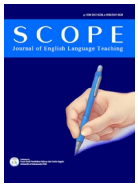
SCOPE
Journal of English Language Teaching
| p-ISSN 2541-0326 | e-ISSN 2541-0334 |
https://journal.lppmunindra.ac.id/index.php/SCOPE/



Research Article

Measuring the Effectiveness of Process Writing Approach to Improve EFL Students' Writing Proficiency via Normalized Gain

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KEYWORDS

Process Writing Approach,
Writing Proficiency,
Normalized Gain

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A B S T R A C T

The process writing approach introduces structured strategies to enhance students' writing skills through planned and reflective stages. In an educational context, this approach not only facilitates the development of writing skills but also encourages students to become critical and reflective writers. This study aimed to assess the effectiveness of the process writing approach in enhancing writing proficiency among EFL (English as a Foreign Language) university students, using Normalized Gain (N-Gain) as a measurement tool. The study involved the participation of 17 university students as sample. The methodology utilized calculated N-Gain scores across two cycles of instruction to evaluate students' progress from pre-test to post-test assessments. The results indicate a significant improvement in students' writing abilities following the implementation of the process writing approach. In Cycle 2, N-Gain scores generally fell within the medium category, reflecting consistent progress across the student cohort and surpassing the outcomes observed in Cycle 1. The observed advancements suggest that foundational learning from Cycle 1 contributed to intensified and cumulative gains in Cycle 2. The study underscores the potential universal effectiveness of the process writing approach across varying levels of student comprehension. Future research should delve deeper into the specific teaching materials customized for process writing approach utilized in Cycle 2 to optimize learning outcomes for all students.

INTRODUCTION

Enhancing English as a Foreign Language (EFL) students' writing proficiency stands as a perennial challenge in language education (Christenson, 2002). Among the diverse pedagogical approaches available, the process writing approach has garnered attention for its potential to cultivate robust writing skills (Onozawa, 2010; Nabhan, 2019). However, amidst the myriad instructional methods, there exists a pressing need to empirically measure the effectiveness of the process writing approach in improving EFL students' writing proficiency. This study endeavors to address this gap by examining the impact of process writing on EFL learners' writing abilities using normalized gain as a quantitative metric.

Over the years, various instructional strategies have been employed to address EFL writing deficiencies. Explicit

DOI: http://dx.doi.org/10.30998/scope.v9i1.24410

grammar and vocabulary instruction (Tuan, 2011), task-based learning, and genre-based approaches (Nagao, 2019) have all demonstrated potential in improving writing skills. However, their effectiveness often depends on learner-specific factors, including proficiency levels, linguistic backgrounds, and exposure to the target language. The process writing approach, by contrast, offers a more holistic framework that guides students through the iterative phases of writing—prewriting, drafting, revising, and editing. Studies have shown that this method can increase fluency, accuracy, and complexity in written work (Sánchez & Pinzon, 2019; Rahman et al, 2024), making it particularly appealing in fostering deep engagement with writing tasks. In the process writing approach, the teacher acts as a facilitator, guiding students through the writing process rather than delivering information or providing motivation (Badger, R and White 2000). This approach is seen as a method of thinking that helps students analyze and organize their ideas(Applebee 1986), fosters collaboration among them (Nunan 1991), offers opportunities for managing and controlling their writing (Brown 2021), and encourages a variety of activities (Onozawa 2010).

The importance of investigating the effectiveness of the process writing approach stems from the increasing importance placed on English language proficiency in today's globalized world (Lee & Schmidgall, 2020). Proficient writing skills are essential for academic success, professional advancement, and effective communication in diverse contexts (Sadiku, 2015; Chin et al, 2012). Moreover, EFL students often face unique challenges, such as limited exposure to authentic language use and cultural differences, underscoring the need for targeted pedagogical interventions (Thi & Anh, 2019). By elucidating the efficacy of the process writing approach, this research aims to inform instructional practices and contribute to the development of evidence-based strategies for enhancing EFL writing instruction.

Despite its theoretical promise, the process writing approach has not been empirically validated on a large scale, especially in terms of its measurable outcomes in EFL contexts. Quantitative evidence on the specific ways how process writing approach improves EFL students' writing proficiency is still limited, especially when compared to other pedagogical methods that rely on more prescriptive grammar or genre-specific instructions. This gap in empirical research points to the need for a more rigorous assessment of the approach, particularly through standardized measurements that can provide a clear understanding of its effectiveness.

In conclusion, the investigation into the effectiveness of the process writing approach holds significant implications for EFL pedagogy and curriculum development. By elucidating the mechanisms through which process writing facilitates the development of writing proficiency, educators can make informed decisions about instructional practices and tailor interventions to meet the diverse needs of EFL learners. Ultimately, this research aims to contribute to the enhancement of EFL writing instruction and empower students to communicate effectively and confidently in English-language contexts.

METHOD

Participants and Action Research

The study involved 17 students enrolled in a fifth-semester Intensive Course Writing class in Universitas Bina Sarana Informatika, specifically chosen for their exposure to the writing process over a semester. The curriculum, implemented from September 2023 to January 2024, consisted of two cycles: cycle 1 (September to November 2023) and cycle 2 (November 2023 to January 2024) (Kemmis & McTaggart, 1992). Throughout this period, students tackled three distinct types of texts: Narrative, Descriptive, and Compare and Contrast Paragraphs (Tompkins, 1994; Nunan, 1999). Employing a Process Writing approach, they undertook various stages such as outlining, drafting, revising, and finalizing their compositions. Continuous monitoring and assessment of their progress occurred throughout the semester, encompassing a range of tasks from brainstorming to finalizing their pieces. Drawing from the academic writing guide by Oshima & Hogue (2006), the treatment provided tailored feedback and guidance to refine students' writing proficiency across diverse genres. This comprehensive strategy aimed to instill a holistic grasp of writing fundamentals and foster ongoing enhancement of their composition skills.

Utilizing the Classroom Action Research (CAR) method (Kemmis & McTaggart, 1992), which involved a structured approach consisting of two distinct cycles, the process comprised four key stages: Planning, Action Implementation, Observation, and Reflection (Burns, 2015; Oshima, 2006). In the planning phase, the researcher delineated the objectives and methodologies for the upcoming cycle, ensuring their alignment with the overarching research goals (Onozawa, 2010). During action implementation, interventions were executed according to the pre-established plan, with the aim of instigating intended changes or improvements. Subsequently, the observation phase entailed closely monitoring the outcomes of the implemented actions, while identifying any emerging patterns or developments. Finally, the reflection stage provided an opportunity for critical analysis and evaluation of the effectiveness of the interventions, thus informing adjustments for subsequent

cycles or future research endeavours (Onozawa, 2010; Rahman, 2024; Sánchez & Lopez-Pinzon, 2019).

Normalized Gain

Normalized gain or N-gain score aims to determine the effectiveness of using a particular method or treatment in one group pre-test-post-test design research (experimental design or pre-experimental design) as well as research using control groups (quasi-experimental or true experimental) (Meltzer, 200; Hake, 1998). The N-gain score test is conducted by calculating the difference between the pre-test score (test before the application of a specific method or treatment) and the post-test score (test after the application of a specific method or treatment). By calculating the difference between the pre-test and post-test scores, we can determine whether the use or application of a specific method can be considered effective or less effective (Coletta & Steinert 2020).

In one group pre-test-post-test design research, the N-gain score test can be used when there is a significant difference between the average pre-test and post-test scores through paired sample t-test (Meltzer, 2002). Meanwhile, in research using experimental and control groups, the N-gain score test can be used when there is a significant difference between the average post-test scores of the experimental group and the post-test scores of the control group through independent sample t-test (Coletta & Steinert, 2020; Meltzer, 2002).

Once all the data has been gathered, we will assess the significance of the improvement in student learning outcomes between the pre-test and post-test scores. To achieve this, we will utilize the N-Gain formula. This formula allows us to quantify the relative gain in student performance by comparing their initial understanding (pre-test scores) with their subsequent performance (post-test scores). By applying the N-Gain calculation, we can more accurately measure the effectiveness of the educational intervention or instructional strategy employed, providing a clearer picture of its impact on student learning progress. The following is the equation to calculate N-Gain score (Meltzer, 2002).

$$\mathrm{N-Gain\ (G)} = \frac{(\mathrm{Posttest}) - (\mathrm{Pretest})}{Maximum\ Score - (Pretest)} \qquad (1)$$

The steps for analyzing N-Gain include four stages:

1. Determine the Initial and Final Scores: Identify the initial (pre-test) score and the final scores for each cycle (post-test Cycle 1 and post-test Cycle 2).
2. Assume a Maximum Score: Set the maximum possible score as 100.
3. Calculate N-Gain for Each Cycle: Use the N-Gain formula provided above to compute the N-Gain for each cycle.
4. Calculate the Average N-Gain: Determine the average N-Gain for each cycle to understand overall improvements.

The categorization of N-Gain scores can be determined based on either the raw N-Gain values or the N-Gain expressed as a percentage (%). The breakdown of these N-Gain score categories is shown in the table below.

Table 1. N-Gain Interpretation Index by Meltzer (2002)

Gain Indexs	Criteria
g > 0,70	High
0,70 ≥ 0,30	Medium
0,30 ≥ g	Low

RESULTS AND DISCUSSION

In Table 2, the pre-test scores, post-test Cycle 1 scores, and post-test Cycle 2 scores for 17 students are presented. These scores were obtained from the evaluations of four assessors who assessed the quality of the students' writing based on Brown writing assessment rubric (2021). To calculate the N-Gain from the provided data with two post-test cycles, N-Gain will be computed for each cycle compared to the pre-test scores.

Table 2. Pre-Test & Post-Test Score

Students	Pre-test	Post-Test Cycle 1	Post-Test Cycle 2
YEG	75	80	85
FAR	65	70	85
S	63	70	83
JR	55	73	73
AAS	65	70	83
AS	65	70	83
ASM	63	70	78
RCO	62	70	83
RRY	60	70	83
DNH	63	70	80
DA	50	70	73
MS	56	70	80
JFRS	59	70	83
MRFA	60	70	83
AY	63	70	83
AQ	52	65	70
AP	60	70	83

To calculate the N-Gain from the given data, one must follow several steps. N-Gain or Normalized Gain is used to measure the effectiveness of score changes from pre-test to post-test, or in this context, from initial to final scores after a period or intervention. The formula for N-Gain for each

 DOI: http://dx.doi.org/10.30998/scope.v9i1.24410

cycle is as follows. The first calculation will be performed for Cycle 1 N-Gain using SPSS software with the N-Gain formula as follows:

$$\text{N} - \text{Gain Cycle 1} = \frac{(\text{Posttest}) \text{ cycle 1} - (\text{Pretest})}{Max\ Score\ (100) - (Pretest)} \qquad (2)$$

Next is the calculation of N-Gain values for these two cycles. Here are the N-Gain calculations for each student across the two given post-test cycles, as well as the average N-Gain for each cycle.

Pretest	Posttest	Postest_kurang_Pretest	Skorideal_kurang_Pretest	Ngain_score	Ngain_persen
75.00	80.00	5.00	25.00	.20	20.00
65.00	70.00	5.00	35.00	.14	14.29
63.00	70.00	7.00	37.00	.19	18.92
55.00	73.00	18.00	45.00	.40	40.00
65.00	70.00	5.00	35.00	.14	14.29
65.00	70.00	5.00	35.00	.14	14.29
63.00	70.00	7.00	37.00	.19	18.92
62.00	70.00	8.00	38.00	.21	21.05
60.00	70.00	10.00	40.00	.25	25.00
63.00	70.00	7.00	37.00	.19	18.92
50.00	70.00	20.00	50.00	.40	40.00
56.00	70.00	14.00	44.00	.32	31.82
59.00	70.00	11.00	41.00	.27	26.83
60.00	70.00	10.00	40.00	.25	25.00
63.00	70.00	7.00	37.00	.19	18.92
52.00	65.00	13.00	48.00	.27	27.08
60.00	70.00	10.00	40.00	.25	25.00

Figure 1. N-Gain Score for Cycle 1

Table 3 compiles posttest cycle 1, N-Gain for cycle 1, and N-gain percentage taken from figure 1.

Table 3. N-Gain of Cycle 1

Students	Pre-test	Post-Test Cycle 1	N-Gain Cycle 1	N-Gain in Percentage
YEG	75	80	0.20	20
FAR	65	70	0.14	14
S	63	70	0.19	18
JR	55	73	0.40	40
AAS	65	70	0.14	14
AS	65	70	0.14	14
ASM	63	70	0.19	19
RCO	62	70	0.21	21
RRY	60	70	0.25	25
DNH	63	70	0.19	19
DA	50	70	0.40	40
MS	56	70	0.32	32
JFRS	59	70	0.27	27
MRFA	60	70	0.25	25
AY	63	70	0.19	19
AQ	52	65	0.27	27
AP	60	70	0.25	25

The N-Gain Cycle 1 table provides an overview of how much students' understanding of the material improved after completing the first learning cycle. N-Gain is calculated based on the difference between students' Post-Test Cycle 1 and Pre-test scores, divided by the difference between the maximum possible score and the Pre-test score. For example, students JR and DA showed the highest N-Gain with a value of 0.40 or 40%, indicating significant improvement in their understanding of the material. This suggests the effectiveness of the learning methods used for them. On the other hand, students like FAR, AAS, and AS had lower N-Gain, around 0.14 or 14%. While still showing improvement, these numbers indicate that their response to learning may vary or there may be other factors influencing their results.

Furthermore, most other students had N-Gain between 0.19 and 0.27 (19% to 27%), reflecting moderate improvement in understanding the material. For instance, RCO, RRY, DNH, ASM, MS, JFRS, MRFA, AY, AQ, and AP showed relatively consistent improvement within this range. This analysis demonstrates variation in students' responses to learning, which can be influenced by factors such as initial readiness, teaching approaches used, or individual motivation levels. By understanding these N-Gain results, educators can evaluate the effectiveness of their teaching and design better strategies to help students achieve better outcomes in the future.

From the data presented in Figure 1, further analysis can be conducted to find the minimum, maximum, and mean (average) scores of N-Gain for Cycle 1.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Ngain_score	17	.14	.40	.2355	.07911
Ngain_persen	17	14.29	40.00	23.5480	7.91052
Valid N (listwise)	17				

Figure 2. Descriptive Statistics of Cycle 1

Figure 2 presents descriptive statistics for N-Gain values and N-Gain as percentages from the first learning cycle. N-Gain values demonstrate the extent of improvement in students' abilities from Pre-test to Post-Test, while N-Gain as a percentage illustrates this improvement in percentage form.

Concerning the N-Gain scores, the mean improvement is 0.2355 with a standard deviation of 0.07911, indicating an average improvement of approximately 0.24 from initial scores. The range of these values varies from a minimum of 0.14 to a maximum of 0.40, showing variability in students' responses to the provided learning.

Meanwhile, for N-Gain as percentages, the average improvement is around 23.5480% with a standard deviation of 7.910. This indicates that, on average, understanding increased by about 23.55% after the first learning cycle. The range of percentage increase spans from 14.29% to 40%, indicating varying levels of improvement in understanding achieved by students. This statistical analysis provides an overview of the effectiveness of learning in enhancing overall student understanding, as well as the individual variation in learning responses. Subsequently, the N-Gain score for Cycle 2 will be calculated using the N-Gain formula as follows:

$$\text{N} - \text{Gain cycle 2} = \frac{(\text{Posttest}) \text{ cycle 2} - (\text{Pretest})}{Max\ Score\ (100) - (Pretest)} \quad (2)$$

The calculation of N-Gain scores for these two cycles will now be presented. Included are the N-Gain calculations for each student across the two post-test cycles, along with the average N-Gain for each cycle.

Pretest	Posttest	Posttest_kurang_Pretest	Skorideal_kurang_Pretest	NGain_Score	NGain_Persen
75.00	85.00	10.00	25.00	.40	40.00
65.00	85.00	20.00	35.00	.57	57.14
63.00	83.00	20.00	37.00	.54	54.05
55.00	73.00	18.00	45.00	.40	40.00
65.00	83.00	18.00	35.00	.51	51.43
65.00	83.00	18.00	35.00	.51	51.43
63.00	78.00	15.00	37.00	.41	40.54
62.00	83.00	21.00	38.00	.55	55.26
60.00	83.00	23.00	40.00	.58	57.50
63.00	80.00	17.00	37.00	.46	45.95
50.00	73.00	23.00	50.00	.46	46.00
56.00	80.00	24.00	44.00	.55	54.55
59.00	83.00	24.00	41.00	.59	58.54
60.00	83.00	23.00	40.00	.58	57.50
63.00	83.00	20.00	37.00	.54	54.05
52.00	70.00	18.00	48.00	.38	37.50
60.00	83.00	23.00	40.00	.58	57.50

Figure 3. N-Gain Score for Cycle 2

Table 4 compiles posttest cycle 2, N-Gain for cycle 2, and N-gain percentage taken from figure 3.

Table 4. N-Gain for Post-Test Cycle 2

Students	Pre-test	Post-Test Cycle 2	N-Gain Cycle 2	N-Gain in Percentage
YEG	75	85	0.40	40
FAR	65	85	0.57	57
S	63	83	0.54	54
JR	55	73	0.40	40
AAS	65	83	0.51	51
AS	65	83	0.51	51
ASM	63	78	0.41	41
RCO	62	83	0.55	55
RRY	60	83	0.58	58
DNH	63	80	0.46	46
DA	50	73	0.46	46
MS	56	80	0.55	55
JFRS	59	83	0.59	59
MRFA	60	83	0.58	58
AY	63	83	0.54	54
AQ	52	70	0.38	38
AP	60	83	0.58	58

The N-Gain Table for Post-Test Cycle 2 illustrates the improvement in students' abilities from Pre-test to Post-Test after undergoing the second learning cycle. This improvement is measured by N-Gain values and N-Gain as percentages, which indicate the extent of progress students have made in understanding the learning material.

From the provided data, it is evident that many students experienced significant improvements in this second cycle. For example, a student with an initial Pre-test score of 65 achieved a Post-Test score of 85, resulting in an N-Gain of 0.57 or 57%. This indicates that the learning approach in the second cycle successfully enhanced their understanding substantially. Similarly, other students showed N-Gain increases ranging from 0.40 to 0.59 (40% to 59%), demonstrating the effectiveness of the learning process.

However, there is variation in the level of improvement among students. For instance, a student with an initial Pre-test score of 52 achieved an N-Gain of 0.38 or 38%, which, although showing improvement, is relatively lower compared to others in the table. This may indicate various factors influencing students' responses to the learning methods, such as initial readiness, motivation levels, or the effectiveness of the applied teaching strategies. This analysis provides valuable insights for educators to evaluate and refine their teaching approaches, aiming to enhance student understanding more consistently in the future.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
NGain_Score	17	.38	.59	.5053	.07295
NGain_Persen	17	37.50	58.54	50.5259	7.29479
Valid N (listwise)	17				

Figure 4. Descriptive Statistics of Cycle 2

The table provides descriptive statistics for N-Gain values and N-Gain as percentages from the second learning cycle. N-Gain score refers to the difference between students' Post-Test Cycle 2 and Pretest scores, while N-Gain as

DOI: http://dx.doi.org/10.30998/scope.v9i1.24410

percentages depicts this increase as a percentage of the initial score.

From the data presented, we observe that the mean N-Gain score for students is approximately 0.5053, with a standard deviation of 0.07295. This indicates that overall, students experienced an improvement of about 0.51 from their Pretest scores after completing the second learning cycle. The range of N-Gain scores varies from a minimum of 0.38 to a maximum of 0.59, showing variability in students' responses to the learning provided in this cycle.

Meanwhile, for N-Gain as percentages, the average increase is 50.5259% with a standard deviation of 7.29479%. This suggests that on average, students enhanced their understanding by about 50.53% after the second learning cycle. The percentage increase ranges from 37.50% to 58.54%, reflecting various levels of progress achieved by students in understanding the learning material. This statistical analysis provides a clear picture of the effectiveness of the second learning cycle in improving student understanding, and allows educators to evaluate the impact of the applied teaching approaches on student learning outcomes.

Table 5. Comparative N-Gain Score of Cycle 1 & Cycle 2

Students	Pre-test	N-Gain Cycle 1	N-Gain Cycle 2	N-Gain Cycle 1 in Percentage	N-Gain Cycle 2 in Percentage
YEG	75	0.20	0.40	20	40
FAR	65	0.14	0.57	14	57
S	63	0.19	0.54	19	54
JR	55	0.40	0.40	40	40
AAS	65	0.14	0.51	14	51
AS	65	0.14	0.51	14	51
ASM	63	0.19	0.41	19	41
RCO	62	0.21	0.55	21	55
RRY	60	0.25	0.58	25	58
DNH	63	0.19	0.46	19	46
DA	50	0.40	0.46	40	46
MS	56	0.32	0.55	32	55
JFRS	59	0.27	0.59	27	59
MRFA	60	0.25	0.58	25	58
AY	63	0.19	0.54	19	54
AQ	52	0.27	0.38	27	38
AP	60	0.25	0.58	25	58

The overall improvement from Cycle 1 to Cycle 2 indicates a significant difference in students' progress in understanding the learning material. The average N-Gain in Cycle 1 was 0.2355, which then increased markedly to 0.5053 in Cycle 2. This suggests that the approach or learning material applied in Cycle 2 may be more effective in enhancing students' overall understanding. This improvement not only reflects the potential of better teaching methods but also the possibility of adjustments based on feedback and evaluations from the previous cycle.

Individual analysis shows variations in students' responses to learning. Students like FAR and S demonstrated a very significant increase in N-Gain from Cycle 1 to Cycle 2, indicating a positive response to new strategies or approaches introduced. On the other hand, students like JR, maintaining the same N-Gain (0.40) in both cycles, may have reached a plateau in their understanding of the material, indicating they already had a solid grasp since Cycle 1.

The distribution of N-Gain values also provides an interesting perspective. Cycle 1 showed a narrower range of N-Gain values, from 0.14 to 0.40, while Cycle 2 exhibited a larger variation, from 0.38 to 0.59. This indicates not only an overall improvement but also consistency in the benefits provided by Cycle 2 to the entire group of students.

One factor to consider in the improvement is that some students, like AQ, experienced a lower increase in Cycle 2 (0.38) compared to others. This may be due to various factors such as learning methods that were less suitable for them or limitations in foundational understanding not covered in Cycle 2 material. This analysis highlights the importance of understanding individual student needs and characteristics to tailor learning approaches that can support their optimal progress.

Overall, the shift in N-Gain categories from Cycle 1 to Cycle 2 also indicates a significant transformation. In Cycle 1, most students were in the "Low" category for their N-Gain, with only a few reaching the "Medium" category (such as JR, DA, MS). However, in Cycle 2, all students showed more significant improvement with N-Gain generally falling into the "Medium" category. This indicates that improvements in teaching strategies not only enhance individual understanding but also elevate the entire cohort of students to higher levels of consistent progress.

The consistent improvement in N-Gain categories aligns with studies that explore the impact of adaptive teaching techniques within the process writing framework. Tangpermpoon (2008) and Kim (2021) both note that individualized feedback and iterative revisions empower students to reflect on and improve their writing, leading to

overall class-wide improvement. This study reaffirms that the process writing approach, when implemented with careful attention to instructional methods, not only enhances individual student performance but also encourage the students to progress positively in improving their writing performance.

CONCLUSION

Overall, it is evident that students' writing abilities improved significantly with the implementation of the process writing approach. This improvement is underscored by the enhanced skills observed in Cycle 2, where N-Gain scores generally fell within the medium category, indicating consistent progress across the student cohort. Moreover, the effectiveness of learning in Cycle 2 surpassed that of Cycle 1, as evidenced by the higher average N-Gain.

The substantial advancements seen from Cycle 1 to Cycle 2 likely benefited from the foundational learning acquired in Cycle 1, which was further intensified and accumulated in Cycle 2. The uniform improvement observed across all students in Cycle 2 suggests that the methodologies applied may be universally effective and accessible across varying levels of student comprehension.

Moving forward, it is advisable to conduct a deeper analysis of the teaching methods and materials employed in Cycle 2, considering their broader application and potential adjustments to cater to students who may not have maximized their benefits. The implications for teaching methodologies indicate that the strategies implemented in Cycle 2 yielded more consistent and significant improvements compared to those in Cycle 1, possibly due to improved materials, more effective teaching approaches , accumulative student comprehension in cycle 1, or additional support provided during Cycle 2.

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