

Evaluating the Effectiveness of 'Muslim Adventure': A Quasi-Experimental Study of Islamic Character Formation among Primary School Students

Syafa'atun Nahriyah¹, Nuruddin Araniri²

^{1,2} Pendidikan Agama Islam, Universitas Majalengka, Indonesia

*syafaatunnahriyah@unma.ac.id

Abstract

The formation of Islamic character in elementary schools is a significant challenge in the context of formal education, particularly in ensuring the internalization of moral values such as honesty, responsibility, tolerance, and cooperation. This study aimed to determine the effectiveness of the "Muslim Adventure" educational game in enhancing the Islamic character of fourth-grade students. A quasi-experimental pre-test and post-test control group design was employed, involving 60 students from two parallel classes at a single elementary school. The experimental group engaged with the "Muslim Adventure" educational game for eight weeks, while the control group received standard character education. Self-report questionnaires were used to measure the students' Islamic character development before and after the intervention. The results indicated that the increase in the mean Islamic character score was greater in the experimental group than in the control group. An independent-samples t-test revealed a significant difference ($t(58) = -3.553$; $p = 0.001$) with a large effect size (Cohen's $d = 0.92$), and the alternative Mann-Whitney U test yielded a p-value of 0.002, supporting the consistency of the findings. The results demonstrate that the experimental group experienced greater improvement in Islamic character than the control group following the program. In conclusion, the "Muslim Adventure" educational game is an effective strategy for fostering Islamic character among elementary school students. These findings have implications for the development of interactive, experience-oriented character education methods that promote moral behavior aligned with Islamic values.

Keywords: Islamic Character Education; Muslim Adventure; Elementary School

Abstrak

Pembentukan karakter Islami di sekolah dasar merupakan tantangan besar dalam konteks pendidikan formal, terutama dalam memastikan internalisasi nilai-nilai moral seperti kejujuran, tanggung jawab, toleransi, dan kerja sama. Tujuan penelitian ini adalah untuk mengetahui efektivitas game edukasi "Muslim Adventure" dalam meningkatkan karakter Islami siswa kelas empat. Penelitian ini menggunakan desain kelompok kontrol pra-uji dan pasca-uji kuasi-eksperimental yang melibatkan 60 siswa dari dua kelas paralel di satu sekolah dasar. Kelompok eksperimen mengikuti game edukasi "Muslim Adventure" selama delapan minggu, sedangkan

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kelompok kontrol mengikuti pendidikan karakter standar. Kuesioner laporan diri digunakan untuk mengukur pembentukan karakter Islami siswa sebelum dan sesudah intervensi. Hasil penelitian menunjukkan bahwa peningkatan rata-rata skor pembentukan karakter Islami kelompok eksperimen lebih besar daripada kelompok kontrol. Uji t sampel independen menunjukkan perbedaan yang signifikan ($t(58) = -3,553$; $p = 0,001$), dengan effect size besar (Cohen's $d = 0,92$), dan uji Mann-Whitney U alternatif memberikan $p = 0,002$, sehingga mendukung konsistensi hasil. Temuan menunjukkan bahwa kelompok eksperimen mengalami peningkatan karakter Islami yang lebih besar dibandingkan kelompok kontrol setelah mengikuti program. Kesimpulannya, game edukasi "Muslim Adventure" efektif sebagai strategi pendidikan karakter Islami untuk siswa sekolah dasar. Temuan ini memiliki implikasi untuk pengembangan metode pendidikan karakter interaktif dan berorientasi pengalaman yang dapat meningkatkan perilaku moral sesuai dengan nilai-nilai Islam.

Kata kunci : Pendidikan Karakter Islami; Muslim Adventure; Sekolah Dasaar

I. Introduction

The character and moral development of the younger generation has become a global concern amidst increasing social, technological, and cultural complexities. Numerous studies highlight the challenges facing character education amid value pluralism and rapid digital advancement—factors that can undermine the internalization of moral and spiritual values among children (Bahiyah, 2025; Mashoedi et al., 2025; McLoughlin & Kristjánsson, 2025; van Olst, 2025). In Indonesia, efforts to build character still encounter implementation hurdles, particularly regarding the integration of Islamic values as a robust moral foundation (Adamson, 2025; Saputro et al., 2025). This situation creates an urgent need to evaluate the effectiveness of Islamic value-based character education programs that address children's moral development needs in a holistic, relevant, and adaptive manner to the local socio-cultural context. Furthermore, advancements in educational technology demand learning innovations that go beyond mere content delivery to effectively shape students' behavior and character (Friedman & Deek, 2003; Indrawan et al., 2024; Serdyukov, 2017).

This study focuses on primary education through the educational game "Muslim Adventure," which is designed to instill Islamic values in the character formation of children aged 7–12. As formal institutions, primary schools play a strategic role in shaping morals and ethics from an early age, given that children at this stage are undergoing rapid cognitive, social, and moral development (Choudhury et al., 2006; Kim & Kochanska, 2024; Schonert-Reichl et al., 2015). This educational game offers an interactive, adventure-based, and contextual learning experience, enabling children to internalize values such as honesty, tolerance, cooperation, and social responsibility through hands-on activities and reflection (Ghani et al., 2025). Selecting the primary school context is important because implementing character education at this stage lays a solid foundation for moral behavior in adolescence and adulthood (Battistich, n.d.; Syaparuddin et al., 2020).

The core issue addressed by this study is the limited empirical evidence regarding the effectiveness of the previously developed Islamic-value-based learning media in producing measurable changes in student character. Previous research developed the "Muslim Adventure" educational game as a learning tool for Islamic religious education in primary schools, utilizing the ADDIE Research and Development (R&D) model (Jamaludin et al., 2026). That study focused on the development process and expert validation, demonstrating that the game fell into the "highly feasible" category based on expert validation results and student feedback (Jamaludin et al., 2026). Although that research established the suitability of "Muslim Adventure" as a learning medium, it did not test the game's effectiveness in enhancing students' Islamic character.

Consequently, this study represents a subsequent phase of that development research, focusing on testing the effectiveness of the "Muslim Adventure" educational game in fostering changes in students' Islamic character. This situation highlights the need to examine the effectiveness of a program that combines conventional pedagogical approaches, interactive experiences, and the integration of Islamic-based moral values supported by digital media.

The theoretical foundation of this study employs a contemporary moral development framework—drawing upon virtue ethics and Kohlberg's stages of moral development—which is considered relevant for explaining how Islamic values can systematically shape children's character (Jamil, 2024; McLoughlin & Kristjánsson, 2025). This theory serves as a conceptual basis for understanding student character development, rather than for testing mediation mechanisms or longitudinal relationships within this study. By combining this approach with Islamic educational principles, the research focuses on measurable changes in students' Islamic character—assessed before and after the intervention—in alignment with their cognitive and emotional developmental stages.

The primary independent variable in this study is the extent of students' engagement with the "Muslim Adventure" educational game, which encompasses activities grounded in Islamic values, social interactions, and reflective experiences. In this study, participation in the program is framed as a learning intervention, and its effectiveness is assessed by changes in Islamic character scores from pretest to posttest. Activities designed with a contextual approach allow children to experience and evaluate the consequences of their actions, thereby fostering deeper learning.

The dependent variable in this study is the development of children's Islamic character, encompassing aspects of honesty, responsibility, tolerance, and cooperation. This is academically relevant as an empirical indicator of the effectiveness of character education interventions grounded in Islamic values, and is practically relevant for the development of curriculum policies, instructional strategies, and moral guidance programs in elementary schools (Adamson, 2025; Pajariantanto, 2025; Syaparuddin et al.,

2020). These measurement results can also serve as a reference for developing more holistic and adaptive character education models tailored to student needs.

Previous studies indicate that character education programs based on Islamic values have a positive impact on moral behavior. However, the effectiveness of this approach varies and is significantly influenced by teacher readiness, resource availability, and the school's cultural context. In the context of the "Muslim Adventure" educational game, previous research has established the medium's feasibility through development and validation processes. Still, it has yet to provide empirical evidence regarding its effectiveness in fostering Islamic character development among students through comparative testing. This highlights the need for a systematic, empirically grounded research approach to quantitatively assess changes in character following use of this interactive learning medium.

The research gaps addressed here include: a) a scarcity of studies advancing from the development and feasibility stages of Islamic character-based learning media to quantitative effectiveness testing; b) limited empirical evidence regarding the effectiveness of the "Muslim Adventure" game-based approach in Islamic character education; and c) the need for effectiveness reporting that encompasses not only statistical analysis but also score changes and effect sizes. Addressing these gaps is crucial, as empirical evidence clarifies the extent to which the developed learning medium fosters measurable changes in character among elementary school students.

The study's novelty lies in its pedagogical approach—specifically, the use of an interactive, contextual, adventure-based gaming experience to support Islamic religious education. Empirically, the novelty lies in testing the effectiveness of the developed "Muslim Adventure" game using a quasi-experimental design with experimental and control groups, along with pre-test and post-test measurements. Thus, this study advances the evidence base from the development and feasibility phase to the empirical testing of effectiveness phase.

This study aims to evaluate the effectiveness of the "Muslim Adventure" educational game in enhancing the Islamic character of elementary school students by comparing changes in Islamic character scores—measured before and after the intervention—between experimental and control groups. Specifically, the study examines whether students who use the "Muslim Adventure" educational game show greater improvements in Islamic character scores than students receiving conventional instruction. Consequently, the study poses the following research question: Does the use of the previously developed "Muslim Adventure" educational game result in greater improvement in students' Islamic character (from pre-test to post-test) than conventional instruction? This study hypothesizes that students in the experimental group will show a greater increase in average Islamic character scores than students in the control group.

The study's contributions span three aspects: empirically, it provides quantitative evidence regarding the effectiveness of the previously developed "Muslim Adventure" educational game; methodologically, it offers a quasi-experimental design featuring pretest-posttest comparisons and significance analysis; and practically, it provides recommendations for teachers, schools, and policymakers regarding the use of game-based learning activities to support Islamic religious education in primary schools. The findings are expected to strengthen the implementation of Islamic character education grounded in empirical evidence and provide a basis for further use of "Muslim Adventure" in character education in primary schools.

II. Research Methods

This study employed a quasi-experimental pretest-posttest control group design to evaluate the effectiveness of the 'Muslim Adventure' educational game in shaping the Islamic character of elementary school students (Rogers & Révész, 2019; Siedlecki, 2020). The study population consisted of all fourth-grade students at an elementary school in Majalengka Regency, comprising two parallel classes: Class 4A (experimental group) and Class 4B (control group). As the classes were pre-existing, group assignment was conducted at the class level rather than through individual randomization. Purposive sampling was used to select the classes, taking into account similar baseline characteristics to minimize bias. The study involved a total of 60 students—30 in the experimental group and 30 in the control group—with inclusion criteria requiring enrollment in the respective class, a minimum attendance rate of 80% during the intervention period, and parental or guardian consent. The experimental group engaged with the 'Muslim Adventure' educational game over eight weeks, involving adventure activities, simulations, and reflection on Islamic values, while the control group participated in the school's standard character education activities.

Islamic character formation was measured using a student self-report questionnaire as the primary research instrument. The instrument comprised 36 items assessing four aspects of Islamic character: honesty, responsibility, tolerance, and cooperation. Item scores were summed to yield a total Islamic character score, with higher scores indicating a higher level of Islamic character. The questionnaire was administered to both groups at the pretest (before the intervention) and posttest (after the intervention) stages. Change scores were calculated for each participant using the formula $\Delta = \text{posttest} - \text{pretest}$.

To assess the equivalence of baseline conditions, the pretest scores of both groups were compared before evaluating the intervention's effectiveness. The mean pretest score for the control group was 114.17 (SD = 15.94), while that of the experimental group was 106.97 (SD = 25.48). The test results indicate no significant difference in pretest scores between the control and experimental groups, $t(58) = -1.312$, $p = 0.195$; thus, no evidence of a significant baseline difference was found. Prosedur pengumpulan data

meliputi pretest sebelum intervensi, pelaksanaan intervensi selama delapan minggu, dan posttest setelah intervensi. Evaluasi follow-up yang sebelumnya direncanakan tidak digunakan dalam analisis penelitian ini karena hasil follow-up tidak disajikan. Dengan demikian, penelitian difokuskan pada perubahan skor karakter Islami dari pretest ke posttest.

Data analysis began with normality tests using the Shapiro-Wilk and Kolmogorov-Smirnov tests, followed by a test for homogeneity of variance using Levene's Test. Normality test results indicated that the change scores for the control group were normally distributed according to the Shapiro-Wilk test ($p = 0.371$), as were those for the experimental group ($p = 0.322$). Levene's test showed that the variances of both groups were homogeneous ($F = 3.425$; $p = 0.069 > 0.05$). Subsequently, the difference in change scores between the experimental and control groups was analyzed using an independent-samples t-test. The mean change score for the control group was 20.30 ($SD = 12.71$), while that for the experimental group was 34.17 ($SD = 17.19$). The test results yielded $t(58) = -3.553$, $p = 0.001$, with a mean difference of -13.87 and a 95% confidence interval of -21.68 to -6.05 . The negative sign of the mean difference indicates that the average change score for the experimental group was higher than that of the control group, based on the calculation order of control minus experimental.

As an alternative non-parametric analysis, the Mann-Whitney U test was also performed on the change scores. The results showed a mean rank of 37.52 for the experimental group and 23.48 for the control group, with Mann-Whitney $U = 239.500$, $Z = -3.113$, and $p = 0.002$. These results indicate that the difference in change scores between the two groups remained significant in the non-parametric analysis. Effect size was calculated using Cohen's d to demonstrate the magnitude of the difference in change scores between the experimental and control groups. Based on the means and standard deviations of the change scores for both groups, Cohen's d was 0.92, indicating a large effect size. Since the intervention was administered to two pre-existing classes rather than through individual randomization, students within the same class may have shared similar learning-environment experiences. This condition is considered a research design limitation regarding the interpretation of the independence of observations and the generalizability of the findings. All research procedures were conducted in accordance with ethical principles, including obtaining consent from parents or guardians and school authorities, maintaining data confidentiality, and ensuring voluntary student participation. Participant identities were anonymized, and the program was designed to be age-appropriate and to entail minimal risk.

III. Result and Discussion

A. Descriptive Data

Descriptive analysis reveals a difference in the change in Islamic character-building scores between the experimental group (Class 4A) and the control group (Class 4B). The experimental group had a mean of 34.17, a median of 32.50, and a standard deviation of 17.19. In contrast, the control group had a mean of 20.30, a median of 20.50, and a standard deviation of 12.71. Based on skewness and kurtosis values, the data distribution is relatively symmetrical and approximates a normal distribution. This difference in mean change scores indicates that the experimental group experienced a greater increase than the control group.

Table 1. Descriptive Statistics of Islamic Character Formation Scores.

Category	N	Mean	Median	SD	Min	Max	Range	Skewness	Kurtosis
Control	30	20,30	20,50	12,71	1	50	49	0,435	-0,443
Exsperimental	30	34,17	32,50	17,19	7	68	61	0,359	-0,854

Note: The change score is calculated as the difference between the post-test and pre-test scores ($\Delta = \text{post-test} - \text{pre-test}$).

B. Test for normality and homogeneity assumptions

Before the test for mean differences, the data were assessed for normality using the Shapiro-Wilk test and for homogeneity of variance using Levene's test. P-values greater than 0.05 for both tests indicated that the change scores in both groups were normally distributed and exhibited homogeneous variances; therefore, the independent samples t-test was used as the primary analysis.

Table 2. Normality and Homogeneity Test

Test	Group	Statistic	p-value
Shapiro-Wilk	Control	0,963	0,371
Shapiro-Wilk	Ekperimental	0,961	0,322
Levene's Test	Both Group	3,425	0,069

The Shapiro-Wilk results indicate that the change scores for the control group ($p = 0.371$) and the experimental group ($p = 0.322$) do not deviate significantly from a normal distribution. Levene's Test results also indicate that the variances of both groups are homogeneous ($p = 0.069$). Given that these assumptions were met, an independent-samples t-test was used as the primary analysis to examine the difference in change scores between the two groups.

C. Analysis of Score Change Differences

An independent-samples t-test revealed a significant difference in change scores between the experimental and control groups, $t(58) = -3.553$, $p = 0.001$, with a mean difference of -13.867 and a 95% CI of $[-21.679; -6.055]$. The negative value for the mean difference resulted from subtracting the experimental group's scores from the control group's scores. Substantively, the experimental group showed a score increase of 34.17,

whereas the control group showed an increase of 20.30, resulting in a 13.87-point difference in improvement between the two groups.

The effect size was calculated using Cohen's *d*, yielding 0.92, indicating a large effect. Thus, the results demonstrate a significant difference—with a large effect size—in the change in Islamic character scores between the group participating in the 'Muslim Adventure' program and the control group. These findings reflect differences in score improvement from pretest to posttest, rather than differences in posttest scores between the groups.

Tabel 3. Independent Samples t-test

Test	<i>t</i>	df	<i>p</i> (2-tailed)	Mean Difference	95%CI Lower	95%CI Upper	Cohen's <i>d</i>
Equal variances assumed	-3,553	58	0,001	-13,867	-21,679	-6,055	0,92

D. Mann-Whitney U Sensitivity Analysis

The Mann-Whitney U test was employed in a sensitivity analysis to assess the consistency of the findings using a nonparametric approach. This analysis was not intended to replace the independent samples t-test—given that the assumptions of normality and homogeneity had already been met—but rather to determine whether the conclusions regarding the difference in change scores remained consistent when a rank-based approach was applied.

The results yielded a Mann-Whitney U value of 239.500, $Z = -3.113$, and $p = 0.002$. The mean rank was 37.52 for the experimental group and 23.48 for the control group. These results are consistent with the independent-samples t-test results, indicating that the change scores for the experimental group were significantly higher than those for the control group.

E. Discussion

The research results indicate that the experimental group experienced a greater increase in Islamic character scores compared to the control group. The mean change score for the experimental group was 34.17, while that of the control group was 20.30, representing a difference of 13.87 points and a Cohen's *d* of 0.92. These findings suggest that participants in the 'Muslim Adventure' program experienced a more significant shift in character scores during the study period. However, given that the study employed a quasi-experimental design using pre-existing classes rather than individual randomization, these results are best interpreted as evidence of differences in score changes between groups rather than as proof of absolute causality. These findings align with contemporary moral development theories that emphasize that active, reflective, and contextual learning experiences can enhance the internalization of moral values in children (McLoughlin & Kristjánsson, 2025). One possible explanation for why the

experimental group demonstrated greater change lies in the 'Muslim Adventure' activities, which provided students with opportunities not only to receive explanations regarding moral values but also to encounter situations requiring choices, interaction, cooperation, and reflection. Adventure-based programs enable students to experience and evaluate the consequences of their actions firsthand, thereby aligning with the virtue ethics approach, in which the practice of virtue through real-life experience shapes moral character (van Olst, 2025). This view aligns with meta-analytic evidence indicating that character education programs generally have a positive effect on students' developmental outcomes compared with control conditions. However, the magnitude of the effect varies across programs and contexts (Brown et al., 2023).

These results align with previous research findings on Islamic-value-based character education which emphasize the importance of integrating Islamic values into daily activities to foster tangible Islamic behavior; meanwhile, (Adamson, 2025) highlights that holistic and contextual character learning is more effective than traditional, normative approaches. Thus, direct, experience-based interventions—such as 'Muslim Adventure'—facilitate the achievement of character education goals aligned with Islamic values, as students not only understand these values but also put them into practice. This characteristic may explain why the experimental group demonstrated higher scores: game-based activities provide a context that allows students to engage with values through concrete actions, rather than merely receiving explanations about moral values.

Furthermore, these findings reinforce the concept that active participation in learning enhances the internalization of values and the reinforcement of moral behavior. (Kim & Kochanska, 2024) emphasize that early social and emotional engagement is a crucial factor in moral development and can predict future ethical behavior. In this study, adventure-based activities enabled students to interact, collaborate, and make moral decisions firsthand, thereby improving their capacity for moral reflection and the application of Islamic values within the school context. From a game-based learning perspective, such activities can also heighten students' emotional engagement in the learning process. A meta-analysis by Lei et al. (2022) demonstrates that game-based learning fosters positive emotions during instruction and can reduce negative emotions compared to traditional methods. However, these effects are influenced by factors such as game type, educational level, cultural context, and intervention duration (Lei et al., 2022). Thus, the use of games in this study can be viewed as a pedagogical feature that fosters student engagement during the learning process, rather than merely a result of technology use.

The teacher's role is also a factor to consider when interpreting these research findings. Since the intervention was delivered within a classroom setting, the students' experiences during the 'Muslim Adventure' program were inextricably linked to the

teacher's role in providing instruction, facilitating activities, and guiding student reflection. However, as this study did not measure teacher involvement as a distinct variable, the teacher's influence cannot be empirically disentangled from the program's impact. Consequently, the teacher factor is best viewed as a contextual element that likely supported the implementation of the intervention.

Student characteristics must also be taken into account when interpreting the results. Although the two groups originated from classes with relatively comparable initial characteristics and showed no significant baseline differences, students within different classes may still exhibit individual variations in motivation, learning experiences, social skills, and other attributes. Given that the study utilized pre-existing classes rather than individual randomization, the potential influence of class and learner characteristics cannot be entirely ruled out.

Furthermore, the use of a quasi-experimental approach with a pretest-posttest control group design provides a more robust basis for comparing outcome changes between the experimental and control groups than a single-group study would. However, because the intervention was administered to pre-existing classes, the findings must be interpreted within the confines of that specific context. Supplementary analysis using the Mann-Whitney U test also revealed significant differences, demonstrating the consistency of the findings even when a non-parametric approach was applied. Specifically, the results yielded Mann-Whitney $U = 239.500$, $Z = -3.113$, and $p = 0.002$, with an effect size of $r = 0.40$, indicating a medium effect. This test was employed not to replace the t-test results, but rather as a sensitivity analysis to determine whether the conclusions regarding the differences between the two groups remained consistent under a non-parametric approach.

The limitations inherent in a two-class design must also be considered when generalizing the results. Students in the same class received the intervention within a shared learning environment, introducing the potential influence of classroom dynamics and peer interactions. Furthermore, the study involved only one experimental class and one control class; consequently, the findings cannot be directly generalized to the broader population of elementary school students across diverse school settings, teaching styles, and environments. Future research could incorporate a larger number of classes or schools to gather more robust evidence regarding the program's consistent effectiveness across varied contexts.

Overall, the research findings support the notion that Islamic character education—integrating interactive experiences, reflection, and moral values—can yield superior outcomes in this context compared to conventional methods. The 'Muslim Adventure' program serves as a practical example of how to foster Islamic character in children from an early age, aligning with Islamic pedagogical principles that emphasize moral development through real-world experiences, social interaction, and the internalization

of values (Adamson, 2025; van Olst, 2025). These findings also align with existing research indicating that while character education can have a positive impact, the magnitude of that impact depends heavily on the program's specific characteristics and the context of its implementation (Brown et al., 2023).

Thus, this study does not aim to elucidate the mechanisms mediating value internalization or longitudinal relationships; rather, it seeks to examine differences in outcomes between the group that participated in 'Muslim Adventure' and the group that received standard character instruction. In this regard, the study's contribution lies in empirically testing the effectiveness of a previously developed game, rather than in developing the game itself.

IV. Conclusion

Based on the results of a quasi-experimental study using a pretest-posttest control group design, the 'Muslim Adventure' program is associated with a difference in Islamic character formation scores between the experimental and control groups. The experimental group demonstrated a higher mean score than the control group, and this difference was statistically significant ($p < 0.05$). The magnitude of the difference indicated a relatively large effect size (Cohen's $d = 0.92$); thus, the findings provide empirical evidence that students participating in the 'Muslim Adventure' program exhibited greater changes in Islamic character scores compared to the control group within the context of this study. However, this study did not examine the internalization of values as a mediating variable; therefore, an increase in the internalization of moral values cannot be directly inferred from the results.

The research findings should be interpreted with certain limitations in mind. The study sample consisted of only 60 students from a single elementary school, selected via purposive sampling, and involved two pre-existing classes without individual randomization. These conditions limit the generalizability of the results to a broader range of schools and student characteristics. Furthermore, the use of self-report data carries a risk of response bias, although teacher observations corroborated the measurements. The eight-week duration of the intervention did not allow for an assessment of the long-term sustainability of the character changes.

Given these limitations, the results are best viewed as preliminary evidence regarding the effectiveness of 'Muslim Adventure' in enhancing Islamic character formation scores compared to standard character instruction within the specific context of the two classes studied. Future research should involve more schools and classes, a larger sample size, and randomized or experimental designs with stronger controls to test the consistency of the findings and improve the generalizability of the results.

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