



# Professional and Didactic Competence of Instructors as a Quality Criterion in Continuing Education for Emergency Medical Services and Emergency Medicine: A Trauma Care Course as an Example

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## Abstract

*The professional and didactic competence of instructors is considered a key quality criterion for continuing education in emergency medical services and emergency medicine, especially when it comes to complex topics such as interprofessional prehospital trauma care. The aim of the study is to examine the perceived professional and didactic competence of instructors in a trauma training course and its significance for learning relevance, interaction, and practical relevance from the participants' perspective. Two one-day training courses on prehospital trauma care for emergency medical personnel and physicians at a German educational institution in 2024 (n=21) and 2025 (n=17) were examined. The data is based on standardized evaluation forms with ratings on professional and didactic design, as well as supplementary qualitative feedback from participants. The quantitative data was evaluated descriptively, and the free comments were subjected to a structured qualitative content analysis according to Mayring [1]. Results indicate that participants predominantly rated the professional and didactic competence of the speakers as good and described the training as practical, motivating, and conducive to learning. Particular importance was attached to authentic case studies, clearly structured input, and explicitly designed interaction and reflection phases that supported interprofessional cooperation and confidence in prehospital trauma management. Criticism mainly focused on organizational aspects and communication processes. The results emphasize that professional and didactic competence is understood as a combination of professional expertise, structured learning organization, and interactive teaching. This area of competence is also perceived as a key quality feature of traumatology training courses in emergency medical services and emergency medicine. If further data analyses confirm the findings, this will have consequences for the selection and qualification of instructors as well as for the curricular design of practice-oriented, reflexive trauma training formats.*

**Keywords:** *Interprofessional training, Prehospital trauma care, Pedagogical competence, Instructional design, Educational quality*

## 1. Introduction

The quality of continuing education in emergency medical services and emergency medicine is a central concern in the context of patient safety and medical professionalism [2, 3]. Prehospital trauma care in particular places considerable demands on the professionals involved: it requires not only a solid foundation of medical knowledge, but also the capacity for structured interprofessional collaboration under time pressure and in dynamic, resource-limited operational environments [3, 4, 5]. Practice-oriented, simulation-based training formats play a pivotal role in sustainably developing and consolidating these action competencies [6, 7, 8].

One aspect that has received comparatively limited empirical attention in this educational domain concerns the significance of instructors' professional and didactic competence for the perceived quality of interprofessional continuing education. While general educational research has produced extensive findings on professional instructor competencies over several decades [e.g., 9, 10], their systematic investigation in the context of continuing medical education for adults, and in emergency medicine training in particular, remains limited [11, 12].

The present study addresses this research gap. It examines how participants in an interprofessional trauma course for emergency medical personnel and physicians perceive the professional and didactic competence of the instructors, and what significance this perception holds for the learning relevance, quality of interaction, and practical orientation of the training. The empirical basis consists of standardized evaluation forms supplemented by qualitative participant feedback collected across two course iterations at a German educational institution in 2024 and 2025. In doing so, the study contributes empirical evidence to quality development in emergency medicine continuing education and provides



impetus for the curricular design as well as the selection and professional development of instructors in this field.

## **2. Background**

### ***2.1. Theoretical Frameworks for Professional Instructor Competence***

The concept of professional instructor competence rests on a well-differentiated theoretical foundation within educational research. Of particular significance for contemporary understanding is Shulman's (1986) concept of Pedagogical Content Knowledge (PCK), which distinguishes between Content Knowledge (related to a subject), (general) Pedagogical Knowledge, and Pedagogical Content Knowledge (related to subject-specific didactic knowledge) [9]. PCK describes a specific body of knowledge which enables instructors to prepare subject matter content in a learning-conducive manner. That is, to transform complex bodies of knowledge in such a way that they become comprehensible and meaningful to the learners in question. This three-dimensional framework has since been recognized as an important reference point in international teaching and learning research [13].

In the German-speaking academic context, the model of professional instructor competence was further developed through the COACTIV research program [10, 14]. Baumert and Kunter (2011) distinguish four core competence domains: professional knowledge (comprising the sub-dimensions of subject matter knowledge, subject-specific didactic knowledge, pedagogical-psychological knowledge, organisational knowledge, and counselling knowledge), beliefs and values, motivational orientations, and self-regulatory abilities. Subject matter knowledge and subject-specific didactic knowledge are identified as the central dimensions of professional action competence, both of which have been empirically shown to be associated with instructional quality and student learning outcomes [10, 14]. Although the COACTIV competence model was originally developed as a generic framework for the school context, its underlying assumptions are transferable to contexts of vocational and continuing medical education [14].

In the domain of adult education, educational researchers emphasize that competence must always be understood as the interplay of cognitive abilities, motivational prerequisites, and practical skills, an interplay that enables situationally appropriate action [15, 16]. Professional and didactic competence in the context of continuing vocational education therefore encompasses not only the structured transmission of knowledge, but equally the design of interaction and reflection processes that are conducive to learning, as well as the capacity for adaptive learning facilitation with heterogeneous groups of participants [15, 16].

A further theoretical framework of reference is provided by the concept of Interprofessional Education (IPE) [17, 18]. The World Health Organization (WHO) defines IPE as a learning approach in which members of different health professions learn together, from and with each other, with the aim of fostering effective collaboration and improving the quality of care [19]. Instructors in interprofessional training formats must therefore possess, in addition to subject matter and subject-specific didactic knowledge, competencies in the facilitation of heterogeneous groups and in promoting interprofessional communication processes. Findings from clinical education research demonstrate that instructional quality, particularly with regard to structured knowledge transmission, clinical authenticity, and the promotion of active learning processes, contributes substantially to learning effectiveness in continuing medical education [3].

### ***2.2. Professional and Didactic Competence in Emergency Medicine Training***

The theoretical approaches outlined in this study can be applied to the specific context of trauma training in emergency medical services and emergency medicine. Prehospital trauma care is characterized by a pronounced degree of complexity and time-criticality: it requires the coordinated interaction of paramedics and emergency physicians within dynamic operational environments with limited resources [3]. Continuing education formats in this field must therefore not only convey subject-specific content, but also explicitly foster interprofessional action and communication competencies.

Applying the COACTIV-competence-model [10, 14] to the context of trauma care training, the following implications emerge for instructors: subject matter knowledge encompasses current medical and prehospital care knowledge, including clinical procedures and guideline-compliant treatment protocols. Subject-specific didactic competence refers to the ability to prepare this knowledge in such a way that it is comprehensible and applicable in practice for participants from diverse professional backgrounds. Pedagogical-psychological knowledge, finally, is expressed in the competent design of learning



sequences that are conducive to learning, sequences that integrate authentic case studies, structured content phases, and explicitly facilitated interaction and reflection phases.

In accordance with the WHO Framework for Action on Interprofessional Education and Collaborative Practice [19], appropriately qualified instructors contribute not only to the development of subject-specific competencies, but also to fostering interprofessional collaboration competency and strengthening participants' confidence in operational contexts. Against this background, the applied didactic approach, understood as the interplay of subject matter expertise, structured learning organization, and interactive instructional design, emerges as a central quality criterion of the continuing education course. Building on this theoretical foundation, the present study examines the extent to which participants in an interprofessional trauma care course perceive the professional and didactic competence of the instructors as learning-relevant, interaction-promoting, and practice-oriented, and what conclusions can be drawn from these perceptions for the curricular design and quality assurance of continuing education programs in emergency medicine.

### 3. Data Collection and Analysis

The empirical basis of the present study consists of standardized evaluation data from two one-day continuing education courses on prehospital trauma care conducted in Pirna, Germany. A total of  $N = 21$  participants took part in the 2024 course and  $N = 17$  in the 2025 course. The participants included paramedics and emergency physicians. Data was collected immediately upon completion of the respective course.

The data collection instrument was the standardized evaluation form of the Saxon Medical Association for the evaluation of externally certified continuing education events. The questionnaire captures study-relevant data including five items (Items 1.1 to 1.5), comprising both closed rating questions and dichotomous questions. Items 1.1 to 1.3 employed a five-point rating scale (ranging from excellent to very poor) to assess the perception of the overall quality of the course (1.1), the professional and didactic competence of the presenters (1.2), and the practical relevance and currentness of the course content (1.3). Items 1.4 and 1.5 used a dichotomous format (yes/no) to assess whether interaction and discussion among participants had been facilitated (1.4) and whether the scheduled time frame of the event had been adhered to (1.5). An additional open-ended text field offered participants the opportunity to provide a free-text comment.

The quantitative data from the closed-ended items were analyzed using descriptive statistics. Frequency counts were conducted for the dichotomous items. The free-text comments were evaluated through a structured qualitative content analysis following Mayring [1]. The analysis was conducted inductively: the coding process proceeded without pre-defined categories, with codes being derived directly and systematically from the data material. The aim was to represent the participants' perspectives as authentically as possible and to identify recurring patterns across responses. The study was exploratory in nature overall, with the objective of generating initial empirical findings on the perception of professional and didactic instructor competence in this emergency medicine continuing education context, thereby laying the groundwork for more in-depth future analyses.

## 4. Results

### 4.1 Quantitative Part of the Survey

Across both survey years, all five evaluated items achieved a median of 1, indicating a high level of satisfaction among most participants (Table 1). Adherence to the schedule was rated excellent unanimously by all participants in both years ( $M = 1.00$ ), reflecting a consistent and reliable time structure throughout the course.

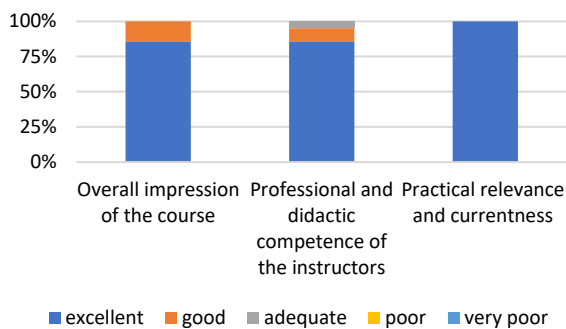
In 2024, the mean scores across all items ranged from 1.00 to 1.19, reflecting a near-uniform distribution of the highest possible rating. In 2025, the overall impression of the course showed the greatest deviation from the optimal value, with a mean of 1.41. This score nonetheless remains within the upper range of the scale. Professional and didactic competence ( $M_{2024} = 1.19$ ;  $M_{2025} = 1.29$ ) and practical relevance ( $M_{2024} = 1.05$ ;  $M_{2025} = 1.12$ ) were rated consistently positively in both years, with only marginally higher mean scores in 2025. As the medians are identical across all items and both years, the slight differences in mean scores reflect isolated ratings in the categories good or adequate, which have no bearing on the central tendency of the distributions.



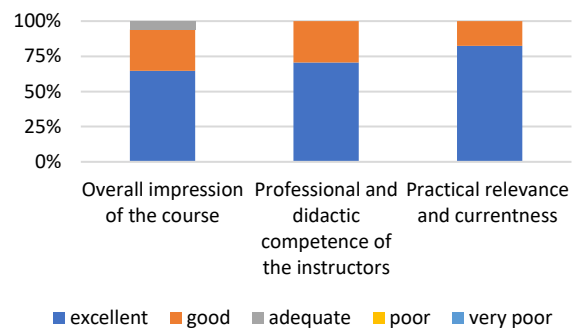
**Table 1.** Descriptive statistics of evaluated items 1.1 to 1.5 (N = 38)

Item	2024 (n = 21)			2025 (n = 17)		
	<i>Mdn</i>	<i>M</i>	<i>SD</i>	<i>Mdn</i>	<i>M</i>	<i>SD</i>
Overall impression of the course	1	1.14	.36	1	1.41	.62
Professional & didactic competence	1	1.19	.51	1	1.29	.47
Practical relevance and currentness	1	1.00	.00	1	1.18	.39
Participant interaction & discussion	1	1.05	.22	1	1.00	.00
Adherence to schedule	1	1.00	.00	1	1.00	.00

A comparison of the two survey years revealed minor differences in mean scores. In both cohorts, all mean values remained below 1.5, consistent with an overall highly positive evaluation. The overall impression did not improve from 2024 ( $M = 1.14$ ) to 2025 ( $M = 1.41$ ). Rather, the slightly higher mean in 2025 indicates a marginally more critical assessment, while still remaining within the range of excellent to good. Given the ordinal scale level and the small sample sizes, inferential statistical testing was not performed.



**Fig. 1.** Percentage distribution of participant ratings across items 1.1 to 1.3 (n = 21, 2024).



**Fig. 2.** Percentage distribution of participant ratings across items 1.1 to 1.3 (n = 17, 2025).

Figures 1 and 2 demonstrate the percentage frequency distribution of ratings for the three ordinal scaled items, presented separately for each survey year. In both years, the response categories “poor” and “very poor” were not selected for any of the criteria, indicating a consistently positive evaluation of the course across both cohorts.

In 2024 (n = 21), responses were strongly concentrated in the “very good” category: practical relevance and currentness were rated very good by all participants unanimously (100% each). Overall impression and professional and didactic competence were each rated very good by 85.7% of respondents. For professional and didactic competence, an additional 4.8% selected “adequate”, representing the only instance of this rating category recorded across the entire 2024 cohort.

In 2025 (n = 17), a slight shift toward the “good” category was observed across these items: professional and didactic competence was rated “very good” by 70.6% and “good” by 29.4% of participants, while practical relevance received ratings of “very good” (82.4%) and “good” (17.6%). For overall impression, 64.7% of respondents selected “very good”, 29.4% “good”, and 5.9% “adequate”.

Comparing the two survey years, a marginal increase in “good” ratings is observable for these items in 2025, while 2024 showed a stronger concentration in the highest rating category. Nevertheless, these differences must be considered negligible, as all responses in both survey years remained exclusively within the positive range of the scale.

The dichotomous items, 1.4 and 1.5, likewise received predominantly positive ratings in both survey years (Table 2). A slight improvement in perceived interaction quality is evident when comparing the two cohorts, with 2025 yielding a fully affirmative response across all participants.

**Table 2.** Percentage distribution of participant ratings across items 1.4 and 1.5

Year	Response	Participant interaction and discussion (%)	Adherence to schedule (%)
2024 (n=21)	Yes	95.24	100.00
	No	4.75	0.00
2025 (n=17)	Yes	100.00	100.00
	No	0.00	0.00



#### 4.2 Qualitative Part of the Survey

Of the 38 completed evaluation forms, a total of 26 (68.4%) contained a free-text comment. Participation rates differed between the two cohorts: in 2024, 17 out of 21 participants (81.0%) provided written feedback, compared to only 9 out of 17 participants (52.9%) in 2025. Inductive categorization of the comments revealed consistent thematic priorities across both years, alongside discernible shifts in content emphasis:

1. **Time management** was the most frequently mentioned topic across both cohorts. In both years, participants repeatedly requested more time for practical exercises and skills training (e.g., 2024: *"please allow more time for the practical exercises"* [Participant 2]; 2025: *"would appreciate more time scheduled for practical exercises"* [Participant 10]). In the 2025 cohort, this request was articulated more specifically, including suggestions to shorten break times in favour of practice time or to allocate an additional ten minutes per station
2. **Interprofessional collaboration** was explicitly and positively highlighted by multiple participants in 2024 (e.g., *"very good collaboration"* [Participant 20]; *"it was great to have the physicians participate so we could practise with them"* [Participant 14]). In the 2025 cohort, this aspect was no longer mentioned in the comments, potentially indicating a normalization of the interprofessional learning format among participants
3. **Team composition** was raised exclusively in the 2025 cohort: two participants advocated for the integration of trainees into mixed teams or, alternatively, for the formation of separate trainee-only teams.
4. **Organisation and communication** were evaluated more critically in 2025 than in 2024: one participant called for improved advance communication to external participants regarding work attire, catering, and the daily schedule. In 2024, the only organisational criticism concerned the limited visibility of the event through internet searches.
5. **Overall impression and atmosphere** were commented on positively in both cohorts. Praise was directed at the quality of the case studies, the realistic nature of the practical exercises, and the pleasant learning environment. Catering received more frequent explicit positive mentions in 2024 than in 2025.

In summary, the qualitative feedback from both cohorts is thematically consistent and reflects the same central area for improvement: increased time for practical exercises. However, the 2025 comments demonstrate a higher degree of specificity and suggest a more differentiated reflection on the learning environment, particularly with regard to team composition and organizational conditions.

#### 5. Discussion and Conclusion

The evaluation data from both survey years (N = 38) demonstrate consistently high levels of participant satisfaction: all five assessment criteria achieved median scores of 1, and the response categories "poor" and "very poor" were not selected in either cohort. The particularly high ratings for practical relevance/currentness and participant interaction/discussion indicate that the instructors successfully structured subject content in a learning-conducive manner and actively facilitated interprofessional communication processes. Both of these represent core elements of professional and didactic instructor competence as conceptualised in the COACTIV model and the WHO framework for interprofessional education [10, 14, 19]. The marginal shift in ratings toward the "good" category in 2025 should not be overinterpreted given the small sample sizes. Across both cohorts, time management represents the central qualitative theme: the repeatedly expressed desire for more time given to practical exercises points to a structural tension between the aspiration for comprehensive interprofessional competence development and the constraints of a single-day format.

For curricular development, the following recommendations are proposed: (1) extending practice time at skills development stations, (2) didactic consideration of heterogeneous participant groups, and (3) improved advance communication for external participants. The limited sample size constrains the generalizability of these findings. A longitudinal analysis incorporating additional cohorts, supplemented by objective measures of competence, would substantially strengthen the evidence base of this study. Furthermore, the findings suggest that the selection and professional development of instructors in emergency medicine continuing education should explicitly include, alongside subject matter expertise, didactic competencies in designing interactive and practice-oriented learning sequences as well as experience in facilitating interprofessional groups as core selection criteria and qualification objectives.



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