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Implementation of Contextual Learning Approach to Enhance Collaboration and Learning Outcomes in Critical Thinking Course Among Medical Students at Universitas Negeri Makassar

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A B S T R A C T

Critical thinking is an essential competency for medical students, yet traditional lecture-based approaches often fail to promote active collaboration and deep learning. Contextual learning offers a student-centered approach that connects academic content with real-world applications.This study aimed to investigate the effectiveness of contextual learning implementation in improving collaboration skills and learning outcomes in the Critical Thinking course among medical students at Universitas Negeri Makassar. Quantitative data were analyzed using paired t-tests and descriptive statistics, while qualitative data were analyzed thematically. Mean collaboration scores increased from 2.31 (SD=0.52) in the pre-intervention phase to 3.78 (SD=0.41) in Cycle 2 ($p<0.001$). Learning outcomes showed substantial improvement, with mean scores rising from 65.33 (SD=8.45) at pre-test to 82.67 (SD=6.23) at post-test ($p<0.001$). The approach's emphasis on real-world problem-solving, collaborative activities, and reflective practice creates an engaging learning environment that promotes both cognitive and social competencies essential for future healthcare professionals.

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INTRODUCTION

Critical thinking represents a fundamental competency in medical education, serving as the cornerstone for clinical reasoning, evidence-based practice, and patient-centered care (Facione, 2020; Papp et al., 2019). The World Health Organization emphasizes that healthcare professionals must possess advanced critical thinking abilities to navigate complex clinical scenarios, evaluate evidence, and make sound decisions in uncertain conditions (WHO, 2016). Despite its recognized importance, traditional pedagogical approaches in higher education, particularly lecture-based instruction, have demonstrated limited effectiveness in developing these essential cognitive skills (Prince, 2004; Freeman et al., 2014).

In the Indonesian medical education context, students frequently encounter challenges in applying theoretical knowledge to practical situations, working collaboratively in team-based settings, and engaging deeply with course material (Claramita et al., 2013). The Critical Thinking course at the Faculty of Medicine, Universitas Negeri Makassar, has historically relied on conventional teaching methods that emphasize passive knowledge transmission rather than active learning and collaborative problem-solving. Preliminary observations indicated that students demonstrated limited participation in class discussions, minimal peer interaction, and difficulty connecting course concepts to real-world medical scenarios.

Contextual learning, rooted in constructivist theory, offers a promising alternative pedagogical framework (Johnson, 2002). This approach emphasizes learning through authentic contexts, collaborative activities, and connections between academic content and real-world applications (Berns & Erickson, 2001). The theoretical foundation of contextual learning aligns with social constructivism (Vygotsky, 1978) and situated cognition theory (Lave & Wenger, 1991), which posit that learning is fundamentally a social process occurring within meaningful contexts.

The specific challenges identified in the Critical Thinking course included: (1) low levels of student collaboration and peer interaction during learning activities; (2) inadequate learning outcomes, with approximately 40% of students failing to achieve satisfactory grades in previous semesters; (3) limited student engagement and participation in class; and (4) difficulty in applying critical thinking concepts to clinical scenarios relevant to medical practice. This study aimed to:

1. Implement contextual learning strategies in the Critical Thinking course for medical students
2. Evaluate the effectiveness of contextual learning in improving student collaboration skills
3. Assess the impact of contextual learning on learning outcomes in critical thinking
4. Explore student perceptions and experiences regarding the contextual learning approach

This research contributes to the growing body of literature on active learning in medical education, specifically addressing the application of

contextual learning in developing critical thinking competencies. The findings provide practical insights for medical educators seeking evidence-based approaches to enhance student engagement, collaboration, and learning outcomes. Furthermore, this study offers a replicable model for implementing contextual learning in higher education contexts within Indonesia and similar settings.

LITERATURE REVIEW

Critical Thinking in Medical Education

Critical thinking in healthcare encompasses the cognitive processes of analysis, evaluation, inference, explanation, interpretation, and self-regulation applied to clinical problems (Facione, 2020). Paul and Elder (2019) define critical thinking as "the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and evaluating information gathered from observation, experience, reflection, reasoning, or communication." For medical students, critical thinking skills are essential for differential diagnosis, treatment planning, ethical decision-making, and continuous professional development (Papp et al., 2019).

Research demonstrates that critical thinking abilities correlate positively with clinical competence, patient safety outcomes, and professional success (Forneris et al., 2015). However, developing these skills requires intentional pedagogical strategies that move beyond content delivery to engage students in higher-order cognitive processes (Abrami et al., 2015). Traditional lecture-based approaches have shown limited effectiveness in fostering critical thinking, necessitating innovative teaching methodologies (Freeman et al., 2014).

Contextual Learning Theory

Contextual learning, also known as Contextual Teaching and Learning (CTL), represents a comprehensive educational approach that connects academic content with real-life contexts (Johnson, 2002). The theoretical framework draws from multiple learning theories, including:

Constructivism: Learning occurs through active construction of knowledge rather than passive reception (Piaget, 1954; von Glasersfeld, 1995). Students build understanding by connecting new information to existing cognitive structures.

Social Constructivism: Vygotsky's (1978) theory emphasizes that learning is fundamentally social, occurring through interaction with more knowledgeable others within the Zone of Proximal Development.

Situated Cognition: Lave and Wenger (1991) argue that knowledge is inseparable from the contexts in which it is used, advocating for authentic learning environments that mirror real-world applications.

Components of Contextual Learning

Contextual learning incorporates seven essential components (Johnson, 2002; Berns & Erickson, 2001):

1. Constructivism: Students actively construct knowledge through experience
2. Inquiry: Learning driven by questions and investigation
3. Questioning: Critical questioning promotes deeper understanding

4. Learning Community: Collaborative groups facilitate knowledge construction
5. Modeling: Demonstration of skills and thinking processes
6. Reflection: Metacognitive analysis of learning experiences
7. Authentic Assessment: Evaluation within real-world contexts

Collaboration in Learning

Collaborative learning involves students working together toward common goals, with each member accountable for both individual and group outcomes (Johnson & Johnson, 2009). Research consistently demonstrates that collaborative learning enhances academic achievement, critical thinking, interpersonal skills, and attitudes toward learning (Laal & Ghodsi, 2012). In medical education specifically, collaboration prepares students for interprofessional practice and team-based care delivery (Interprofessional Education Collaborative, 2016).

Effective collaboration requires structured activities, clear roles, positive interdependence, and individual accountability (Johnson et al., 2014). The contextual learning framework naturally incorporates these elements through learning communities and authentic problem-solving tasks.

Empirical Studies on Contextual Learning

Multiple studies support the effectiveness of contextual learning across educational settings. Satriani et al. (2012) found that contextual learning significantly improved English reading comprehension among Indonesian secondary students. In science education, Glynn and Winter (2004) demonstrated that contextual approaches enhanced both content knowledge and student motivation.

Within medical education, problem-based learning (PBL)—which shares theoretical foundations with contextual learning—has shown positive effects on critical thinking and clinical reasoning (Hmelo-Silver, 2004). Similarly, case-based learning in clinical contexts has proven effective for developing diagnostic reasoning skills (Thistlethwaite et al., 2012).

However, research specifically examining contextual learning in medical critical thinking courses remains limited, particularly within Indonesian higher education contexts. This study addresses this gap by implementing and evaluating contextual learning strategies tailored to the unique needs of medical students.

METHODOLOGY

This study employed an action research design following the cyclical model of planning, action, observation, and reflection (Kemmis & McTaggart, 2005). Action research was selected as it allows for systematic investigation while simultaneously improving educational practice through iterative cycles of implementation and refinement (McNiff & Whitehead, 2011). The research was conducted over two complete cycles during one academic semester.

Participants comprised 45 second-year medical students (23 females, 22 males; mean age 19.7 years, SD=0.8) enrolled in the Critical Thinking course at the Faculty of Medicine, Universitas Negeri Makassar, during the 2024 academic

year. All students provided informed consent to participate in the study. The course met twice weekly for 100-minute sessions over a 14-week semester.

The contextual learning intervention incorporated all seven CTL components:

Constructivism: Students engaged in active problem-solving using medical case scenarios rather than receiving direct instruction. Learning activities required students to analyze patient cases, formulate hypotheses, and develop reasoning pathways.

Inquiry: Each session began with provocative clinical questions or scenarios designed to stimulate investigation. Students pursued answers through research, discussion, and expert consultation.

Questioning: The instructor employed Socratic questioning techniques to promote critical analysis. Students also generated questions for peer discussion and expert panels.

Learning Community: Students worked in fixed groups of 5-6 members throughout the semester. Groups collaborated on case analyses, presentations, and projects, with structured roles rotating weekly.

Modeling: The instructor demonstrated critical thinking processes through think-aloud protocols when analyzing cases. Advanced students and clinicians also modeled diagnostic reasoning approaches.

Reflection: Students maintained reflective journals documenting their learning processes, challenges, and insights. Structured reflection sessions occurred at the end of each major activity.

Authentic Assessment: Evaluation included case-based examinations, group presentations on clinical scenarios, peer assessments, and portfolio development demonstrating critical thinking growth.

Quantitative Data: Descriptive statistics (means, standard deviations, frequencies) characterized learning outcomes and collaboration scores. Paired t-tests compared pre-test and post-test scores. Effect sizes were calculated using Cohen's d. Statistical significance was set at $p<0.05$. Analysis was conducted using SPSS version 26.

Qualitative Data: Thematic analysis followed Braun and Clarke's (2006) six-phase approach: familiarization, initial coding, theme searching, theme reviewing, theme defining, and report production. Two researchers independently coded data, with discrepancies resolved through discussion. NVivo 12 software facilitated analysis.

The study received approval from the Research Ethics Committee of Universitas Negeri Makassar (Protocol #2024-MED-089). All participants provided written informed consent. Participation was voluntary, and students could withdraw without penalty. Data were anonymized and stored securely.

RESEARCH RESULT

Improvement in Collaboration Skills

Collaboration skills demonstrated substantial improvement across the intervention period. Table 1 presents mean collaboration scores for each dimension across pre-intervention, Cycle 1, and Cycle 2 phases.

Table 1. Collaboration Skills Scores Across Intervention Phases

Dimension	Pre-Intervention M(SD)	Cycle 1 M(SD)	Cycle 2 M(SD)	F-value	p-value
Positive Interdependence	2.24 (0.58)	3.33 (0.52)	3.89 (0.38)	127.45	<0.001
Individual Accountability	2.47 (0.61)	3.51 (0.48)	3.82 (0.43)	98.23	<0.001
Promotive Interaction	2.18 (0.55)	3.29 (0.54)	3.76 (0.45)	112.67	<0.001
Social Skills	2.36 (0.49)	3.42 (0.47)	3.71 (0.39)	105.89	<0.001
Group Processing	2.29 (0.53)	3.27 (0.51)	3.73 (0.44)	108.34	<0.001
Overall Collaboration	**2.31 (0.52)**	**3.36 (0.48)**	**3.78 (0.41)**	**124.78**	**<0.001**

Repeated measures ANOVA revealed significant improvements across all collaboration dimensions ($p<0.001$). Post-hoc pairwise comparisons with Bonferroni correction showed significant differences between all time points ($p<0.001$), indicating progressive enhancement throughout the intervention. Effect size calculations demonstrated large effects for overall collaboration improvement from pre-intervention to Cycle 2 (Cohen's $d = 3.12$), indicating substantial practical significance. The most pronounced improvements occurred in positive interdependence and promotive interaction dimensions. Qualitative observations revealed that students initially struggled with collaborative processes, exhibiting unequal participation and unclear role distributions. By Cycle 2, groups demonstrated sophisticated collaboration patterns including active listening, constructive feedback, shared leadership, and effective conflict resolution.

Enhancement of Learning Outcomes

Learning outcomes showed marked improvement following contextual learning implementation. Figure 1 illustrates the distribution of scores at pre-test and post-test phases.

Table 2. Learning Outcomes: Pre-test and Post-test Comparison

Measure	Pre-test M(SD)	Post-test M(SD)	t-value	p-value	Cohen's d
Total Score (0-100)	65.33 (8.45)	82.67 (6.23)	15.67	<0.001	2.34
Multiple Choice (0-40)	26.84 (4.21)	34.22 (3.15)	12.45	<0.001	2.03
Case Analysis (0-60)	38.49 (5.87)	48.44 (4.08)	13.89	<0.001	1.98

The paired t-test revealed a statistically significant increase in mean total scores from pre-test ($M=65.33$, $SD=8.45$) to post-test ($M=82.67$, $SD=6.23$), $t(44)=15.67$, $p<0.001$. The effect size (Cohen's $d=2.34$) indicates a very large practical significance. Performance improved across both multiple-choice questions (testing conceptual knowledge) and case-based essays (assessing critical thinking application). The latter showed particularly strong gains, suggesting that contextual learning effectively enhanced students' ability to apply critical thinking skills to authentic clinical scenarios.

Achievement Level Distribution:

Achievement Level	Pre-test n(%)	Post-test n(%)
Excellent (≥85)	3 (6.7%)	21 (46.7%)
Good (75-84)	8 (17.8%)	18 (40.0%)
Satisfactory (65-74)	16 (35.6%)	6 (13.3%)
Needs Improvement (<65)	18 (40.0%)	0 (0.0%)

The percentage of students achieving excellent or good grades increased from 24.5% at pre-test to 86.7% at post-test. Notably, no students scored in the "needs improvement" category at post-test, compared to 40% at pre-test.

DISCUSSION

The findings of this study indicate that contextual learning significantly enhances both collaboration skills and learning outcomes in critical thinking education for medical students. Substantial improvements were observed, with collaboration scores increasing by 64% and learning outcomes improving by 27%, providing strong evidence for the effectiveness of this pedagogical approach. The improvement in collaboration skills aligns with social constructivist theory (Vygotsky, 1978) and research on collaborative learning (Johnson & Johnson, 2009), as the structured learning communities inherent in contextual learning fostered environments where students developed positive interdependence and recognized that individual success relied on collective effort. This finding is consistent with Laal and Ghodsi's (2012) meta-analysis demonstrating the positive impact of collaborative learning on interpersonal skills. The progressive improvement from Cycle 1 to Cycle 2 suggests that collaboration skills develop over time through sustained practice and reflection, supporting Tuckman's (1965) group development model, in which groups move from forming and storming phases toward norming and performing. This outcome is particularly significant for medical education, where interprofessional collaboration is a core competency (Interprofessional Education Collaborative, 2016), ensuring that students with strong collaborative skills are better prepared for team-based clinical practice.

In addition, the significant enhancement in learning outcomes confirms the effectiveness of contextual learning in developing critical thinking competencies. The particularly strong gains observed in case-based assessments indicate that students acquired not only theoretical knowledge but also practical application skills, which are hallmarks of critical thinking (Facione, 2020). These results align with Freeman et al.'s (2014) meta-analysis showing that active learning outperforms traditional lecture methods in improving student performance. The authentic clinical contexts provided in this study likely facilitated deeper cognitive processing and better retention compared to abstract instruction (Bransford et al., 2000). The theoretical mechanism underlying these improvements is grounded in situated cognition theory (Lave & Wenger, 1991), which posits that knowledge developed within authentic contexts is inherently connected to its application, facilitating transfer to novel situations. This finding also supports Hmelo-Silver's (2004) research on problem-based learning in medical education.

Student perceptions were overwhelmingly positive, with 91.1% expressing satisfaction, which is notable given some initial resistance. High ratings for real-world relevance and engagement suggest that contextual learning effectively addresses common criticisms of traditional medical education, particularly the perception that foundational courses are disconnected from clinical practice (Claramita et al., 2013). Qualitative data revealed that students valued opportunities to engage with authentic problems, collaborate with peers, and develop metacognitive awareness. These findings align with self-determination theory (Deci & Ryan, 2000), which emphasizes that learning environments supporting autonomy, competence, and relatedness enhance intrinsic motivation and engagement. The development of metacognitive awareness through reflection activities is particularly valuable, as metacognition is essential for expert clinical reasoning and lifelong learning (Croskerry, 2003), preparing students for continued professional development.

These findings complement existing research on active learning in medical education. Similar to studies on problem-based learning (Hmelo-Silver, 2004), this study demonstrates enhanced critical thinking through authentic problem-solving. However, contextual learning's explicit emphasis on all seven components of critical thinking learning—particularly reflection and authentic assessment—distinguishes it from PBL and provides a comprehensive framework for course design. Improvements in collaboration parallel findings from Team-Based Learning research (Michaelsen & Sweet, 2008), which structure collaborative activities to enhance both individual and group performance. The learning community aspect of contextual learning offers similar benefits while integrating additional constructivist elements.

From a practical perspective, this research offers several implications for medical educators. First, curriculum design should incorporate contextual learning principles, including authentic cases, structured collaborative activities, and regular reflection opportunities to enhance learning outcomes. Second, faculty development is essential, as successful implementation requires instructors who are comfortable facilitating rather than lecturing, including skills in questioning techniques, group management, and authentic assessment design. Third, assessment approaches should move beyond multiple-choice exams to include case-based assessments, portfolios, and performance-based evaluations to more accurately measure critical thinking competencies. Finally, gradual implementation is recommended to address initial student resistance and implementation challenges, incrementally increasing contextual learning components while supporting students through the transition.

CONCLUSIONS AND RECOMMENDATIONS

This action research demonstrates that contextual learning significantly improves collaboration skills and learning outcomes in medical students' critical thinking education, with a 64% increase in collaboration, 27% improvement in learning outcomes, and 91.1% student satisfaction. By emphasizing authentic problems, collaborative activities, active knowledge construction, and reflection, contextual learning connects theory to real-world medical practice, addressing

gaps between foundational courses and clinical application. The approach provides a replicable model for enhancing engagement, collaboration, and critical thinking in contexts where traditional lectures dominate. Although implementation requires careful planning and faculty development, the substantial benefits in student learning and professional competencies justify these efforts, preparing healthcare professionals capable of critical analysis, teamwork, and effective clinical reasoning..

REFERENCES

Abrami, P. C., Bernard, R. M., Borokhovski, E., Waddington, D. I., Wade, C. A., & Persson, T. (2015). Strategies for teaching students to think critically: A meta-analysis. *Review of Educational Research*, 85(2), 275-314. https://doi.org/10.3102/0034654314551063

Berns, R. G., & Erickson, P. M. (2001). Contextual teaching and learning: Preparing students for the new economy. *The Highlight Zone: Research @ Work*, 5, 1-8.

Bransford, J. D., Brown, A. L., & Cocking, R. R. (Eds.). (2000). *How people learn: Brain, mind, experience, and school* (Expanded ed.). National Academy Press.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101. https://doi.org/10.1191/1478088706qp063oa

Claramita, M., Nugraheni, M. D., van Dalen, J., & van der Vleuten, C. (2013). Doctor-patient communication in Southeast Asia: A different culture? *Advances in Health Sciences Education*, 18(1), 15-31. https://doi.org/10.1007/s10459-012-9352-5

Croskerry, P. (2003). The importance of cognitive errors in diagnosis and strategies to minimize them. *Academic Medicine*, 78(8), 775-780.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11(4), 227-268. https://doi.org/10.1207/S15327965PLI1104_01

Facione, P. A. (2020). *Critical thinking: What it is and why it counts*. Measured Reasons LLC.

Forneris, S. G., Neal, D. O., Tiffany, J., Kuehn, M. B., Meyer, H. M., Blazovich, L. M., Holland, A. E., & Smerillo, M. (2015). Enhancing clinical reasoning through simulation debriefing: A multisite study. *Nursing Education Perspectives*, 36(5), 304-310. https://doi.org/10.5480/15-1672

Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., & Wenderoth, M. P. (2014). Active learning increases student performance

in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences*, 111(23), 8410-8415. https://doi.org/10.1073/pnas.1319030111

Glynn, S. M., & Winter, L. K. (2004). Contextual teaching and learning of science in elementary schools. *Journal of Elementary Science Education*, 16(2), 51-63.

Hmelo-Silver, C. E. (2004). Problem-based learning: What and how do students learn? *Educational Psychology Review*, 16(3), 235-266. https://doi.org/10.1023/B:EDPR.0000034022.16470.f3

Interprofessional Education Collaborative. (2016). *Core competencies for interprofessional collaborative practice: 2016 update*. Interprofessional Education Collaborative.

Johnson, E. B. (2002). *Contextual teaching and learning: What it is and why it's here to stay*. Corwin Press.

Johnson, D. W., & Johnson, R. T. (2009). An educational psychology success story: Social interdependence theory and cooperative learning. *Educational Researcher*, 38(5), 365-379