

# Computational Thinking in Developing Students' Reading Comprehension Skill

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**Abstract**— Understanding and interpreting text is a crucial component of reading comprehension. This process might be hampered by several problems, which affect students' capacity to understand meaning. However, there are several strategies that can be applied regarding this issue. The first is using appropriate reading techniques, especially computational thinking. And the second is using visual aid. Students' understanding can be improved by using visual aids like graphic organizers or pictures to help them visualize ideas and relationships in the text. The purpose of this study was to produce a story mapping card as a visual aid that can help students understand English texts better. The development was carried out through the method of formulating problems, collecting data, designing products, validating designs, revising designs, conducting trials, drawing conclusions. The results of the study showed that the story mapping card was valid and ready to use. The results of the assessment of the story mapping card were an average of 4.5 with a very good category, the indicator of the benefits of the story mapping card for students got a total average value of 4.5 with a very good category and the indicator of ease of use of the story mapping card in the reading stage for teachers with a total average value of 4.4 with a very good category.

**Keywords**— Computational Thinking, Story Mapping, Crads, Reading Comprehension Skill

## I. INTRODUCTION

Indonesian students have low reading comprehension skills. The PISA study shows that Indonesia is ranked 60th out of 72 countries (Nugrahanto & Zuchdi, 2019). The urgency of low interest and literacy skills of students lead to regulation number 23 of 2015 which requires students to read 15 minutes before learning begins (Sari, 2018). The 2013 curriculum even states that students must read at least 4 literary or non-literary books in one year. The movement to encourage literacy is not limited to activities in schools but also in society through the

National Literacy Movement (GNLB) (Nugrahanto & Zuchdi, 2019).

Improving students' reading ability in Bahasa Indonesia language texts is not easy, but understanding English language texts for students is much more challenging, especially in elementary school. Elementary school students have weaknesses in understanding English language texts (Amalia & Arditiya, 2021). Having good reading skills in English texts is very important because it can provide students with greater opportunities for self-development and knowledge. Therefore, it is important for students to have good reading skills in English texts (Amalia, 2023).

The application of appropriate methods, techniques, and strategies can help students understand English texts easier. Studies show that Computational Thinking and literacy have a strong relationship (Jacob et al., 2018). Computational thinking is a method that supports students to process information. It also supports 21st century skills (Nur Marifah et al., 2022).

Several previous studies have investigated the implementation of computational thinking in elementary school. However, the existing literature is limited to mathematics and computer subjects (Rodríguez-Martínez et al., 2020). Research also shows that computational thinking increases student motivation in learning (Parsazadeh et al., 2021). Other studies also involve Computational thinking in constructing stories so that students can build and structure ideas in solving problems (Jacob et al., 2018).

There are limited studies discuss the implementation of computational thinking in English learning practically (Parsazadeh et al., 2021). Research demonstrated that although CT can improve language acquisition by encouraging problem-solving abilities, students' practical application of CT techniques is still low (Rottenhofer et al., 2022). This implies that same patterns can be present in Indonesia, where teachers might find it difficult to successfully apply CT because of a lack of resources or training.

Therefore, through this study, the author fills the research gap on the topic of computational thinking. The author elaborates on the investigation of the application of computational thinking in English learning, especially in the field of reading comprehension of English texts using learning media, namely story mapping.

Based on the results of the initial study through observation and questionnaires at SDN 012 Palaran, the author found that students' English text reading comprehension skills were weak with the average score in reading comprehension test of 57. Through the focus group discussion, the teacher said that the teacher had tried several previous methods but there were no significant results. The teacher also said that students needed learning media as a companion to activities in the learning process. Thus, based on this background, the author developed a reading media in the form of a Mapping card as a strategy in reading activities. The Mapping card developed were based on the computational thinking method using local wisdom literacy, the Mahakam River. The novelty of this research lies in the development of the Mapping card media using the computational thinking method with the aim of producing media that can help students improve their English text reading comprehension skills.

## II. LITERATURE REVIEW

### A. Reading

Having good reading comprehension skills in English texts is very important in facing competition in the 21st century since English is an international language that is widely used in the development of science and technology (Amalia, 2023). Studies show that students have weaknesses in reading comprehension skills (Anisa et al., 2021; Sawyer & Hunter, 2021). The use of appropriate learning approaches and media can improve students' reading comprehension skills (Djaga et al., 2020; Wahyuningsih, 2021). Some theories used in this research are as follows.

### B. Computational Thinking (CT)

Computational thinking (CT) is the process of thinking in determining problems and finding solutions. Computational thinking is an approach with computer science concepts to develop analytical skills and problem-solving skills in students, which are important for students to learn and compete in the 21st century (Parsazadeh et al., 2021). In general, computational thinking has 4 techniques, namely decomposition, where at this stage students solve complex problems into simpler parts, pattern recognition, where students look for similarities between various problems, abstraction, where students focus on important information only and ignore unimportant information, algorithms, which is the stage where students design steps to solve problems (Azizah et al., 2022).

### C. Story Mapping Card

The use of learning media is a factor that can improve and stimulate learning activities. Learning media is any

form of media that can be used by teachers in teaching and learning activities that can increase interest, motivation and stimulate learning activities, help teachers deliver learning materials effectively (Alwi & Aulia, 2023). One form of learning media that can be presented to elementary school students is a series of cards in the form of cards containing pictures, cards containing letters, or sentences. This series of cards can increase the effectiveness of student learning activities (Utami et al., 2021).

As a learning media, the card developed by the author. It has story mapping line. Story mapping is a map that shows information about place/time, character, problem, solution, result, reaction and theme. The use of story mapping in the classroom can improve students' reading comprehension and students are also enthusiastic about being involved in learning activities in the classroom (Syafii, 2021).

## III. METHODS

The author uses a type of research and development with steps that aim to validate the product being developed (Amalia, 2023). The steps in this research are formulating potential and problems, collecting data, designing products, validating designs, revising designs, conducting trials and drawing conclusions. The explanation of the stages is as follows:

### A. The Author Formulates Potential and Problems

At the stage of formulating potential and problems, the author conducted an interview. Several questions were asked by the author to the English teacher and fourth grade students of SDN 012 Palaran. At this stage the author produced a problem formulation.

### B. The Author Collects Data

At this stage, the author conducted a literature study on nationally accredited journal articles related to the theory of computational thinking, story mapping, and reading comprehension.

### C. The Author Carries Out Story Mapping Design

The author compiled a mapping card. This mapping card was based on the implementation of computational thinking in reading English texts, especially using local wisdom literacy, the maritime area of the Mahakam River. The results obtained from this stage were the mapping card design.

### D. The Author Conducts Design Validation and Results Analysis

The author validated the mapping card that had been prepared through a questionnaire using a 5-point Likert scale response. The questionnaire used to assess the mapping card was based on several indicators and consisted of a set of statements (Amalia, 2023; Syafii, 2021). The author distributed questionnaires to grade IV elementary school teachers and English lecturers with the Furthermore, the author analyzed the data by finding the average score per item on the questionnaire statement. Then the author converted the average value based on the

assessment category as can be seen in Table 1. This stage produces the average value per item indicator along with its category.

Table 1. Assessment Categories

Average value	Category
>4.2	Very good
3.4 – 4.2	Good
2.6 – 3.4	Enough
1.8 – 2.6	Not enough
≤ 1.8	Very less

E. The Author Revises the Design

At this stage, the author revised the mapping card. The author made revisions based on low category values that required improvement. So, at this stage, the author made improvements to the mapping card that has been compiled.

F. The Author Conducts Trials and Analyze Trial Results of Story Mapping

After making improvements to the mapping card, the author conducted a trial on the mapping card by involving students of SDN 012 Palaran. This stage resulted in a trial of the mapping card product

G. The Author Draws Conclusions from The Results of Story Mapping

The final stage is to draw conclusions about the quality of the mapping card that has been developed. At this stage the author produces a ready-to-use mapping card that has been validated with the right category values.

IV. RESULTS AND DISCUSSION

In the first stage, the author explored potential and formulated problems. The author interviewed teachers and students regarding student weaknesses, especially in reading English texts. The author also explored potential in students that can be improved. At this stage, the author found a problem, it was students' weak of English reading skills. The author also made observations and found that teachers did not have varied learning media. Therefore, teachers only used student handbooks. The author also found potential in students. Students had a high interest in creativity and art. Based on this finding, the author integrated reading using learning media, namely story mapping cards, where through story mapping cards, students can be motivated to learn reading using creativity.

After finding the problems and potential, the author collected data. Data was obtained through accredited journal articles related to story mapping cards, reading comprehension and computational thinking. Furthermore, the author designed the story mapping card. This design was done through information planning that needed to be included as well as visual design planning which included story mapping layout, letters, colors and images. The story mapping card design can be seen in Figure 1 below.

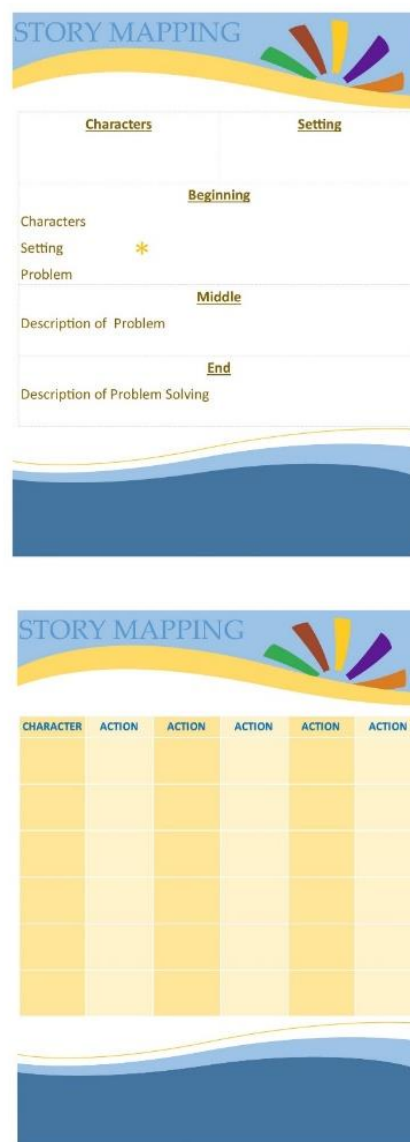


Figure. 1. Story Mapping Card

The next stage was to validate the story mapping card design and validation analysis. The author distributed questionnaires to assessors, including teachers, students and English teaching practitioners/English learning media creators. The questionnaire included three indicators, the appearance of the story mapping card, the benefits of the story mapping card for students and the ease of use of the story mapping card in the reading stage for teachers. The assessors responded to each statement using a 5-point Likert scale of strongly disagree (1 point), disagree (2 point), neutral (3 point), agree (4 point) and strongly agree (5 point). Based on the questionnaire, the author obtained an average value for each sub-indicator as can be seen in Table 2.

Based on Table 2, it can be concluded that the story mapping display indicator has an average value of 4.5 with a very good category. Meanwhile, the indicator of the benefits of story mapping cards for students shows that the average value is 4.5 with a very good category.

Furthermore, the indicator of ease of use of story mapping cards in the reading stage for teachers shows that the average value is 4.4 with a very good indicator.

Table 2. Results of The Assessment of The Story Mapping Card Sub-Indicators

Indicator	Sub Indicator	Average & Category	
Story mapping card view	Attractive display design layout	4.4	Very good
	Easy to read writing	4.6	Very good
	Interesting picture	4.4	Very good
	Average indicator 1	4.5	Very good
Benefits of story mapping cards for students	Reading stories using story mapping cards makes it easier to understand the story text	4.4	Very good
	Reading stories using story mapping cards is fun	4.7	Very good
	Reading stories using story mapping cards trains problem solving skills.	4.2	Good
	Reading stories using story mapping cards improves reading skills.	4.4	Very good
	Reading stories using story mapping cards increases knowledge and vocabulary	4.6	Very good
	Average indicator 2	4.5	Very good
	Ease of use of story mapping cards in the reading stages for teachers	Pre-reading	4.1
Students use story mapping cards to obtain initial information related to the story they will read.			
Students use story mapping cards to provide responses to teacher questions related to the story that will be read by answering the teacher's questions or raising their hands.		4.7	Very good
<i>Whilst reading</i>			
Students respond to teacher instructions by completing story mapping cards.		4.2	Good
Students are able to retell the details of the story they have read with the help of information they have written on the story mapping card.		4.2	Good
Students are able to increase their English vocabulary with the help of vocabulary that they have written on story mapping cards.		4.2	Good
Students are able to have discussions with their groups with the help of story mapping cards.		4.4	Very good
Students are able to retell or present with the help of story mapping cards that they have completed.		4.6	Very good
Post reading			
Students are able to solve problems/questions using the story mapping cards that they have completed.		4.3	Very good
Students are able to tell the problem using the story mapping cards that they have completed.		4.6	Very good
Average of indicator 3		4.4	Very good

The results of the analysis also show the general value of the story mapping card from the assessors which can be categorized into three, namely students, teachers and English teaching practitioners/creators of English learning media as can be seen in Table 3.

Table 3. General analysis results based on assessor classification

Assessor	Average	Category
Student	4.4	Very good
Teacher	4.5	Very good
English teaching practitioner/ English learning media creator	4.3	Very good

Based on the results of the analysis, the author can conclude that in the category of Ease of Use of story mapping cards in the reading stage for teachers with sub-indicators that students utilize story mapping cards to obtain initial information related to the story to be read, the average value still needs to be improved with an average value of 4.1. Thus, the author made a revision.

Based on the assessor's notes, the assessor gave feedback that the story mapping card did not provide information for the pre-reading stage, students did not have initial information about the story text to be discussed. This information is needed to carry out pre-reading activities, for instance teachers and students ask and answer questions related to the text before reading. At this stage, the author revised the design that was developed as in Figure 2. In this revision, the author added information about the title of the story book and the author of the story book. Through this revision teachers and students can carry out pre-reading activities actively and enjoyably.

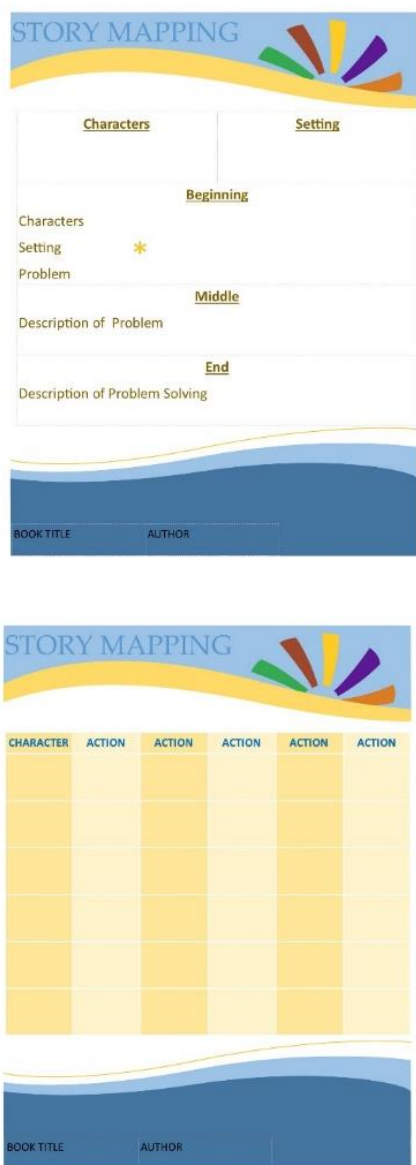


Figure 2 Revised Story Mapping Card

The next stage is to conduct a product trial. The author conducted an activity of reading English texts based on Local Wisdom Literacy, Mahakam River Maritime Region using Story Mapping Cards. This activity includes pre-reading, whilst-reading and post-reading. To evaluate the Story Mapping Card that has been developed, the author gave students questions that measure reading comprehension of English texts used in reading activities. The value of students' reading comprehension has increased from an average of 50 to an average of 70, as can be seen in the following Table 4.

Table 4. Students' reading comprehension scores before and after using story mapping cards.

No	Student	Reading comprehension scores before using story mapping cards	Reading comprehension scores before using story mapping cards
1	Student1	40	70
2	Student2	50	80
3	Student3	60	80
4	Student4	50	70
5	Student5	40	70
6	Student6	60	80
7	Student7	60	70
8	Student8	40	60
9	Student9	50	70
Average		50	72

Based on these values, it can be concluded that students can improve their reading comprehension using story mapping cards. Story mapping is a visual technique that arranges a story's characters, places, and events to aid students in understanding narrative texts. It entails producing a visual depiction that delineates a narrative's framework, facilitating comprehension of its historical progression and essential elements. According to research, learners' reading comprehension abilities can be considerably enhanced by employing story mapping approaches. research has shown that students who utilize it perform better than their counterparts who do not (Syafii, 2021). In line with this study, research also reveal that computational thinking and storytelling can be used to create a rich learning environment (Parsazadeh et al., 2021).

The next stage is drawing conclusions. Based on the validation analysis carried out by the assessor as an expert and user and the value of student understanding, it can be concluded that story mapping cards are feasible and ready to be used in reading English texts with the aim of improving the ability to understand English texts, and students' thinking skills in solving problems.

## V. CONCLUSION

This study developed story mapping cards Using Computational Thinking and Local Wisdom Literacy, Mahakam River Maritime Area. The author developed story mapping cards with several stages, they are Author Formulates Potential and Problems, the Author Collects Data, the Author Designs Products, Validates Designs and Analyzes Validation Results. The validation results are the total average value of students 4.4 with a very good category. The total average value of teachers 4.5 with a very good category. English teaching practitioners/English learning media creators' total value 4.3 with a very good category.

The detailed assessment can be seen in three main indicators, namely the appearance of the story mapping card with a total average value of 4.5 with a very good category, the benefits of the story mapping card for students with a total average value of 4.5 with a very good category and the ease of use of the story mapping

card in the reading stage for teachers with a total average value of 4.4 with a very good category.

After conducting validation, the author conducted a design revision, conducted a trial and analysis of the results of the story mapping card trial and drew conclusions from the story mapping card results. So it can be concluded that based on the assessment of students, teachers and English teaching practitioners/English learning media creators, the story mapping card is generally good and ready to use.

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