0.00
6 Prioritized goals.	4.65(0.56)	4.23(0.86)	< 0.00
7 Repeated goals periodically.	4.59(0.59)	4.22(0.89)	< 0.00
8 Reestablished goals as needed.	4.64(0.56)	4.16(0.91)	< 0.00
<b>Overall mean</b>	4.64	4.20	

**Table 2** The preceptors' and interns' assessment on the 4–6 category of the augmented SFDPQ

Item	Means(SD)		P(Exact sign) 2-sided
	preceptor'	interns'	
<b>Promoting understanding and retention</b>			
1 Presented well-organized material.	4.70(0.49)	4.25(0.82)	<0.00
2 Explained relationships in material.	4.69(0.50)	4.25(0.87)	<0.00
3 Answered learners' questions clearly.	4.60(0.57)	4.25(0.82)	<0.00
4 Used blackboard or other visual aids.	4.69(0.49)	4.32(0.85)	<0.00
5 Emphasized what he/she wanted learners to remember.	4.71(0.49)	4.31(0.83)	<0.00
6 Had learners reformulate material.	4.63(0.58)	4.21(0.84)	<0.00
7 Had learners apply material to own experiences.	4.71(0.48)	4.22(0.89)	<0.00
8 Assessed learners' level of knowledge before teaching sessions.	4.54(0.67)	4.13(0.93)	<0.00
<b>Overall mean</b>	4.66	4.24	
<b>Assessment</b>			
1 Observed learners' performance (eg, watched bedside skills)	4.71(0.48)	4.21(0.84)	<0.00
2 Evaluated learners' knowledge of factual medical information.	4.67(0.51)	4.22(0.81)	<0.00
3 Evaluated learners' ability to analyze or synthesize knowledge.	4.68(0.49)	4.21(0.85)	<0.00
4 Evaluated learners' ability to apply medical knowledge to specific patients.	4.66(0.50)	4.22(0.85)	<0.00
5 Evaluated learners' medical skills as they apply to specific patients.	4.70(0.49)	4.21(0.83)	<0.00
6 Evaluated learners' attitudes as they apply to specific patients.	4.72(0.47)	4.26(0.79)	<0.00
7 Asked learners to self-assess.	4.62(0.61)	4.19(0.82)	<0.00
<b>Overall mean</b>	4.68	4.21	
<b>Feedback</b>			
1 Gave positive feedback to learners.	4.73(0.46)	4.19(0.87)	<0.00
2 Gave negative (corrective) feedback to learners.	4.47(0.79)	4.20(0.84)	<0.00
3 Explained to learners why he/she was correct or incorrect.	4.73(0.46)	4.22(0.87)	<0.00
4 Offered learners suggestions for improvement.	4.73(0.47)	4.22(0.88)	<0.00
5 Developed a plan for improvement with learners.	4.61(0.63)	4.03(0.99)	<0.00
6 Gave feedback frequently.	4.64(0.55)	4.10(0.91)	<0.00
7 Asked for learners' reaction to feedback.	4.64(0.56)	4.07(0.97)	<0.00
<b>Overall mean</b>	4.65	4.15	

(4.09). The “Revealed broad reading in his/her medical area” was the highest-rated item(4.35) and the “Was willing to say “I don't know” was the lowest-rated item(3.84) (Tables 1, 2 and 3).

### The preceptors' characteristics and self-assessment

Based on the preceptors' gender, age and teaching experience, Male preceptors rated the “Teacher's knowledge” category and the “Directed students to useful literature in the field” item significantly ( $p < 0.05$ ) higher than female preceptors. The older preceptors with more teaching experience rated “Teacher's knowledge and attitude” higher than younger with less teaching experience ( $p < 0.05$ ).

Regarding the educational qualification and the different disciplines, across all categories of the augmented SFDPQ, no significant differences with preceptors' educational qualification ( $p > 0.05$ ). The four categories have statistically significant difference with different

disciplines ( $p < 0.05$ ). The disciplines of internal medicine and pediatrics rated the “Control of session” category significantly higher than surgery and obstetrics/gynecology. The disciplines of internal medicine, pediatrics, and obstetrics/gynecology rated “Communication of goals” higher than surgery. On the “Teacher's knowledge and attitude” two categories, the disciplines of internal medicine, pediatrics, and surgery are significantly higher than obstetrics/gynecology.

The interns' demographics and assessment of the augmented SFDPQ, there was no statistically significant difference in all categories of the augmented SFDPQ based on interns' gender ( $p > 0.00$ ).

### Discussion

#### Compare the assessment of preceptors and interns

Despite the fact that both preceptors and interns at KMU gave overall positive ratings to student-centered clinical preceptors' competency, the preceptors' self-assessment

**Table 3** The participants' assessment on the 7–9 category of the augmented SFDPQ

Item	Means(SD)		P(Exact sign)
	preceptor'	interns'	2-sided
<b>Promoting self-directed learning</b>			
1 Asked learners to identify their goals, interest, and needs.	4.61(0.63)	4.13(0.89)	<0.00
2 Asked learners how they wanted to address their goals, interests, and needs.	4.64(0.57)	4.15(0.89)	<0.00
3 Explicitly encouraged further learning.	4.71(0.48)	4.23(0.88)	<0.00
4 Motivated learners to learn on their own.	4.73(0.46)	4.26(0.86)	<0.00
5 Encouraged learners to do outside reading.	4.70(0.49)	4.19(0.87)	<0.00
6 Encouraged learners to make appropriate use of consultation.	4.71(0.48)	4.22(0.87)	<0.00
7 Pursued his/her own continuing medical education.	4.72(0.48)	4.22(0.89)	<0.00
8 Helped learners more effectively deal with obstacles to learning (eg, daily work overload).	4.63(0.60)	4.09(0.98)	<0.00
<b>Overall mean</b>	4.68	4.19	
<b>Teacher's knowledge</b>			
1 Revealed broad reading in his/her medical area.	4.53(0.63)	4.35(0.76)	<0.00
2 Directed students to useful literature in the field.	4.51(0.63)	4.19(0.92)	<0.00
3 Discussed current developments in his/her medical area.	4.59(0.58)	4.24(0.85)	<0.00
4 Demonstrated a breadth of knowledge in medicine generally.	4.37(0.75)	4.39(0.71)	>0.05*
5 Discussed points of view other than his/her own.	4.58(0.58)	4.22(0.89)	<0.00
<b>Overall mean</b>	4.52	4.28	
<b>Teacher's attitude</b>			
1 Demonstrated great enthusiasm and warmth.	4.76(0.45)	4.23(0.89)	<0.00
2 Demonstrated great humility.	4.74(0.47)	4.18(0.89)	<0.00
3 Was very sober and serious.	4.60(0.63)	4.32(0.76)	<0.00
4 Was very thorough	4.61(0.60)	4.21(0.89)	<0.00
5 Created the impression that he is accessible for further teaching and clarifications.	4.70(0.49)	4.22(0.89)	<0.00
6 Demonstrated empathy toward the learners.	4.75(0.44)	4.15(0.93)	<0.00
7 Demonstrated empathy toward the patients.	4.78(0.43)	4.31(0.75)	<0.00
<b>Overall mean</b>	4.71	4.23	

\* no statistically significant

was significantly higher than the interns'. The preceptors gave the highest ratings in the "Teaching attitude" category and the "Expressed respect for learners" item. This finding state that self-assessments appeared to overestimate their abilities and may be confounded by respondents' bias, which was consistent with other studies [28–31]. Therefore, it would be worthwhile to conduct a longitudinal study and multiple assessments of preceptors by peers or faculty, or by direct observation of interactions with preceptors over a long period of time [32], to providing constructive feedback, to determine which of the competencies identified are most relevant to the outcomes for interns, professional satisfaction, and career progression, all of which may indicate that the preceptorship model is successful [12].

In this study, preceptors and interns both gave the lowest ratings for "Was willing to say "I don't know". It suggests that many educators feel that doing so is a sign of weakness [33]. However, the lack of this competency can affect the mutual respect and communication between

preceptors and learners, because once learners understand that a teacher has limitations just as they do, they begin to recognize a common ground on which to build [34]. As a result, preceptor should aware of their own limitations and take steps to improve it, and not be afraid to reveal them to learners [33].

Interestingly, the "Teachers' knowledge" category received the lowest rating from preceptors' self-assessment compared to interns. This could be considered an intrinsic modesty trait in preceptors who have been deeply influenced by Chinese culture, because the "Demonstrated a breadth of knowledge in medicine generally" received a similarly high rating from both groups, with no significant difference detected. Obviously, a qualitative study is necessary to investigate the preceptors' and interns' experience in depth and understand the factors that influenced their ratings [35]. On the other hand, this finding could also explain that the preceptors at KMU have already reflected on their weaknesses in relation to their subject knowledge and realized that effective

teaching requires expertise in one's discipline, and students want their teachers to "know their stuff" [36].

### The assessment from the interns

The study results showed that interns of different genders have similar perspectives on preceptors' teaching performance. The "Learning climate" category received the lowest rating, although hospitals' primary activity being patient care rather than clinical teaching [1], but some studies on work-based learning show that teaching and learning in the clinical environment need to focus on creating a learning climate that provides effective learning opportunities and guidance for interns without being intimidating enough to reduce their confidence [2, 37, 38].

### The self-assessment from the preceptors

The study results showed that the evaluation of internal medicine faculty was higher than that of surgical faculty on some categories. Although should be taking different assessment circumstances into account in different disciplines, but reflecting that this assessment measures what it stands for, that is teaching in the clinical environment [39]. Therefore, there should be more strengthening the development of teaching competence for surgical faculty in clinical settings.

Teachers with different educational qualification showed no difference in their self-assessments, suggests that academic medicine has assumed that talent as a clinician or the ability to teach is frequently incorrect [33]. The finding also shown that older preceptors with more teaching experience have higher rating than younger with less teaching experience on the "Teachers' knowledge and attitude" category. Therefore, regardless of educational qualification, especially young teachers should strengthen the development of teaching competence.

### Implications for clinical preceptor's competency development

The increased social demand for excellence and the introduction of competency-based internships have heightened preceptors' awareness of their teaching competency. Based on study findings, it is meaningful and feasible to explore a framework for competency development that enables preceptors to understand and plan their professional development. The preliminary framework includes four key domains:

1. Enriching Knowledge: Provide opportunities (fellowships or teaching scholar programs) to promoting preceptors' depth and breadth of professional and pedagogical knowledge, ensuring they stay up-

to-date with developments in teaching and learning (including digital literacy).

2. Skills for Establishing a Learner-Centered Learning Climate: Understand learners to create an inclusive learning environment, tailor teaching flexibly to learners' needs (e.g., experience, competence), and provide constructive feedback (both positive and negative) to help overcome individual difficulties.
3. Competency in Practice-Based Learning and Reflection: Engage in learning by doing or observing, participate in work-based learning and workshops (especially for younger preceptors with less teaching experience), develop teaching strategies for different disciplines and diverse settings, and reflect on personal strengths and weaknesses in teaching activities to meet learner outcomes.
4. Authentic Professional Attitude: Conduct objective self-evaluations to serve as good role models for learners, treat all learners equitably and with respect, maintain positive attitudes towards diverse learners and patients, and demonstrate best educational and cost-appropriate care practices.

In summary, utilizing multiple evaluations and providing constructive feedback to develop competent clinical preceptors is an indispensable duty of medical universities, as preceptors contribute to excellence in medical training and patient care.

### Limitation

This study was conducted at only one medical university using non-probability sampling, which may have an impact on the external validity and generalizability of the results. Another limitation is that online questionnaires produce lower response rates than paper-based questionnaires. Furthermore, the survey tool for the augmented SFDPQ was validated only through an expert review and a small sample pilot study. Finally, the study may be subject to bias because there was insufficient information to determine whether confounding factors were taken into account during the study design.

### Conclusion

Employing the augmented SFDPQ to evaluate learner-centered teaching competency of clinical preceptors, offers potentially useful information for delivering constructive feedback. Combining self-evaluations with learner evaluation data can detect between-faculty differences on competency of learner-centered teaching, it contribute to exploring preceptor competency development framework to guide them in targeted teaching skill acquisition and improvement, finally improving the overall quality of internships.

## Abbreviations

SFDPQ	Stanford Faculty Development Program questionnaire
SFDP	Stanford Faculty Development Program
KMU	Kunming Medical University
SCL	Learner-centered teaching

## Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12909-024-05883-4>.

Supplementary Material 1

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## Informed consent

Informed consent was obtained from all participants.

## Authors' contributions

Wenlan Zhao and Xiaohan Yin accounted for substantial the conception or design of the work, and all aspects of the work. Zixian Liu and Tong Wang contributed to analyse the data and collate the Tables and Figures of manuscript and drafting the manuscript. Yanchun Sun proposed the valuable suggestions for revised it. Siwen Wu and Bin Xu contributed to the acquisition, and interpretation of data for the work. All authors agree to be accountable for all aspects of the work.

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## Availability of data and materials

The datasets analysed during the current study are available from the corresponding author on reasonable request.

## Data Availability

Data is provided within the manuscript or supplementary information files.

## Declarations

### Ethics approval and consent to participate

Ethical approval was obtained from the Kunming Medical University Research Ethics Committee; consent was obtained from all participants. All methods used to inform and develop this paper were carried out under relevant guidelines and regulations.

### Consent for publication

Not applicable.

### Competing interests

The authors declare no competing interests.

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