

Influence of 21st Century Learning Skills on the Problem-Solving Ability of Grade Six Learners

Angelie O. Cahayag

Master of Arts in Teaching, Major in Social Studies, Graduate School, Valencia Colleges (Bukidnon),
Inc. Purok 17-A, Hagkol, Valencia City, Bukidnon Philippines

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ABSTRACT

This study examined the relationship between 21st-century learning skills and the problem-solving ability of 356 Grade 6 learners in San Fernando II District, Division of Bukidnon, during the School Year 2025–2026. A descriptive–correlational research design was employed to determine the levels of learners’ 21st-century skills, critical thinking, communication, collaboration, and creativity, and their problem-solving ability, as well as the association between these variables. Data were collected using validated survey instruments and analyzed using descriptive statistics, Pearson product–moment correlation, and multiple regression analysis.

Findings revealed that learners demonstrated moderate levels of critical thinking and communication, and high levels of collaboration and creativity, while their overall problem-solving ability was interpreted as good. However, correlation analysis showed no statistically significant relationship between 21st-century skills and problem-solving ability. Regression results further indicated that none of the skill dimensions significantly predicted learners’ problem-solving performance.

The absence of a significant relationship may be explained by a knowledge–skills gap, in which learners demonstrate awareness of 21st-century competencies but have limited ability to apply these skills in complex, context-based problem-solving situations. Consistent with global frameworks such as the Programme for International Student Assessment (PISA), effective problem-solving requires not only general competencies but also the integration and application of knowledge in authentic contexts.

The study suggests that developing 21st-century skills alone may not be sufficient to enhance problem-solving ability. Instructional approaches should therefore emphasize guided practice, contextualized learning, and opportunities for learners to apply skills in real-world problem scenarios.

Keywords: 21st-century skills, critical thinking, problem-solving ability, Grade 6 learners, descriptive-correlational research

INTRODUCTION

Education systems are highly focused on developing 21st-century skills such as critical thinking, communication, collaboration, creativity, and problem-solving. These competencies are deemed necessary to equip learners to play a role in a fast-changing, knowledge-based society. Schools are supposed to be more than mere memorization; they should offer learning experiences that motivate learners to process and articulate information, collaborate, and develop creative solutions to real-world problems.

The Department of Education in the Philippines supports this objective by emphasizing the four Cs as per DepEd Order No. 21, s. 2019, which underlines the necessity to incorporate the four Cs in all subject areas of the K to 12 Basic Education Program. These competencies are especially useful for enhancing learners’ problem-solving capacity, as they enable them to assess scenarios, think in multiple ways, and apply knowledge to real-world problems (Varona, 2020). By actively engaging in critical thinking, communication, teamwork, and creative activities, learners feel confident, independent, and able to solve real-life difficulties as they continue to develop

both academically and personally (Ekizer & Yildirim, 2023). The Four Cs were also identified as one of the most essential competencies that modern learners need to succeed in their education and in society (Kalyani, 2024).

Despite these learning objectives, many learners remain unable to acquire the necessary 21st-century skills. Although these competencies are well spelled out in the curriculum, there has been a disparity between the intended learning outcomes and classroom practice. The lack of professional training, concise guidelines, and instructional resources usually leads to teachers having difficulty incorporating these skills into everyday lessons. In the study by Afzal et al. (2023), most teachers struggle to implement 21st-century skills in their lessons due to insufficient preparation and support. Moreover, the lack of equal access to technology among learners also limits the development of digital literacy and problem-solving skills. It is further complicated by the lack of uniform definitions and clear models for teaching and assessing those competencies, making lesson planning and classroom delivery more challenging (Afzal et al., 2023). Thus, there are still many learners who are not sufficiently competent to apply their knowledge in real-life scenarios and to be active contributors in resolving community-related issues (Madhu & Bhattacharyya, 2023).

Even though past researchers emphasize the significance of 21st-century skills in enhancing learners' problem-solving capacity, there is a paucity of research studies that are empirical in nature and look at the nature of how these skills are specifically implemented and practiced in social studies at the elementary level. The majority of existing literature addresses 21st-century skills within a general or cross-curricular approach, and little focus is paid to the role of Social Studies, a subject closely related to everyday life and community concerns, in developing learners' problem-solving abilities. Moreover, there is an absence of localized research on public elementary schools, especially at the rural or district level, that examines how teachers implement these skills and how learners actually apply them in classroom settings. The gap is significant to consider how the skills of the 21st century could be successfully incorporated into the teaching of Social Studies to enhance the problem-solving skills of Grade 6 students. Thus, the purpose of this study is to analyze how the 21st-century skills can be integrated into Social Studies and how this would affect the problem-solving capacity of Grade 6 learners.

This research is anchored in two theories that demonstrate how learners can gain knowledge and develop the skills necessary to solve problems in the 21st century. Namely, the Constructivist Learning Theory of Jean Piaget (1972) and Lev Vygotsky (1978), as well as the Social Learning Theory of Albert Bandura (1977). These theories offer a basis in the way learning skills in the 21st century affect problem-solving in the minds of the learners.

Figure 1 shows the impact of 21st-century learning skills, a set of competencies crucial to enabling learners to succeed in a fast-changing, global world. Thornhill-Miller et al. (2023) identify critical thinking, communication, collaboration, and creativity as these elements assist learners in analyzing information, communicating effectively, collaborating efficiently, and developing innovative solutions. Skills play a significant role in equipping learners to adapt to emerging challenges and opportunities in education and life.

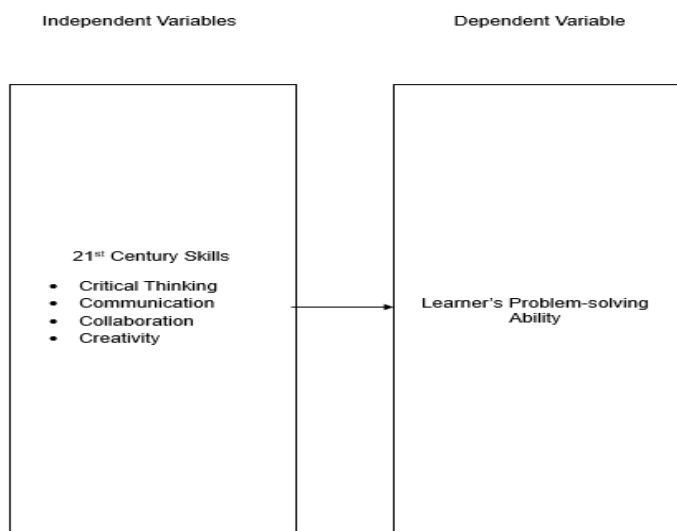


Figure 1. Schematic Diagram showing the Relationship of the Independent and Dependent Variables of the Study

This study aims to examine the relationship between the cooperative learning method and the development of metacognitive skills among Grade 6 learners in San Fernando District II, Division of Bukidnon, for the School Year 2025-2026.

This study aimed to determine the influence of 21st-century skills on problem-solving ability among Grade 6 learners in San Fernando District II, Division of Bukidnon, school year 2025-2026.

Specifically, this study sought to answer the following questions:

1. What is the level of 21st-century skills among Grade 6 learners in terms of critical thinking, communication, collaboration, and creativity?
2. What is the level of problem-solving ability among Grade 6 learners?
3. Is there a significant relationship between 21st-century skills and solving ability among Grade 6 learners?

Hypothesis of the Study

The hypothesis was tested at a 0.05 level of significance.

Ho. There is no significant relationship existing between 21st-century skills and problem-solving ability among Grade 6 learners.

Delimitation of the Study

This research aimed at determining the relationship of 21st-century skills with problem-solving skills among Grade 6 students in the San Fernando District II, Division of Bukidnon, the school year 2025-2026. It addresses the four primary 21st-century skills: critical thinking, communication, collaboration and creativity. In particular, it is designed to determine the level of these skills in learners, their problem-solving capability, and the correlation between the two. The research is restricted to Grade 6 students of selected elementary schools in San Fernando District II. Others in terms of grade levels, subjects, and district are not covered. The data will be collected using modified questionnaires.

METHODS

This chapter presents the research methodology used in the study. It includes the research design, research locale, study respondents, sampling procedure, research instrument, data-gathering procedure, scoring procedure, statistical treatment of data, and ethical considerations.

Research Design

This study employed a descriptive–correlational research design. This design is appropriate for studies that aim to describe variables and determine the relationship between them without manipulating the research environment (Creswell & Creswell, 2018).

In this study, a survey questionnaire was used to collect data regarding the 21st-century skills and problem-solving abilities of Grade 6 learners. Descriptive statistics were used to determine the level of learners' 21st-century skills in terms of critical thinking, communication, collaboration, and creativity, as well as their problem-solving ability.

Furthermore, Pearson Product–Moment Correlation Coefficient was used to determine whether a significant relationship exists between learners' 21st-century skills and their problem-solving ability. In addition, multiple regression analysis was employed to identify which components of 21st-century skills significantly predict or influence learners' problem-solving ability. This approach allowed the researcher to gain a deeper understanding of the strength and direction of the relationship between the variables.

Research Locale

The study was conducted in San Fernando II District, which is under the Schools Division of Bukidnon, Department of Education (DepEd), Philippines. The district is located in the municipality of San Fernando, Bukidnon, which was created as a municipality through Executive Order No. 347 on July 29, 1959, and was later officially established under Republic Act No. 4789 on June 18, 1966.

San Fernando II District includes several public elementary schools situated in different barangays within the municipality. Most learners in these schools come from rural and upland communities, where agriculture is the primary source of livelihood. Due to the geographical characteristics of the district, some schools experience challenges related to accessibility, availability of instructional materials, and classroom resources.

The schools included in the study provide Kindergarten to Grade 6 education and implement the K–12 Basic Education Curriculum mandated by the Department of Education. These schools are staffed by licensed professional teachers and managed by duly appointed school heads. Despite limitations in instructional materials and facilities, the schools continue to implement various instructional strategies and educational interventions to improve learners’ academic performance.

San Fernando II District was selected as the research locale because it represents a typical rural public school setting in Bukidnon, providing an appropriate context for examining the relationship between 21st-century skills and learners’ problem-solving abilities.

Respondents of the Study

The respondents of this study were Grade 6 learners enrolled in San Fernando II District during the School Year 2025–2026. These learners are typically between 11 and 12 years old and are in a critical stage of their education as they prepare for secondary schooling.

At this level, learners are expected to demonstrate fundamental 21st-century competencies, including critical thinking, communication, collaboration, and creativity, which are essential components of effective problem-solving. Grade 6 learners were selected as respondents because they possess the cognitive and social maturity necessary to apply these skills in academic tasks and real-life learning situations.

A total of 356 Grade 6 learners from the participating schools were included in the study.

Table 1. Distribution of Respondents by School

School	Population	Sample
Kalagangan Central Elementary School	65	65
Bugca Elementary School	32	32
Matupe Integrated School	41	41
Mahayag Elementary School	36	36
Cayaga Elementary School	33	33
Iglugsad Elementary School	37	37
Palacpacan Elementary School	41	41
Kibongkog Integrated School	34	34

Panayaban Elementary School	37	37
Total	356	356

Sampling Procedure

This study utilized total enumeration sampling, wherein all Grade 6 learners in the selected schools of San Fernando II District were included as respondents.

Total enumeration sampling was employed because the population size was manageable and allowed the researcher to include the entire group of learners in the study. By involving the full population of 356 Grade 6 learners, the study ensured a comprehensive representation of learners' 21st-century skills and problem-solving abilities across the district.

This approach helped increase the accuracy and reliability of the findings by minimizing sampling bias and capturing the diversity of learners' skills and abilities within the district.

Research Instrument

The primary instrument used in this study was a structured questionnaire consisting of two parts.

Part I measured learners' 21st-century skills, adapted from the standardized instrument developed by Varona (2020). This section assessed four key competencies:

- Critical Thinking
- Communication
- Collaboration
- Creativity

Part II measured learners' problem-solving ability, using an instrument developed by Ventura-Leon et al. (2025).

The questionnaire consisted of closed-ended statements rated on a five-point Likert scale, enabling the researcher to measure learners' skills and abilities in a structured, quantifiable manner.

Validity and Reliability of the Instrument

The research instruments underwent validation and reliability testing prior to data collection. Content validity was established through expert review to ensure that the items were clear, relevant, and aligned with the constructs of 21st-century skills and problem-solving ability.

To determine internal consistency, a pilot test was conducted among 30 Grade 6 learners who were not included in the final sample. The reliability of the 21st-century skills questionnaire yielded a **Cronbach's alpha coefficient of 0.91**, while the problem-solving instrument obtained a coefficient of **0.88**, indicating high reliability. These values suggest that the instruments were consistent and appropriate for measuring the variables among the target group.

Data Gathering Procedure

Prior to data collection, the researcher secured formal permission from the Schools Division Superintendent, District Supervisor, and the school heads of the participating schools in San Fernando II District.

After approval was granted, the researcher coordinated with the school heads and Grade 6 advisers to schedule the administration of the questionnaires. The study's purpose and procedures were explained to both teachers and learners to ensure a clear understanding of the research process.

The questionnaires were administered to the Grade 6 learners with the assistance of their class advisers. Clear instructions were provided to ensure that the respondents understood how to answer each item. Adequate time was given for learners to complete the questionnaire.

After completion, the questionnaires were collected and checked for completeness. The responses were then coded, tabulated, and organized for statistical analysis.

Scoring Procedure

The questionnaire used a five-point Likert scale to assess learners' responses.

A. 21st-Century Skills

Scale	Range	Descriptive Rating	Interpretation
5	4.20 – 5.00	Always	Very High
4	3.40 – 4.19	Often	High
3	2.60 – 3.39	Sometimes	Moderate
2	1.80 – 2.59	Rarely	Low
1	1.00 – 1.79	Never	Very Low

B. Problem-Solving Ability

Scale	Range	Descriptive Rating	Interpretation
5	4.20 – 5.00	Always	Excellent
4	3.40 – 4.19	Often	Very Good
3	2.60 – 3.39	Sometimes	Good
2	1.80 – 2.59	Rarely	Fair
1	1.00 – 1.79	Never	Poor

Statistical Treatment of Data

The data gathered from the respondents were analyzed using both descriptive and inferential statistical techniques.

To determine the level of 21st-century skills and problem-solving ability, the following descriptive statistics were used:

- Mean
- Standard Deviation

To determine the relationship between 21st-century skills and problem-solving ability, the Pearson Product–Moment Correlation Coefficient (r) was applied.

Furthermore, multiple regression analysis was conducted to identify which of the four components of 21st-century skills (critical thinking, communication, collaboration, and creativity) significantly predict learners’ problem-solving ability.

These statistical tools allowed the researcher to determine the level, relationship, and predictive influence of the variables examined in the study.

Ethical Considerations

Ethical principles were strictly observed throughout the study. Permission to conduct the research was obtained from the Schools Division Office of Bukidnon, the district supervisor, and the school heads of the participating schools.

Participation in the study was voluntary. The respondents were informed about the purpose, procedures, and benefits of the research before participating. Since the respondents were minors, parental consent and learner assent were secured prior to data collection.

Confidentiality and anonymity were ensured by not collecting any personal identifiers from the respondents. All data collected was securely stored and used strictly for academic and research purposes.

The study adhered to ethical standards in educational research to protect the rights, dignity, and welfare of all participants.

RESULTS AND DISCUSSION

This chapter presents the results of the study through a systematic analysis and interpretation of the data gathered from the Grade 6 learners. The results are organized according to the research problems of the study. Statistical tools such as the mean, standard deviation, and Pearson Product–Moment Correlation Coefficient were used to analyze the data and determine the level of 21st-century skills, the level of problem-solving ability, and the relationship between these variables.

Level of 21st-Century Skills among Grade 6 Learners

Table 2. Level of 21st-Century Skills among Grade 6 Learners

Variable	Mean	SD	Interpretation
Critical Thinking	3.29	0.705	Moderate
Communication	3.30	0.637	Moderate
Collaboration	3.43	0.682	High
Creativity	3.54	0.974	High
Overall Mean	3.39	0.750	Moderate

Table 2 presents the overall level of 21st-century skills among Grade 6 learners in terms of critical thinking, communication, collaboration, and creativity. The results show an overall mean of 3.39 ($SD = 0.750$) interpreted as Moderate. This indicates that learners sometimes demonstrate the competencies associated with 21st-century learning but still require further development and opportunities to strengthen these skills.

Among the four skill dimensions, creativity obtained the highest mean ($M = 3.54$) followed by collaboration ($M = 3.43$), both interpreted as High. This suggests that learners are relatively capable of generating ideas, exploring different perspectives, and engaging in group activities. On the other hand, communication ($M = 3.30$) and critical thinking ($M = 3.29$) were interpreted as Moderate, indicating that learners may still encounter challenges in expressing ideas clearly, analyzing information independently, and applying reasoning skills in various situations.

The results imply that while learners demonstrate emerging competencies associated with 21st-century education, they still require ongoing exposure to instructional strategies that promote higher-order thinking, communication, and collaborative problem-solving.

These findings support the Constructivist Learning Theory of Piaget (1972) and Vygotsky (1978), which states that knowledge and skills develop through active engagement, exploration, and interaction with others. Learners gradually build their understanding through meaningful learning experiences and social interactions in the classroom. Through these experiences, learners progressively develop cognitive abilities such as reasoning, communication, and collaboration.

Furthermore, the findings are consistent with Bandura’s Social Learning Theory (1977), which explains that learners acquire skills through observation, modeling, and interaction with others. In classroom settings, learners develop communication and collaboration skills by observing teachers and peers, participating in group discussions, and engaging in cooperative learning activities.

Overall, the moderate level of 21st-century skills suggests that Grade 6 learners possess foundational competencies in critical thinking, communication, collaboration, and creativity. However, these skills still require continuous development through learning activities that encourage inquiry, reflection, and real-world problem solving.

Level of Problem-Solving Ability among Grade 6 Learners

Table 3. Level of Problem-Solving Ability among Grade 6 Learners

Variable	Mean	SD	Interpretation
Problem-Solving Ability	3.00	0.250	Good

Table 3 presents the overall level of problem-solving ability among Grade 6 learners. The findings show an overall mean of 3.00 ($SD = 0.250$) interpreted as Good, indicating that learners are sometimes able to apply problem-solving processes such as identifying problems, evaluating alternatives, and selecting possible solutions.

The results suggest that learners possess basic problem-solving skills, particularly in recognizing problems and considering possible alternatives. However, some aspects of problem solving—such as evaluating results, analyzing unsuccessful solutions, and considering the broader impact of decisions—received relatively lower mean scores. This indicates that learners may still require guidance in reflective thinking and evaluating the consequences of their decisions.

The findings imply that Grade 6 learners have begun developing essential problem-solving skills but may still require structured guidance and practice to strengthen their analytical and decision-making abilities. These findings may also be interpreted in light of global frameworks such as the Programme for International Student Assessment (PISA) 2022, which highlights that creative thinking and collaborative problem-solving involve the integration of knowledge, skills, and contextual understanding. According to PISA, learners must not only possess cognitive skills but also demonstrate the ability to transfer and apply them in novel situations. The lack of significant relationship in this study may therefore reflect limitations in learners’ ability to transfer classroom-acquired skills into authentic problem-solving contexts.

These results are supported by the Constructivist Learning Theory of Piaget (1972) and Vygotsky (1978), which emphasizes that learners develop problem-solving skills through active engagement in learning tasks and meaningful experiences. According to this theory, learners construct knowledge as they interact with problems, analyze situations, and collaborate with others to develop solutions.

Similarly, Bandura’s Social Learning Theory (1977) explains that learners develop decision-making and problem-solving skills through social interaction, observation, and modeling. When learners observe how others approach and solve problems, they gradually acquire strategies that can help them improve their own problem-solving abilities.

Overall, the results indicate that Grade 6 learners demonstrate a good level of problem-solving ability, suggesting they can address basic academic challenges. However, continuous exposure to problem-based learning activities and real-world tasks may further enhance their analytical and reflective thinking skills.

Relationship between 21st-Century Skills and Problem-Solving Ability

Table 4. Relationship between 21st-Century Skills and Problem-Solving Ability

Variable	r	p-value	Interpretation
Critical Thinking	.030	.567	Not Significant
Communication	.054	.309	Not Significant
Collaboration	.039	.461	Not Significant
Creativity	.034	.520	Not Significant
Overall	.063	.237	Not Significant

Table 4 presents the results of the correlation analysis between 21st-century skills and problem-solving ability among Grade 6 learners. The findings reveal a very weak positive correlation ($r = .063$, $p = .237$), indicating that the relationship between the variables is not statistically significant at the 0.05 level.

Among the four dimensions of 21st-century skills, communication showed the highest correlation ($r = .054$) followed by collaboration ($r = .039$), creativity ($r = .034$), and critical thinking ($r = .030$). However, all p-values were greater than 0.05, indicating that none of these relationships were statistically significant.

The results imply that although learners demonstrate moderate levels of 21st-century skills, these competencies do not necessarily translate into stronger problem-solving ability in academic contexts. This suggests that learners may possess these skills but may not consistently apply them when solving problems in classroom tasks.

These findings align with Bandura’s Social Learning Theory (1977), which explains that complex skills, such as problem-solving, develop through guided practice, modeling, and repeated interactions with others. Without structured opportunities to apply these skills in real-life problem-solving contexts, learners may struggle to transfer their knowledge and abilities into practical situations.

Similarly, the results support the Constructivist perspective of Piaget (1972) and Vygotsky (1978), which emphasizes that problem-solving skills are developed through active learning experiences, social interaction, and meaningful engagement with authentic tasks. Learners must be provided with opportunities to apply their knowledge and skills in real-world situations to strengthen their problem-solving competence.

Based on the findings, the null hypothesis stating that there is no significant relationship between 21st-century skills and problem-solving ability among Grade 6 learners is not rejected.

Overall, the results suggest that while learners demonstrate moderate levels of 21st-century competencies, these skills alone may not be sufficient to significantly influence their problem-solving ability. Additional instructional strategies, guided practice, and authentic problem-based learning activities may be necessary to help learners effectively apply these competencies in solving complex problems.

The absence of a significant relationship between 21st-century skills and problem-solving ability may be explained by a knowledge–skills gap among learners. While the results indicate that learners possess moderate to high levels of the four Cs (critical thinking, communication, collaboration, and creativity), this does not necessarily mean that they can effectively apply these competencies in complex problem-solving situations.

Learners may demonstrate theoretical understanding of these skills, for example, recognizing the importance of collaboration or identifying steps in critical thinking, but may lack the domain-specific knowledge and cognitive strategies needed to apply them in real-world or academic problem contexts. This gap between knowing and doing suggests that developing 21st-century skills alone is insufficient unless accompanied by structured opportunities for application.

This interpretation is consistent with international assessments such as the Programmed for International Student Assessment (PISA), which emphasize that problem-solving requires not only general competencies but also the ability to apply knowledge in unfamiliar and complex situations. Learners must engage in authentic, context-based tasks that require them to integrate knowledge, think critically, and evaluate outcomes.

Thus, the findings suggest that instructional practices should move beyond skill awareness and focus on guided application, in which learners actively use these competencies to solve meaningful problems.

CONCLUSION

Based on the results and discussions presented, the following conclusions are drawn:

The research concludes that Grade 6 students have moderate to high scores on 21st-century skills; collaboration and creativity are the most developed areas, with critical thinking and communication at a developing stage. This implies that the learners can usually work in teams and share creative thoughts when undertaking learning tasks. However, their capacity to think independently, critically analyze ideas, and communicate effectively in different situations needs more improvement. A stronger focus on these areas through organized, learner-based learning activities could contribute to a more balanced development of 21st-century competencies.

The results also reveal that learners' problem-solving capacity is generally good. The learners can recognize problems, propose possible solutions, and compare alternatives at a basic level. Yet other, more sophisticated features of problem solving, including reflective analysis of results, consideration of the effects of choices, and review of the effects of solutions on others, are not as well developed. This means that although learners can be logical in solving problems, they might still require additional practice to think reflectively and to analyse the problem-solving process more thoroughly.

Lastly, the findings indicate that 21st-century skills are not significantly associated with learners' problem-solving ability. Although weak positive relationships were observed, these were not statistically significant. This suggests that possessing 21st-century skills does not automatically translate into effective problem-solving performance. Instead, learners may require structured guidance, contextual learning experiences, and opportunities to apply these skills in authentic situations. Therefore, the null hypothesis is accepted.

Future research is recommended to incorporate qualitative approaches, such as think-aloud protocols, interviews, or focus group discussions, to better understand learners' cognitive processes during problem-solving tasks. These methods can provide deeper insights into how learners apply, or fail to apply, 21st-century skills in real situations, which may not be fully captured through quantitative measures alone.

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