

The Effectiveness of Cooperative CTL Model Integrated with Qur'anic Values in Psychotropic Topic at MAN 4 Bantul

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Abstract: This study aims to determine the effectiveness of the cooperative learning model with a Contextual Teaching and Learning (CTL) approach based on thematic Qur'anic verses on the learning outcomes and spiritual attitudes of students on the sub-subject of psychotropic drugs at MAN 4 Bantul. The type of research used is a quasi-experiment with a nonequivalent control group design. The research sample consisted of two 11th grade science classes, namely XI F1 as the control class (14 students) and XI F2 as the experimental class (13 students). The research instruments were a multiple-choice test consisting of 15 questions and a valid 28-item Likert scale questionnaire to measure spiritual attitudes. The results showed that the experimental class experienced an increase in learning outcomes with a moderate N-Gain score (0.43), while the control class only achieved a low score (0.25). The paired samples t-test showed a significant difference between the pretest and posttest in the experimental class ($p < 0.001$). Meanwhile, the average spiritual attitude score of the experimental class was higher than that of the control class. These findings indicate that the cooperative learning model with a CTL approach based on thematic Qur'anic verses has the potential to improve learning outcomes while fostering students' spiritual attitudes.

Keywords: CTL, cooperative learning, thematic Qur'anic verses, learning outcomes, spiritual attitudes.

Introduction

Education plays a very important role in shaping human potential as a whole, including cognitive, affective, and spiritual aspects. In the Islamic perspective, the pursuit of knowledge is not only for the sake of acquiring knowledge, but also as a means of improving character and drawing closer to Allah (Khasanah 2021). However, in today's modern era, technological advances often bring new challenges. Students are faced with a rapid flow of information that is not always positive and can even lead to a decline in focus on learning and moral degradation (Meilinda, Malinda, and Aisyah 2020).

In the context of biology learning, students are expected not only to understand scientific concepts but also to be able to relate them to real life

(Lutfiah, Anisa, and Hambali 2021). Based on observations at MAN 4 Bantul, biology learning outcomes are still relatively low, including for conceptual material such as psychotropic drugs. Many students find it difficult to understand the concept of substance abuse, both from a biological perspective and in terms of its moral and spiritual values. In fact, during adolescence, this understanding is very important for preventing risky behavior and fostering self-awareness.

One solution that is considered effective is the application of a cooperative learning model that allows students to work together, exchange opinions, and actively build knowledge (Lestari et al. 2023). This model can be reinforced with the Contextual Teaching and Learning (CTL) approach, which emphasizes the connection between scientific concepts and everyday contexts.

When this learning is integrated with the values of the Qur'an, the learning process not only produces knowledge but also fosters spiritual awareness (Mualimin 2020).

This study aims to examine the effectiveness of the cooperative learning model with a CTL approach based on thematic Qur'anic verses on the learning outcomes and spiritual attitudes of students on psychotropic material. This approach is expected to make biology learning more meaningful, contextual, and religiously valuable.

Materials and Methods

This study used a quantitative method with a quasi-experimental design and a nonequivalent control group design (Sugiono 2013). Class XI F1 was designated as the control group, while XI F2 was designated as the experimental group. The experimental group received treatment in the form of a cooperative learning model with a CTL approach based on thematic verses from the Qur'an, while the control group followed conventional cooperative learning.

The research population consisted of all 43 students in class XI IPA MAN 4 Bantul for the 2024/2025 academic year. However, only 27 students completed the entire research series. The sampling technique used total sampling, so that the entire population became the research subjects. The final sample consisted of 14 students from the control class and 13 students from the experimental class.

The research instruments included learning outcome tests and spiritual attitude questionnaires. The learning outcome tests consisted of 15 multiple-choice questions developed based on learning outcome indicators, while the spiritual attitude questionnaires consisted of 28 valid statements using a Likert scale. The validity of the learning outcome instruments was tested using Aiken's V (≥ 0.8 , very high category), and their reliability was tested using Cronbach's Alpha (0.842). The spiritual attitude questionnaire was tested using Pearson Product Moment and had a reliability of 0.703.

The learning process was carried out over four meetings. The experimental class followed CTL-based learning using verses from the Qur'an, where each activity began with a reflection on relevant verses, followed by group discussions, experiments, and presentations of learning outcomes. The control class followed conventional cooperative learning without the integration of Islamic values.

Data analysis was performed using Jamovi 2.6.26 software. Prerequisite tests included normality testing using Shapiro-Wilk and homogeneity testing using Levene's Test. The difference between the pretest and posttest was analyzed using a paired samples t-test, while comparisons between groups were tested using an independent samples t-test. The improvement in learning outcomes was calculated using the N-Gain formula. Spiritual attitude data were analyzed descriptively based on the mean, median, and standard deviation.

Results and Discussion

The research was conducted at MAN 4 Bantul with two groups of students from class XI science stream: XI F1 as the control group (14 students) and XI F2 as the experimental group (13 students). The experimental class received a cooperative learning model with the Contextual Teaching and Learning (CTL) approach integrated with thematic Qur'anic verses, while the control class followed a conventional cooperative model without explicit integration of Islamic values.

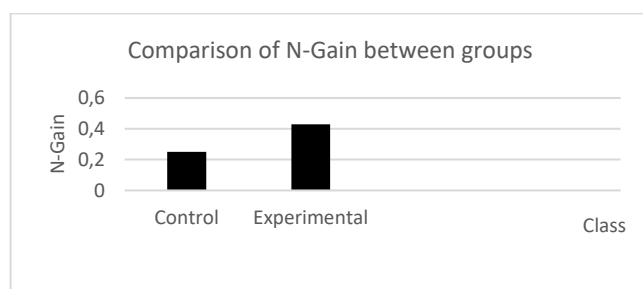
The descriptive analysis showed that both groups had comparable initial abilities, with pretest means of 9.57 (control) and 9.85 (experiment). After the treatment, posttest means increased to 11.00 in the control class and 12.08 in the experimental class. The N-Gain scores indicated a low improvement in the control group (0.25) and a moderate improvement in the experimental group (0.43). These results illustrate that CTL integrated with Qur'anic values tends to enhance learning outcomes more effectively than the conventional cooperative approach.

Table 1 Descriptive statistics of students' learning outcomes.

Class	N	Pretest Mean	Posttest Mean	N-Gain	Category
Control	14	9.57	11.0	0.25	Low
Experimental	13	9.85	12.08	0.43	Moderate

Source: Research data (2025)

The paired samples *t*-test confirmed significant differences between pretest and posttest scores in both groups ($p < 0.05$). The effect size was greater in the experimental group (Cohen's $d = 1.32$) compared to the control group (Cohen's $d = 0.647$), indicating a stronger influence of the Qur'an-based CTL model. However, the independent samples *t*-test showed no statistically significant difference between posttest scores ($p = 0.196$), which may be due to the small sample size and high variability among students.

**Figure 1** Comparison of N-Gain between groups. Source: Processed from Jamovi output (2025)

Throughout the learning process, students in the experimental group showed active participation and deeper curiosity. For instance, one student asked, "If someone accidentally consumes food containing psychotropic substances and then feels good, what should they do?" This led to a reflective discussion on how psychotropic substances affect the nervous system and why Islam commands humans to protect their intellect and body. Such dialogues reflect how CTL integrated with Qur'anic context can promote meaningful understanding that connects scientific and moral perspectives.

The descriptive analysis of the spiritual attitude questionnaire showed a higher mean score in the experimental group (88.4) than in the control group (85.4). Median values also followed the same trend (89.0 vs. 83.5), indicating a consistent pattern of

higher spiritual awareness among students in the experimental class.

Table 2 Descriptive statistics of students' spiritual attitudes.

Class	N	Mean	Median	SD	Min	Max
Control	14	85.4	83.5	4.3	78	92
Experimental	13	88.4	89.0	3.9	82	94

Source: Research data (2025)

Observations supported these findings: students who learned through CTL with Qur'anic integration demonstrated more reflective behavior. During a discussion on addiction, one student quoted a verse from QS. Al-Baqarah: 195, "Do not throw yourselves into destruction," showing that students had begun internalizing Islamic values in their thinking.

These findings align with Krathwohl's affective taxonomy, which explains that the development of spiritual attitudes occurs progressively from awareness, response, appreciation, and organization to internalization. Although the results were not tested inferentially due to the absence of pretest data, the descriptive and observational evidence indicates that the integration of Qur'anic values in learning encourages students to reflect spiritually and relate scientific concepts to moral responsibility.

The overall findings demonstrate that the Qur'an-based CTL approach effectively supports cognitive and affective development. The learning outcomes improved at a moderate level, and the spiritual attitudes were strengthened through contextual and value-based learning. These results correspond to previous studies (Mualimin 2020; Liza Sundari et al. 2023; Sugrah 2020), which emphasize that integrating faith-based content into science education can enrich meaning-making and foster moral awareness.

Constructivist learning theory suggests that students build understanding through active involvement and reflection (Sugrah 2020). When Qur'anic values are integrated into the psychotropic topic, students are encouraged to view biological concepts within a moral and spiritual framework. This integration helps them recognize that avoiding harmful substances is both a scientific necessity and a form of responsibility toward Allah, reinforcing the coherence between biological knowledge and spiritual awareness (Haryadi, Antarnusa, and Apriliyanti 2024).

Although the statistical difference between groups was not significant, the practical effect observed in classroom behavior suggests meaningful transformation. The limitation of a small sample size (27 students) may have reduced statistical power (Besekar, Jogdand, and Naqvi 2023), yet qualitative observations confirm the growing engagement and spiritual sensitivity among learners. Thus, CTL integrated with Qur'anic verses shows promise as a pedagogical model that not only improves comprehension but also cultivates reflective and ethical learners.

Conclusion

The cooperative learning model with a Contextual Teaching and Learning (CTL) approach based on thematic verses from the Qur'an proved to be effective in improving student learning outcomes on psychotropic substances at MAN 4 Bantul. The improvement in learning outcomes in the experimental group was moderate and was accompanied by an improvement in spiritual attitudes. Although the differences between the groups were not statistically significant, this learning method showed strong potential in creating a balance between mastery of knowledge and religious values.

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Conflict of Interest: The author declares that there is no conflict of interest in the publication of this article.

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