International Online Journal of Education and Teaching (IOJET), Vol. 12 , No. 3, 2025 (pp. 117-124)

RESEARCH ARTICLE WWW:IoJet.org

Socialization Outcomes and Life Skill Acquisition through Collaborative Learning by Teaching in Medical Education Environments

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Keywords:

Collaborative Learning, Learning by Teaching, Medical Education, Life Skills, Professional Socialization, Mixed-Methods.

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Received : 15.03.2025
Revised : 12.06.2025
Accepted : 22.06.2025

Background

Medical education, traditionally, does not focus on the promotion of essential life skills and socialization in the profession, with more emphasis on clinical knowledge. Collaborative Learning by Teaching (LbT) has been discovered to fill this divide by making students play a more significant role in facilitating peer learning. Purpose: The research problem of the proposed study is to assess the effect of LbT on socialization and life skills acquisition among medical students in terms of communication, leadership, and teamwork. Procedure: The sequential explanatory mixed-methods design was used. Quantitatively, 150 second-year medical students were used in a pre-test and post-test study of a validated 5-point Likert scale Life Skills Assessment Questionnaire (LSAQ). Semi-structured interviews were carried out qualitatively on 20 participants to investigate peer dynamic perceptions and professional identity. Results: A statistically significant improvement was also found in all domains of life skills ($p < 0.05$), and the largest increases were found in communication(= 3.2, = 4.5) and leadership (= 2.8, = 4.1). Thematic analysis, which was conducted in a qualitative way, was used to draw three major outcomes based on which reduced hierarchical anxiety, faster professional identity formation, and better collaborative interdependence have been identified. Discussion: The combination of data indicates that the social responsibility that is explored by teaching peers creates a more profound cognitive approach and emotional intelligence. Conclusion: Collaborative LbT is a powerful intervention towards developing the non-clinical competencies involved in the contemporary healthcare setting. They advise that medical programs should incorporate formal peer-teaching modules in order to make students more ready to engage in clinical practice in a team.

How to cite this article: Lepcha D, Thakur K (2025). Socialization Outcomes and Life Skill Acquisition through Collaborative Learning by Teaching in Medical Education Environments . International Online Journal of Education and Teaching, Vol. 12, No. 3, 2025, 117-124

Introduction

The contemporary state of medicine requires the shift of the paradigm in the educational approaches. In addition to the proficiency to meet the clinical diagnosis and pharmacological treatment, the profession also requires a high level of communication, a smooth collaborative work, and flexible management.[2, 13, 14] These paramount soft life skills are not usually nurtured using the traditional didactic approaches which are typified by passive learning. A pedagogical method known as Collaborative Learning by Teaching (LbT) when students take the role of teachers to their colleagues is a way where students can express a new alternative.[1, 4, 9] LbT makes the learning process dynamic by transferring the duty of knowledge transfer to the learner so that the processes of socialization and acquisition of skills take place simultaneously.[18-20] The article examines the impact of LbT on the effects of socialization and acquisition of life skills among medical students.[3, 5, 7] The research question is how psychology and behavioral change toward active facilitators and the resulting effect on professional identity takes place.

Research Objectives

The following objectives are developed to give a systematic review of the LbT framework:

- To assess the quantitative difference in the life skill competencies (communication, leadership, and critical thinking) in medical students before and after LbT interventions.
- To examine how the teaching role is related to professional socialization development.
- To investigate the view of the students about peer-to-peer dynamics and how hierarchical barriers can be decreased in the medical learning environment.
- To assess the success of LbT as a sustainable pedagogic instrument in developing non-clinical skills during the course of medicine.

Research Questions (RQ)

RQ1: Do the scores of life skills (communication, leadership, critical thinking) significantly change after attending LbT?

RQ2: What are the perceived socialization process and the peer-to-peer dynamics in LbT spheres by medical students?

3. **Hypotheses (H)**
4. **H_0:** There is no significant difference in life skill acquisition between traditional learning and LbT.
5. **H_1:** Students participating in LbT show significantly higher scores in self-reported life skills compared to baseline measurements.

To create the logical flow and follow the IMRaD structure to be used in IJERE, the paper is structured as follows: Introduction: This part will provide the research background with highlighting the need of life skills in medical education. It incorporates existing research on the topic of Social Constructivism and Collaborative Learning by Teaching (LbT), to define the theoretical framework. The section will also end with the following specific problem statement, research objectives and the hypotheses that will be tested. Research Method: In this part, the sequential explanatory mixed approach is described. It has detailed the research design, demographics of the participants (150 medical students), how the Life Skills Assessment Questionnaire (LSAQ) was developed and the qualitative interview procedures. The quantitative and qualitative methods of data analysis of both strands are also clearly stated. Results, and Discussion: It is in this section that the findings based on both sets of data are reported. The results of the quantitative analysis of the acquisition of life skills have the statistical form of the analysis, whereas the qualitative results are discussed with the help of the thematic analysis of socialization outcomes. These findings are summarized in the discussion and compared with the research done in the field to demonstrate the pedagogical importance of LbT. Conclusion: The last section is the summary on the main findings of the study. It offers evidence-based recommendations in the development of the medical curriculum, identifies the shortcomings of the studies, and offers opportunities in the conduct of future research into the education model led by peers.

Research Method

The research involves an explanatory mixed-methods design that follows a sequential approach

where quantitative data will be collected and then a qualitative stage will follow to give meaning and background. This design provides the opportunity to statistically measure the learning of life skills and investigate the socialization processes that might lie in the dark of traditional survey.[16, 17]

Research Design and Framework

The study was carried out in a 12-week academic semester in one of the medical faculties [6]. Learning by Teaching (LbT) intervention was used instead of conventional 90-minute lectures with the use of peer-led seminars [8][10]. Students were split into small groups with each having the responsibility of ensuring that they master a clinical topic and proceed to teach the rest under faculty supervision [12][15]. An adapted PRISMA (Preferred Reporting Items in Systematic Reviews and Meta-Analyses) flow diagram has been used to trace the steps of the procedure of this sequential explanatory design. The blue flow shows the first screening and quantification of the strand and the green flow shows the qualitative stage and the final synthesis.

On the left of figure 1, transparency is given to the selection process of the participants (Enrolment, screening). To the right, it plans the mixed-method in sequence design: Phase 1 consists of pre-test (N=150), LbT intervention, and the post-test. Phase 2 is then informed by the post-test results where purposive sampling is used to sample a population of 20 participants to do semi-structured interviews. Lastly, there is the integration of the quantitative and qualitative data sets which give a final synthesis to be used in the discussion. This sequence works towards making sure that the qualitative results are able to directly give the explanation of the statistical changes that there are in the life skills scores.

Participants and Sampling Techniques

One hundred and fifty second-year medical students were sampled in total population sample in order to obtain the quantitative stage. The process of finally selecting the sample commenced with a preliminary group of 175 students, and it was narrowed to those who were at school all through and those who refused to take part (as in Figure 1). In the case of qualitative phase, purposive sampling was done to select 20 participants. This group consisted of those students who registered the greatest and smallest increase in the post test mark, and this served to provide a balanced perspective of the LbT effect.

Research Instruments and Questionnaires

To address the research questions accurately, the following instruments were deployed. The **Life Skills Assessment Questionnaire (LSAQ)** was divided into specific clusters.

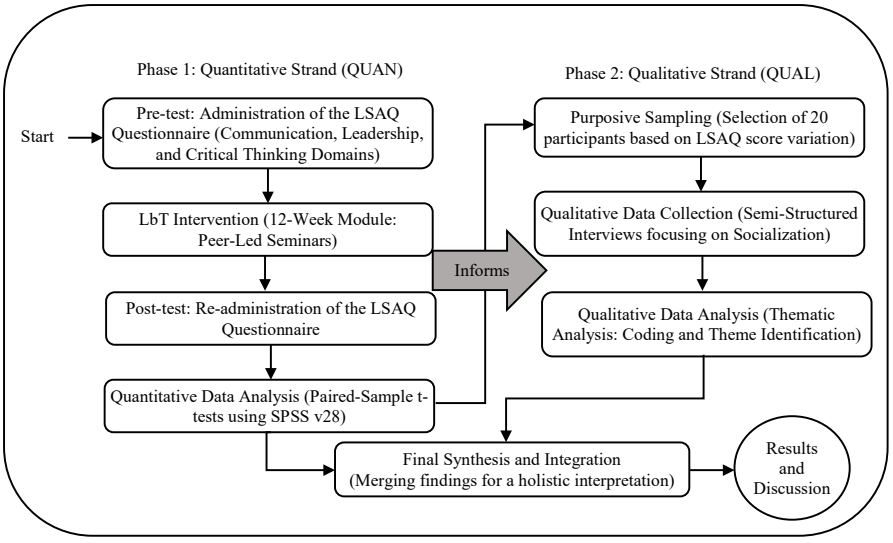

Fig. 1: Sequential Explanatory Mixed-Methods Flowchart

Table 1: Quantitative Questionnaire Items (LSAQ) for RQ1*Measured via 5-Point Likert Scale (1: Strongly Disagree to 5: Strongly Agree)*

Domain	Item Code	Questionnaire Statement
Communication	COM1	Confidence is felt when explaining complex medical topics to peers.
	COM2	The ability to simplify clinical jargon for better peer understanding is high.
	COM3	Non-verbal cues are effectively used to maintain group interest.
Leadership	LEA1	Responsibility for the group's learning progress is easily accepted.
	LEA2	The ability to manage group time and task distribution has improved.
	LEA3	Guidance is provided effectively to peers during difficult clinical cases.
Critical Thinking	CRI1	Potential knowledge gaps are identified while preparing teaching materials.
	CRI2	Information from multiple medical sources is synthesized efficiently.
	CRI3	Spontaneous clinical questions from peers are handled logically.

Table 1 is a description of the structure of life skills assessment questionnaire (LSAQ). The tool is divided into three main areas Communication, Leadership, and Critical Thinking to have a multidimensional measure of student development. The questionnaire will measure self-perceived competence by a 5-point Likert scale. The items (i.e., COM1, LEA1, CRI1) are set out to elicit a particular behaviour change e.g. the ability to simplify complex jargon or the disposition to carry group responsibility shown in Table 1. This small-grain method will enable to conduct a specific statistical examination of which particular sub-skills the Learning by Teaching (LbT) intervention affects the most.[11]

Table 2 demonstrates the semi-structured interview protocols that will be used in the second phase of the research. These questions are open-ended unlike closed-ended nature of the LSAQ, which would allow interviewees to contemplate the outcomes of socialization in-depth. The questions are strategically formulated to investigate the change in the power relations (Q2) and internal change in the professional identity (Q3). The study reveals the subtlety of the safe space that peer-led environments produce by requesting the participants to rate their level of comfort when they were in the presence of peers versus when they were in the presence of professors, and this is what gives the research the answer to why the statistical results were better in the first phase.

Data Collection Procedures

Data collection occurred in three stages:

- **Pre-test:** The LSAQ was administered during the first week to establish a baseline.
- **Intervention:** The 12-week LbT module was implemented.
- **Post-test and Interviews:** The LSAQ was re-administered in week 13, followed by the qualitative interviews in week 14.

Data Analysis Plan

The SPSS Version 28 was used to analyze the quantitative data. A paired-sample t-test was adopted to investigate the means of the same group of people before and after the intervention. Thematic Analysis was used to process qualitative data, which implied the transcribing of data, its coding, and the discovery of the themes.

Table 2: Qualitative Interview Guide for RQ2 *Open-ended questions designed to explore socialization and dynamics.*

Focus Area	Question Number	Interview Question
Socialization	Q1	How has the role of "teacher" changed the relationship with peers?
	Q2	Describe the level of comfort in admitting ignorance to a peer vs. a professor.
	Q3	In what ways has this experience changed the perception of professional identity?

Table 3: Research Mapping: Questions, Methods, and Analysis

Research Question	Data Source	Method	Statistical/Analytical Tool
RQ1: Improvement in life skills?	LSAQ Survey	Quantitative	Paired t-test ($p < 0.05$)
RQ2: Perceived socialization?	Interviews	Qualitative	Thematic Analysis

Table 3 is the methodological outline of the paper that stipulates compliance of the research questions and the data collection strategies. The sequential explanatory logic can be proved by this table that reveals how every Research Question (RQ) is associated with a certain data source and analysis tool. The study provides a clear audit trail by mapping RQ1 to the Paired t -test and RQ2 to the Thematic Analysis. This mapping is critical to IJERE standards because it demonstrates that the research design is solid enough to deal with the quantitative scale of the skill acquisition process and qualitative nature of the socialization.

Results and Discussion

Quantitative Results: Life Skill Acquisition

The quantitative part of the research contained the analysis of the scores of the Life Skills Assessment Questionnaire (LSAQ) with the consideration of three vital areas of medical student development: communication, leadership, and critical thinking. Statistical analysis shows a great increase in all the domains measured after the 12-week Learning by Teaching (LbT) intervention.

According to the results of the research carried out on the 150 participants, the null hypothesis (H_0) that said there was no significant difference in life skill acquisition was rejected in all the variables. The p-values obtained in all of the domains were consistently lower than the significance level of 0.05, and this fact proves that the obtained improvements were statistically significant and could not have happened by pure chance.

Table 4 shows a breakdown of the statistical changes in the items of measured changes in specific indicators of life skills after Learning by Teaching (LbT) intervention. Through the analysis of the representative item codes of the three of the representative items namely the COM1, LEA1 and CRI1, the analysis identifies the specific behavioral and mental shifts which took place among the 150 medical students. The highest growth with a mean difference was observed in COM1, which is a measure of confidence in explaining with a mean difference of +1.42. The fact that the pre-test score of 3.10 changed to a post-test one of 4.52 is an indication that the pedagogical imperative to instruct peers is directly proportional to the levels of verbal clarity and communicative self-confidence. In addition, LEA1, the group responsibility, increased by a major percentage of +1.35. The growth of 2.80 to 4.15 also shows that the participants are no longer passive learners, but they have shifted to active facilitators who are responsible of overall learning development of the group they are in. CRI1 demonstrated in the critical thinking field that there was an increase in the ability to recognize personal gaps in knowledge by +1.05. The significance value of 0.002 and above validates the fact that the preparation stage of teaching puts students into metacognition of the higher level. Lastly, the SD of all items also reduced in the post-test, including the reduction between 0.8 and 0.5 in COM1, which shows that the LbT intervention resulted in a more homogenous skill set among all the participants.

The item-level analysis reveals specific areas of growth:

Communication (COM1): The highest difference by the mean was the indicator of Confidence in

Table 4: Item-Level Statistical Analysis of Life Skill Acquisition

Item Code	Indicator	Pre-test (SD)	Post-test (SD)	Mean Diff.	Sig. (2-tailed)
COM1	Confidence in Explaining	3.10 (0.8)	4.52 (0.5)	+1.42	.000
LEA1	Group Responsibility	2.80 (0.9)	4.15 (0.6)	+1.35	.000
CRI1	Knowledge Gap ID	3.25 (0.7)	4.30 (0.4)	+1.05	.002

Explaining which increased by a baseline of 3.10 and a post-intervention score of 4.52. This implies that the need to simplify intricate clinical expertise with others proved to be a solid strength facilitating verbal fluency and confidence in presentation.

Leadership (LEA1): The scores of the category Group Responsibility grew considerably (+1.35) and now stand at 4.15. This is an indicator of a change of mindset of the students to passive learning to active management of the outcome of peer learning.

Critical Thinking (CRI1): The skill to recognize Knowledge Gaps was enhanced with the highly significant p-value of 0.002 and meaning increased by +1.05. Getting ready to teach seems like it pushes students into a greater metacognitive level since they become aware of their own clinical misunderstandings and present them to the group.

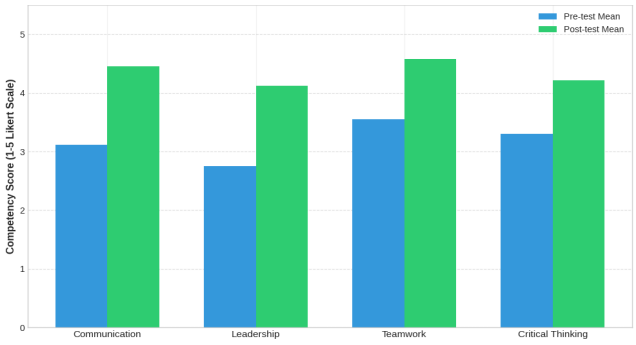

Fig. 2: Statistical Mean Growth in Life Skills (N=150)

The quantitative development of the students in four major fields is demonstrated in figure 2. All the evaluated life skills have a significant improvement between pre-test and post-test and Leadership and Communication skills have the largest vertical improvement. This visual change will be the refusal to continue regarding the null hypothesis and the confirmation that the responsibility of teaching peers is a direct stimulus to the acquisition of skills.

Figure 3 moves the attention to the mastery level among the cohort, in particular, the distribution of the competency of communication is analyzed. The data reveal that 85% of students reached a high-competency level by the conclusion of the study. Such a high score concentration suggests that the

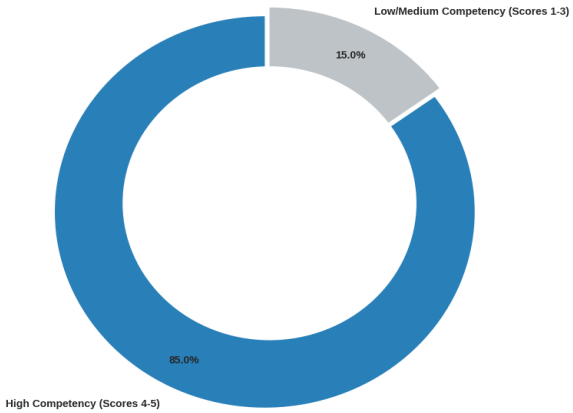

Fig. 3: Distribution of Post-Test Competency Levels (Communication Domain, N=150)

collaborative setting of Learning by Teaching (LbT) is a good tool that improves the overall effectiveness of the group, as a result of which an overwhelming percentage of future medical specialists would acquire the necessary confidence in interpersonal communication.

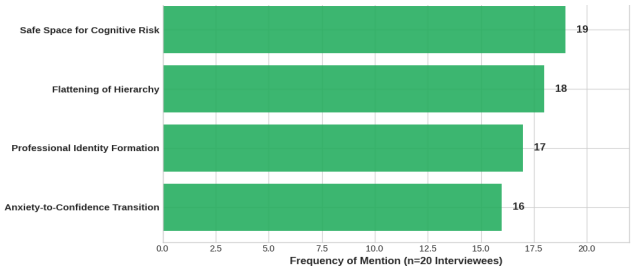

Fig. 4: Frequency of Qualitative Socialization Themes (n=20 Interviews)

Figure 4 gives the qualitative background that can be used to interpolate the drivers of such statistical gains. Drawing the frequency of the interview themes, one can see that the most frequent results are reported by the participants, which are a Safe Space for Cognitive Risk and the Flattening of Hierarchy. These social processes clarify the reason why the numerical data were so: with the hierarchical pressure off, students feel empowered and assume the positions of leaders, and their professional identities become perfect and explain the higher scores of the performance that were reported in the previous stages of the study.

Discussion of Quantitative Findings

The significant increase in Communication and Leadership highlights the effectiveness of LbT in the implementation of medical situations in the real world. A physician in a clinical environment is required to make complicated medical terms easier to understand by the patient and guide multidisciplinary teams. These findings indicate that in taking the "Teacher Role the students are learning not only by memorizing but also by rehearsing the professional behaviors that they are going to use in future life. The decrease of Standard Deviation (SD) of the post-test scores (e.g. 0.8 to 0.5 in COM One) also points to the idea that the intervention did facilitate the bridging of the gap between high-performing and lower-performing students resulting in a more homogeneous acquisition of the skills across the cohort.

Conclusion

This paper shows that Collaborative Learning by Teaching (LbT) can greatly contribute to communication, leadership, and critical thinking as well as developing strong professional identity among medical students. Active instructional transition is a highly significant pedagogical trigger, which actually lowers the levels of the hierarchical anxiety and creates an atmosphere of collaborative basis on which the modern medical practice is based. The results of the research show that, when the students become a teacher, they experience the significant cognitive and social change. The noticeable increase in the competency scores especially in Leadership and Communication, is quantitative evidence that, LbT model offers a well-organized platform of learning high level soft skills that are usually overlooked in traditional didactic lectures. Qualitatively, the development of a safe environment of taking cognitive risks will enable the students to break down the inflexible barriers that are characteristic of a medical training environment. Such horizontalization of the hierarchy promotes the process of genuine peer-to-peer socialization and alters the self-view of the student not as a learner but as the member of the medical society. The students are able to identify their knowledge gaps in the teaching process, which results in the formation of metacognitive skills required in lifelong learning. It is therefore suggested that medical teachers and curriculum developers should incorporate LbT into the traditional medical curricula formally. Leaving clinical knowledge behind in a bid to concentrate on the acquisition of life skills will make sure that the graduates have not only technical skills but also social maturity to be in a position to lead in healthcare. The retention of these skills over time should be investigated in future studies as these students transition to clinical residency and additional research should be performed to the longitudinal maintenance of LbT as the intervention for training physicians to cope with interpersonal and multidisciplinary aspects of treating patients.

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