

## Review Article

# The Development of the Framework of Effective Teaching-Learning in Clinical Education: A Meta-Synthesis Approach

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Teaching as the center of every curriculum is a set of actions undertaken to create and facilitate student learning. In recent years, the number of qualitative studies of effective teaching in clinical education of undergraduate medical education has increased. As the number of research studies grows, it is necessary to aggregate them. Therefore, the purpose of this study was to synthesize effective teaching-learning factors through the meta-synthesis in clinical education. In this study, the meta-synthesis approach was used to synthesize qualitative evidence in relation to effective teaching-learning factors in clinical education. From 1990 to 2021, electronic databases and journals were searched to identify studies and publications on effective teaching-learning factors in clinical education. Based on the combination and search strategies in the databases (OVID, PubMed, Web of Science, SCOPUS, Eric, Magiran, and SID), 33,799 and 56 studies were identified from other sources. Following reviewing the full text of the articles, 53 studies were selected. Forty-five studies were selected and included in the meta-synthesis process after critical appraisal using the Critical Appraisal Skills Program. The synthesis of qualitative evidence was developed as an effective teaching-learning framework in clinical education. Based on this comprehensive framework, effective teaching-learning in clinical education can be seen through behavioral or content (learner, teacher, and patient and their behaviors), social (collaborative learning community), pedagogical (instructional design and teaching-learning opportunities), contextual (positive and supportive clinical environment), and educational leadership (classroom management and structure) lenses. The current research is the first qualitative meta-synthesis to provide a thorough and comprehensive review of effective teaching-learning factors in clinical education. The results of this meta-synthesis provide a holistic view of clinical education and can help with clinical teaching-learning design.

## 1. Introduction

Medical education has at least five important elements: content and objectives, the actual teaching-learning processes, assessment of learning outcomes, evaluation processes, and the context, in which medical education happens. The learning activities are an important part of teaching [1]. Specifically, there should be alignment between of the learning outcomes, teaching and learning activities, and assessment [2]. Clinical teaching-learning is the heart of medical education, and many factors affect the development of students' clinical competency [3].

The primary purpose of medical education is to train students with clinical and professional competencies who are competent to manage common medical problems in the community. This is accomplished by providing medical students with authentic clinical experiences to apply theory and competence in clinical situations [3]. The role of the clinical teacher is vital in clinical practice. Regarding the role of faculty members in medical schools in the literature, the four roles of physician/clinician, administration, research/scholar, and educational/teaching can be identified (see Figure 1).

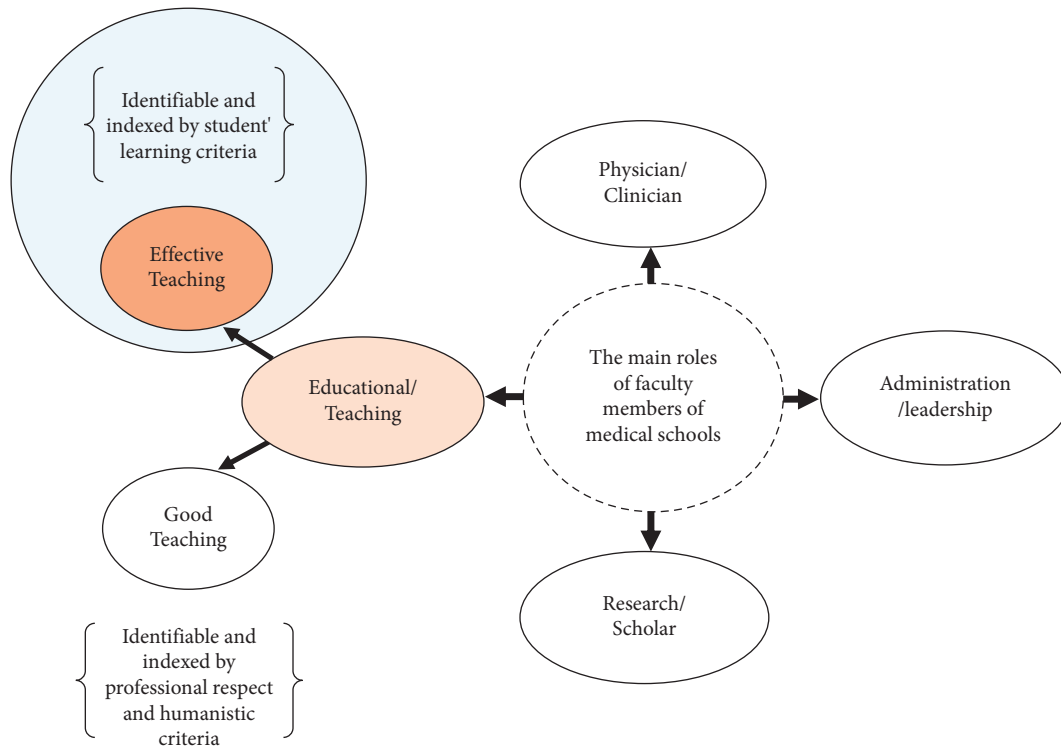


FIGURE 1: The four main roles of faculty members of medical schools.

As one of the roles of faculty members in medical schools, teaching is a set of actions and activities performed by teachers and educators to create and facilitate student learning and is the center of every curriculum. Effective teaching is one of the key factors for educational system improvement [4]. Although teaching focuses on teachers' activities, its goals and outcomes are involved in changing students' activities. Therefore, teaching is a social and complex phenomenon [5]. The concept of teaching and the components of effective teaching have been among the most important concerns of educational researchers and theorists worldwide from the past to the present.

In relation to effective teaching, Hattie's [6] valuable research work entitled "visible learning: a synthesis over 800 Meta-analysis" introduces a comprehensive list of factors with known effects on learning outcomes in primary, secondary, and higher education. The factors included learner traits (e.g., motivation), teacher traits (e.g., teacher-learner relationship), teaching methods (e.g., concept mapping), school policies (e.g., classroom management), home characteristics (e.g., family structure), and curriculum design and development (e.g., comprehension programs).

Wu [7] reported interesting results in a study entitled "Qualitative evidence synthesis of studies on teaching: focusing on student learning." Based on this qualitative meta-synthesis, a preliminary causal-effect theory of teaching and learning was developed. It contains eight elements: teacher-student dialogue, peer dialogue, link with real-life, learning through multiple presentations, teaching with ICT, multiple assessments, demonstration, and practice. Relevance, scaffolding, and adaptation are three effective strategies that are helped by these eight instructional factors.

However, teaching in clinical education is different from other professions and training due to the physician-patient relationship, focus on patient safety, and experiential learning [8, 9], and the results of Hattie's study and Wu cannot be generalized to the context of clinical teaching.

Around effective teaching in clinical education, Huang et al. [10], in a meta-analysis, compared effective teaching in clinical education. Based on the results of research of Huang et al. [10], mastery learning, small group learning, and goal setting are the most effective teaching-learning factors in clinical education.

Beigzadeh et al. [11] identified six categories of barriers to teaching and learning in clinical rounds in a qualitative meta-analysis. These six major categories are related to the system, climate, teacher, student, patient, and personnel. According to the results of this study, effective teaching in clinical rounds can be achieved by removing these barriers.

The synthesis of qualitative evidence related to effective teaching-learning in clinical education is limited. There is synthesis on this topic. It covers only quantitative studies (meta-analysis) or solely considers one setting of clinical education (such as teaching-learning in clinical rounds, inpatient education, and bedside teaching). On the other hand, many isolated and dispersed qualitative researches concerning effective teaching-learning in clinical education necessitate integration and synthesis. In this study, we synthesized qualitative evidence of effective teaching-learning in clinical education (from the perspective of both medical students and clinical teachers as the key stakeholders in the clinical settings). We believe that, by combining the findings of the studies, a comprehensive

framework can be developed, which can be used as a foundation for faculty development, changing clinical education policies, designing and reorganizing clinical teaching, and finally, students' achievement of clinical learning outcomes.

In this regard, the specific research questions were as follows: (1) What are the fundamental components and dimensions of effective teaching-learning in clinical education? (2) What is the relationship between components and dimensions of effective teaching-learning in clinical education? (3) What are the dimensions of a comprehensive framework of effective teaching-learning in clinical education?

## 2. Methods

**2.1. Ethical Approval.** Accurate referencing and honesty and scientific trusteeship are among the ethical considerations in this research. In addition, researchers have avoided bias in the research process, especially when collecting data, critical appraisal of studies, and analyzing data, and finally completed the research ethics committee approval form. This article is extracted from the first substudy of the Ph.D. dissertation of Mr. Hamed Khani from the Department of Medical Education of Shahid Beheshti University of Medical Sciences and has received ethics approval with the number IR.SBMU.SME.REC.1399.097 on 2021-01-13 from the university ethics committee.

**2.2. Study Design.** Research synthesis is the conjunction of a specific set of literature review characteristics and attempts to combine empirical research to create generalizations. In other words, it seeks generalizations with definite limits [12].

In this research, the meta-synthesis approach was used. According to Zimmer [13], a meta-synthesis is a qualitative study incorporating data from other qualitative studies on the same topic. The researchers integrate the findings of various qualitative studies in this process, resulting in a whole that is more than the sum of its components.

Different and relatively similar methods have been proposed to implement meta-synthesis. The qualitative meta-synthesis procedures of Sandelowski and Barroso [14] were applied in this study.

## 3. Process and Results

**3.1. Step One: Formulating the Research Question.** In meta-synthesis, the first step is the formulation of the research question. The researcher can use different strategies, such as population, intervention, comparison, outcome, and study (PICOS) design and setting, perspective, intervention/phenomena of interest, comparison, and evaluation (SPICE). In this study, the researchers used the four-question strategy or W<sup>3</sup>H to formulate the research question as follows:

- (i) The first question: "What?" This question covers the aim of the research. The purpose of this study is to develop a comprehensive framework of effective

teaching-learning factors in clinical education (ETLFs-CE).

- (ii) The second question: "Who?" This question specifies the research community or population.
- (iii) The third question: "When?" This question determines the time scope of the research.
- (iv) The fourth question: "How?" This question represents the method used to collect research data.

**3.2. Step Two: Conducting a Systematic Literature Search.** A significant effort is required to provide a comprehensive list of studies to be included in meta-synthesis. The researcher systematically searched for publications and studies published in specific databases using keywords in this step. An author performed a systematic search. A health librarian was recruited to increase the reliability of the search. In addition, the search was conducted in several stages (from broad to specific search). Table 1 represents the keywords related to effective teaching-learning factors in clinical education (ETLFs-CE), the electronic scientific databases, and the time scope of studies and texts.

Table 1 presents the following indicators: the concepts of effective teaching and the effectiveness of teaching in higher education under the heading of generic concepts (GC), general qualitative keywords such as qualitative research and qualitative methodology under the title generic methodology (GM), concepts of effective teaching and teaching effectiveness in medical education, effective teaching, and teaching effectiveness in clinical education under the title of specific concepts (SC), and qualitative specific keywords such as grounded theory, ethnography, phenomenology, and thematic analysis under the title specific methodology (SM). Keywords and search combinations are presented in supplemental 1 (see Supplementary Materials file).

Finally, based on the combination and search strategies in the electronic databases (OVID, PubMed, Web of Science, SCOPUS, Eric, Magiran, and SID), 33,799 and 56 studies were identified from other sources.

**3.3. Step Three: Screening and Selecting Appropriate Qualitative Studies.** In the third step, after collecting articles and texts using keywords, some texts should be deleted according to different criteria. Table 2 shows the criteria for inclusion and exclusion of articles and texts in this study. Studies screening was performed based on inclusion and exclusion criteria (predetermined objective criteria) by one author. However, two researchers conducted the eligibility evaluation (full-text assessment) simultaneously and independently. Any disagreement between researchers was discussed and resolved. We sought help from an expert outside the research team in case of severe discrepancies.

**3.4. Step Four: Critical Appraisal of Studies and Extracting the Required Data from Final Selected Studies.** The remaining papers from the previous phase were assessed for quality in

TABLE 1: Keywords, indicators, search combination, databases, and time scope.

Search combination	Keywords and concepts	Indicators
GC + GM GC +SM	Effective teaching in higher education <b>OR</b> effectiveness of teaching in higher education <b>AND</b> Qualitative research <b>OR</b> Qualitative Methodology <b>OR</b> Qualitative Study <b>OR</b> Qualitative Approach	(Generic) concept  (Generic) methodology
SC + GM	<b>AND</b> Effective teaching in medical education <b>OR</b> Effective teaching in clinical education <b>OR</b> Learning in clinical environment <b>OR</b> Learning in clinical setting <b>OR</b> Teaching-Learning factors in clinical education <b>OR</b> Effective clinical teaching <b>OR</b> Effectiveness of clinical teaching <b>OR</b> Effective Clinical Teaching Behaviors	(Specific) concept
SC +SM	<b>AND</b> Grounded Theory <b>OR</b> Ethnography <b>OR</b> Phenomenology <b>OR</b> Thematic Analysis <b>OR</b> Content Analysis <b>OR</b> Delphi method <b>OR</b> Focus Groups <b>OR</b> Discourse analysis Databases OVID, PubMed, Web of Science, SCOPUS, Eric, Magiran, SID Date of publication (Time scope) 1990–2021	(Specific) methodology

TABLE 2: The inclusion and exclusion criteria of articles and texts.

Exclusion criteria	Inclusion criteria
Reports of quantitative research	Articles (research / letter to the editor) that have been published in academic circles and prestigious journals
Questionnaire and survey studies	PhD theses
Theses below the PhD level	Book, book chapter
Reports of secondary research	Studies containing primary and original data
Pseudoscientific or unverified research Report	Studies with scientific sampling and defined samples
Reports in which the depth and breadth of the data did not give confidence of the trustworthiness of their findings	Reports from primary qualitative research (any type)
articles and studies not written in English and Persian	Studies that describe the characteristics of effective teaching-learning in clinical education
1990 >	All health disciplines Articles and studies written in English and Persian 1990 ≤ 2021 ≥

this step, and the final studies were identified for inclusion in the meta-synthesis. Evaluating qualitative research can be difficult, because it cannot be treated as a single field due to diverse approaches and methodologies [15]. This stage aims to exclude papers and research that may be methodologically suspect; as a result, certain studies may be removed. In the present study, the Critical Appraisal Skills Program (CASP) was used to evaluate the quality of studies critically. Finally, after evaluating articles and studies based on indicators (CASP), 45 articles and studies were selected and included in meta-synthesis. Figure 2 shows this process.

Regarding methodological quality, one study did not have the third criterion; four cases did not have a clear fourth criterion; four cases did not meet the fourth criterion. Also, the sixth criterion was not clear in 15 cases, and 11 cases did not have the sixth criterion. In addition, three items were not clearly explained about the seventh criterion. Finally, out of the total cases, 29 studies had excellent value and rigorous (++), and 16 studies had good value and rigorous (+) (see Table 3).

In this step, in addition to evaluating the studies, in supplemental (2) data such as author/authors (publish year), country, language, discipline/context of the study, study methodology (qualitative research method, data collection methods and techniques), study participants (number and type), and purpose of the research (the focus of the study) were extracted, summarized, and coded from the final selected studies (see supplementary material file).

This is necessary to prepare the researcher to analyze and synthesize the findings of the selected qualitative studies (fifth step).

Some descriptive findings, such as the distribution of studies according to indicators of date of publication, study methodology, and the country, in which the study was conducted, are shown in Table 4 and Figure 3.

3.5. Step Five: Analyzing and Synthesizing of Findings of Qualitative Studies. In meta-synthesis, data analysis is almost subjective, and performance is heavily influenced by the

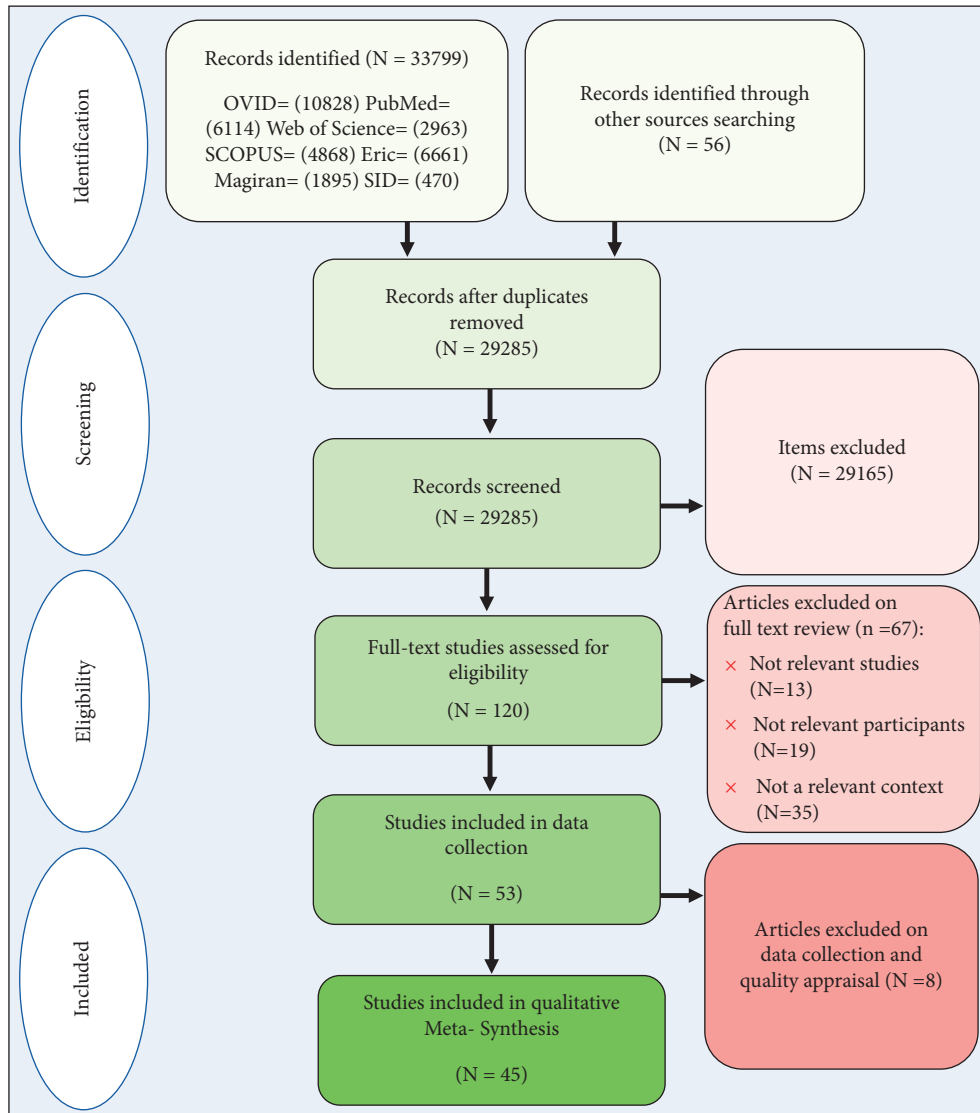


FIGURE 2: Flow diagram of records identified, screened, and studies removed and included.

TABLE 3: Distribution of selected studies according to 10 quality criteria.

	Quality criteria	Yes	Not clear	No
1	Was there a clear statement of the aims of the research?	45	—	—
2	Is a research methodology (qualitative) appropriate?	45	—	—
3	Was the research design appropriate for addressing the aims of the research?	44	—	1
4	Was the sampling strategy (recruitment) appropriate to the aims of the research?	37	4	4
5	Was the data collected in a way that addressed the issue of the research?	45	—	—
6	Has the relationship between researcher and participants been adequately considered?	19	15	11
7	Have ethical considerations been considered in the research?	42	3	—
8	Was the data analysis sufficiently accurate and rigorous?	45	—	—
9	Are the findings clearly reported?	45	—	—
10	How rigorous is the research? (Value and accuracy of research)*	29++		16+

\* ++ = excellent value and rigorous; + = good value and rigorous.

author’s background and the research’s purpose [16]. Some researchers employ grounded theory [17], and some begin with a list of codes [18], while still others conduct the least amount of

analysis in early studies and focus on synthesizing metaphors [19]. Paterson [19] believes that all qualitative analysis methodologies can be applied to meta-synthesis analysis. In this

TABLE 4: Distribution of selected studies by date of publication, study methodology, and research place (country).

Date of publication	N (frequency)	Percentage
1990 to 2000	3	6/67
2001 to 2011	24	53/33
2012 to 2021	18	40/0
Total	45	100/0
Study approach/methodology	N (frequency)	Percentage
Discourse analysis	1	2/22
Thematic analysis	12	26/68
Qualitative content analysis	14	31/12
Grounded theory	6	13/33
Phenomenology	6	13/33
Phenomenography	1	2/22
Ethnography	1	2/22
Descriptive qualitative (critical incident technique)	1	2/22
Case study	1	2/22
Framework analysis	1	2/22
Narrative analysis	1	2/22
Total	45	100/0
Research place (country)	N (frequency)	Percentage
Australia	3	6/67
Netherlands	3	6/67
Canada	4	8/89
New Zealand	3	6/67
Taiwan	1	2/22
Joint project (Taiwan and Finland)	1	2/22
UK	7	15/56
United States of America	12	26/67
Ireland	1	2/22
Iran	5	11/11
Saudi Arabia	1	2/22
China	1	2/22
Malawi	1	2/22
Turkey	1	2/22
South Africa	1	2/22
Total	45	100/0

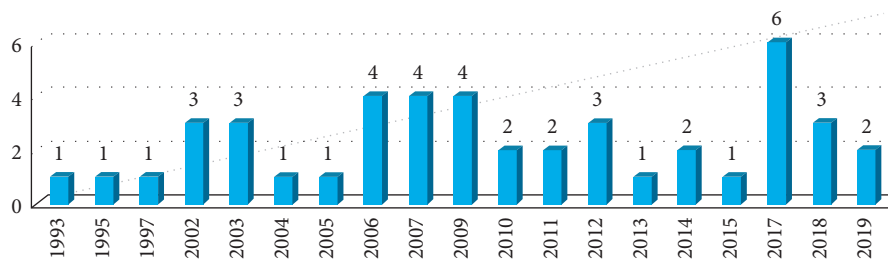


FIGURE 3: Distribution chart of studies according to date of publication.

research, inductive coding (reading and reading carefully studies, open, axial, and selective coding and production of analytical themes) was used. According to the findings of the included qualitative research in supplemental (3), seven criteria were synthesized into five primary dimensions for effective teaching-learning in clinical education (ETLCE). This includes dimensions such as behavioral or content (learner, teacher and patient and her/his behavior), social (collaborative learning community), pedagogical (instructional design and teaching-learning opportunities), the context of teaching-learning

(positive and supportive clinical environment), and educational leadership (classroom management and structure) (see supplementary material file).

**3.6. Step Six: Maintaining Quality Control (Rigor and Trustworthiness).** In meta-synthesis, the Maxwell and Kvale criteria tend to be more relevant in terms of the research's credibility. These criteria include descriptive validity, interpretive validity, theoretical validity [20, 21], and

pragmatic validity [22]. The researchers used specific procedures in this study to ensure that each of these requirements, which are listed in Table 5, was met.

*3.7. Step Seven: Presenting Findings (Conceptual Framework).* The findings of this meta-synthesis resulted in the development of a framework based on the synthesis of qualitative studies. In fact, five factors for effective teaching-learning in clinical education have been identified based on this approach. These dimensions include behavioral or content dimension, social, pedagogical, the context of teaching-learning, and educational leadership (see Figure 4).

#### 4. Discussion

The primary goal of medical education is to produce qualified graduates who possess the essential knowledge, abilities, and attitudes (competency). Clinical education is the cornerstone of achieving this important mission [23], since a significant portion of the medical education curriculum is dedicated to it. On the other hand, teaching-learning in clinical settings is the essence of medical education. In fact, students acquire medical knowledge and clinical skills and begin to think, act, and feel as a doctor in the clinical environment [24, 25].

Teaching is the most fundamental function of higher education and the primary responsibility of faculty members. The quality of teaching is highly effective in motivating and increasing the efficiency of students. Learning as one of the most important educational goals is the product of teaching, and there is a close and mutual relationship between these two concepts. Effective teaching in higher education is widely focused on students and their learning. Effective clinical teaching [26, 27] is critical in clinical education for guaranteeing high-quality patient care and student learning [28–31]. To achieve this goal, two basic principles must be considered: first, teaching requires a set of particular skills and procedures identified via research, and second, teaching must be sensitive to the demands of specific contexts [32]. One of the important topics in the medical education literature is effective teaching. According to previous research, there is no consensus in medical education, particularly clinical education, on the definition and indicators of effective teaching.

Based on the results of this research, components and dimensions for effective teaching-learning in clinical education were extracted and categorized as a result of synthesizing qualitative studies. The behavioral or content dimension is an example of one of them. Human action, work, and behavior are all referred to as “behavior.” There are three components to it: the teacher, the student, and the patient.

Medical students need continuous learning as part of their day-to-day work to improve patient care services. Aside from the teacher, other factors such as the student’s learning skills and style, personal characteristics such as motivation, enthusiasm, self-confidence, responsibility, communication skills, love of learning, experience, and

prior knowledge, and so on, all have an impact on the student’s learning [33].

In addition to the learner, a teacher is another factor of behavioral or content dimension. Clinical teaching is a highly complicated activity and many factors impact its quality. Undoubtedly, one of the most important factors influencing clinical teaching is clinical educators and the quality of their work [34]. For example, studies show that one of the factors influencing students’ interest in their profession is clinical instructors and their effectiveness [35].

According to the results of this study, another component of the behavioral or content dimension of effective teaching-learning is the patient and his/her behaviors. Actually, patient problems and their educational value, patient educational involvement and collaboration, individual characteristics of patients and their families, and such behaviors are part of effective teaching-learning. The focus of teaching and learning in a medical environment is on patients and their concerns [8]. As a result, patient involvement in medical education, particularly clinical education, has been increasingly popular in recent decades [36]. Although patients as experts in their sickness or disability give knowledge and opportunity for students to practice and enhance clinical skills [37, 38], their narratives are no longer employed just as “subjects for learning” in clinical education. Towle et al. [39] identified different levels of patient involvement in education, from paper-based involvement to involvement at the institutional level as co-designers of the medical curriculum. In addition, involvement as a patient teacher in education, evaluation, and curriculum development has been considered [36, 40].

In the clinical setting, the teacher, student, and patient are the teaching-learning triangle. To construct an effective teaching-learning system, it is essential to focus on these three. Educational policymakers should make this possible by selecting motivated and interested students in the medical profession. Also, strengthen self-directed learning skills and develop students as lifelong learners during training.

The teacher is an important part of the teaching program and influences the goals in three ways: first, by shaping the knowledge needed by learners through appropriate and effective teaching; second, by motivating learners to learn; third, by improving learners’ knowledge and skills; they will create opportunities for better learning [41]. Accordingly, teachers and educators have an important role in students’ clinical learning. Thus, recruiting competent teachers is extremely important in medical education, and their personal and professional development must be taken into account during the service.

Contacting real patients play an essential role in educating students, teachers, and physicians. Patients should not be only considered as “subjects for teaching-learning.” Educational policymakers and clinical educators should involve patients in clinical education, curriculum design, or evaluation. In other words, the culture of patient participation in education must be institutionalized, and her/his voice should be heard in the educational involvement.

TABLE 5: Criteria for the validity of meta-synthesis and its guaranteeing strategies.

Strategies	Criteria	Descriptive validity	Interpretive validity	Theoretical validity	Pragmatic validity
Use of all channels to search for studies		✓			
The consulting with librarians and information science experts		✓			
Iterative search strategy to ensure a comprehensive search		✓			
The meetings with the supervisor and two information science experts on important databases, search methods and retrieval procedures		✓			
Contacting the authors of the studies included in meta-synthesis to resolve possible ambiguities with the help of the author		✓	✓		
Using reference manager software to track search and partitioning of found studies		✓			
The audit trail or documentation		✓	✓	✓	✓
The regular meetings regarding the evaluation strategies of the study report			✓		
The critical appraisal of the study report under the guidance of the supervisor and two internal and external reviewers and two Ph.D. students in medical education			✓		
Consulting with the supervisor, and several specialists in qualitative methodology and meta-synthesis				✓	
The expert peer review (evaluation of synthesized findings by supervisors, medical education specialists and expert clinical teachers)					✓

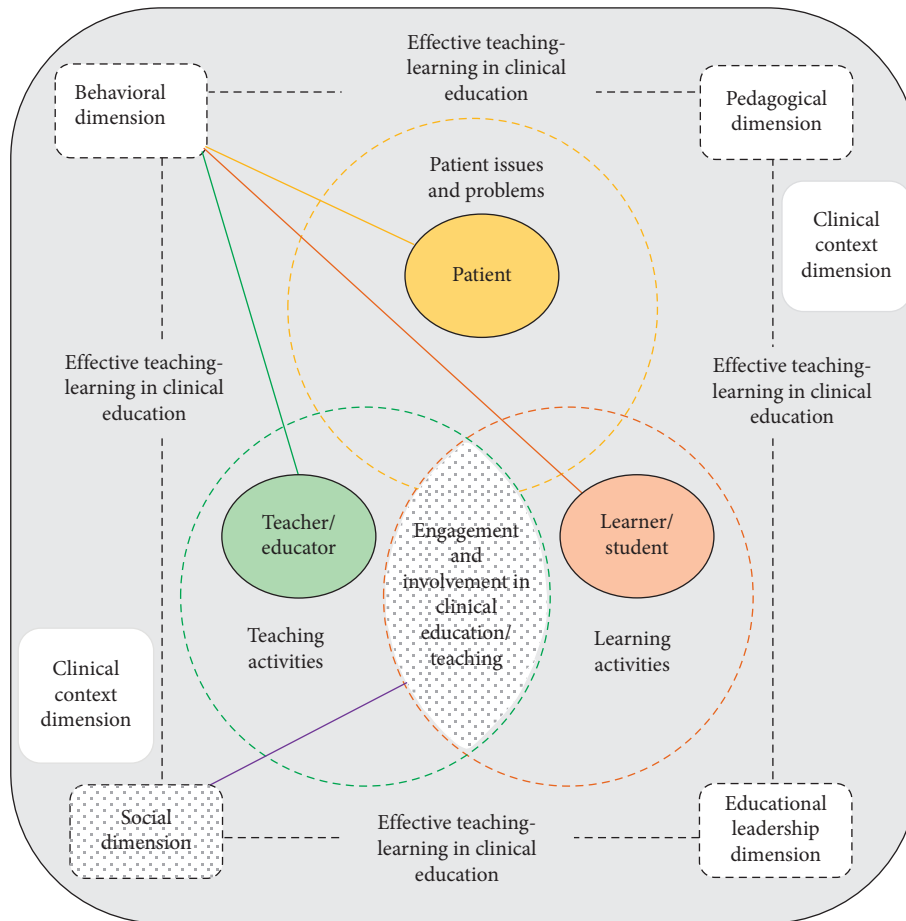


FIGURE 4: Comprehensive framework of factors and dimensions of effective teaching-learning in clinical education.



According to the results of this study, another aspect of effective teaching-learning in clinical education is the social dimension, which includes interactions between teacher, student, patient, and other health workers, as well as the building of a collaborative learning community in clinical practice. John Dewey's concept of community as a society, in which logical and democratic decision-making procedures enable common goals to be attained, is the foundation of collaborative learning community philosophy in education. In learning communities, open discourse is a fundamental feature of democracy. In fact, a belief about the building of community in human societies suggests that open discourse leads to shared social values and free and unrestricted social relations. The concept of collaborative learning communities is well developed by Kahne [42] in the educational context. Also, interactive dialogue is the primary tool of learning originated in Socrates' view. In this regard, social constructivist theories show that learning occurs when interacting with others. Vygotsky [43] introduced the concept of situated learning. This well-known psychologist believed that when students work in a supportive setting, they perform better than when they work alone. Vygotsky [43] describes this difference in performance level as the "Zone of Proximal Development (ZPD)" as the area in which learning takes place [44]. Also, Lave and Wenger [45] described the concept of Legitimate Peripheral Participant (LPP). In a Community of practice, any person who wishes to become a member of a community is permitted by the community's members to participate in their activities under the supervision of the community members. As a result, the individual acquires knowledge and skills gradually and is accepted as a full member of the community [44].

Interaction in clinical learning environments is significant. In clinical settings, constructivist theories and adult learning principles can serve as the foundations of training-learning. Accordingly, the use of collaborative learning strategies such as small-group teaching, problem-based learning, team-based learning, peer-assisted learning can be excellent mechanisms. In fact, in these environments, conditions should be provided for students to construct their knowledge as adult learners.

Based on the results of this research, the pedagogical dimension is another dimension of effective teaching-learning in clinical education, which includes educational design and teaching-learning opportunities. The claim that learning occurs in clinical settings through unplanned activities and direct contact with patients and health care providers may not be entirely accurate. Although clinical teaching is deeply embedded in clinical care and work, it is influenced by patient problems, learner's needs, and the context of teaching. Additionally, it relies on educational strategies such as Socratic questions and scaffolding and occurs on a spectrum that includes planned, opportunistic, formal, and informal teaching-learning [25].

Contrary to popular belief, leaving learners in a clinical setting has no pedagogical basis. It is better for clinical teachers to be equipped with pedagogical knowledge. Pedagogical knowledge is a term that refers to an understanding of how to teach that may be applied to a variety of

educational situations. Therefore, in clinical education/teaching, educational design and even planning of teaching-learning opportunities are highly significant. In this regard, the development of clinical teachers and educators in medical education training courses is effective.

According to the results, the context dimension is another dimension of effective teaching-learning in clinical education, which includes a positive and supportive clinical environment. The environment is an integral part of teaching-learning. One of the variables that determines the quality and effectiveness of clinical education is the optimal educational and clinical environment, which comprises both physical and human (psychosocial) factors. The clinical physical environment, as a component of the learning environment, has a significant impact on the quality of clinical teaching, and it is an important and effective learning factor as well as an integral part of the clinical teaching process [46–48].

One of the variables affecting the environment is the atmosphere and climate of teaching-learning, as well as the quality of exchanges and interactions between students and clinical instructors. If the environment is quiet and stress-free, the student will be more likely to engage in clinical learning as much as possible, which will benefit their learning. In general, the environment is one of the most important factors in the successful development of the curriculum. The research findings show a positive and supportive learning environment leading to the academic achievement of students [49].

In this regard, Lave and Wenger [45] referred to the significance of teaching-learning in context. They believe that teaching-learning in a clinical setting is the result of the activity, context, and culture in which it occurs. As a result, in addition to psychological, pedagogical, technological, and pragmatic perspectives, cultural and contextual factors should be considered when building clinical teaching models and environments [50].

The learning environment or "atmosphere" is a key aspect of the curriculum, which is less tangible than the other aspects of the curriculum. According to Genn [51], the "educational climate" is the soul of the medical curriculum. Teachers, clinical educators, and curriculum planners should consider measuring the educational environment as part of the curriculum evaluation process and consistently encourage a suitable teaching-learning environment.

Finally, another dimension of effective teaching-learning in clinical education is the dimension of educational leadership, which is characterized by classroom management and structure. This dimension includes subcategories such as system and administrative support, time management, the balance between roles, responsibilities, and clinical work and teaching and educational supervision. To improve teaching efficacy, for example, a reasonable balance between clinical practice and instruction should be developed in order to generate an acceptable and coordinated interaction between teacher, student, and patient. Although some of the qualities of this dimension pertain to the teacher or educator, effective teaching-learning at a higher level and organizational level necessitates culture and leadership.

Medical teachers and educators are engaged in an extensive range of activities, including teaching-learning, curriculum development, assessment and evaluation, and management of teams and programs. All these activities require some kind of leadership. Therefore, they should be prepared for this important role. In this regard, their development in educational leadership and management courses is recommended.

## 5. Conclusion

Clinical education occurs in naturalistic settings and encompasses a variety of locations and activities. Accordingly, this study was focused on combining qualitative evidence, and the qualitative studies related to effective teaching-learning factors in clinical education were synthesized and developed a framework. Based on this framework, effective teaching-learning in clinical education can be seen through behavioral or content, social, pedagogical, contextual, and educational leadership lenses. To implement this framework in practice and create an effective teaching-learning system in clinical education, clinical teachers and educators and medical education policymakers should focus on the following.

Selecting motivated and interested students in the medical profession, training students as lifelong learners, recruiting competent teachers and their personal and professional development, involving patients in clinical education, curriculum design, or evaluation, using collaborative learning strategies such as small-group teaching and problem-based learning should be taken into account. Equipping clinical teachers with pedagogical knowledge and training clinical teachers and educators in medical education training courses, measuring the educational environment and promoting an appropriate teaching-learning environment, developing leadership and management skills of clinical teachers and educators should also be considered.

The findings of this study can be used for research purposes and other purposes such as including assessing the effectiveness of clinical teachers and instructors, planning faculty development, and continuing professional development in relation to teaching behaviors. In addition, an instrument can be designed and developed to measure the teacher's effectiveness in the teaching clinical based on the framework of this research in future studies.

## 6. Limitations and Recommendations for Future Researchers

While Persian and English are among the inclusion criteria, some valid studies written in languages other than Persian and English may not have been included in the meta-synthesis. In addition, studies included in this meta-synthesis are from different countries, the cultural characteristics and context of clinical education may have influenced teaching-learning practice. Therefore, we suggest that future researchers consider specific features of the studies' contexts.

## Abbreviations

ETLCE: Effective teaching-learning in clinical education  
ETLFs- Effective teaching-learning factors in clinical  
CE: education.

## Data Availability

All data generated or analyzed during this study are included in supplementary material files.

## Conflicts of Interest

The authors declare that they have no conflicts of interest.

## Authors' Contributions

HK and SA conceptualized and formulated the research question. SA and HK contributed to the design and methodology of the study. The systematic literature search, screening, and selecting appropriate qualitative studies were done by HK and SA. SA monitored the review of the literature. HK analyzed and synthesized of findings of qualitative studies. HK and SA assisted in writing and editing the final report. Finally, all the authors read and approved the final manuscript.

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## Supplementary Materials

Supplemental 1: keywords and search combinations. Supplemental 2: extracting, grouping, and summarizing the required data from selected studies and articles. Supplemental 3: coding and analytical themes resulting from the analysis and synthesis of qualitative studies. (*Supplementary Materials*)

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