

PRACTICING COLLABORATIVE STRATEGIC READING OF INDONESIAN EFL STUDENTS: A PRELIMINARY FIELD TESTING

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ABSTRACT

Teaching reading in 21st-century learning requires EFL teachers to be concerned with what students should do to understand the reading material successfully since reading skill is the gateway to accessing knowledge. On the other hand, many multifaceted issues showed students had difficulty reading EFL texts. Indeed, foreign languages cannot be understood easily when students do not have appropriate strategies to help them in an academic setting. In this way, students need a strategy relevant to their learning needs revealed in the pilot study, where students felt alone in understanding texts. This quantitative study aimed to reveal the effectiveness of Collaborative Strategic Reading (CSR) in students' reading proficiency. The researcher involved 36 students from one school in Yogyakarta Province. The pretest and posttest became the method for collecting students' information, then were analyzed using paired samples test statistically. The findings showed that CSR covering four comprehension strategies (Preview, Click and Clunk, Get the Gist, and Wrap-up) was effective because the pretest and posttest scores indicated that using CSR as a reading strategy significantly improved students' reading proficiency in collaborative nuance. As reading treatment in this study, the use of CSR affected students' motivation to read the texts. EFL teachers are highly recommended to adopt this strategy for their pedagogy needs in reading classrooms.

Keywords: reading proficiency, collaborative reading, collaborative strategic reading

1. INTRODUCTION

Teaching reading comprehension in this modern era requires EFL teachers to direct and help their students to be lifelong learning readers who understand that the reading context belongs to one of the most important ways of knowledge production and social development basis (Kula & Budak, 2020). In this context, reading should be categorized as a skill requiring severe treatment in EFL classrooms. Therefore, many reading issues were studied by researchers covering central skills in promoting students' literacy, competence, and academic achievement (Hamiddin & Saukah, 2020). Indeed, the results make the language practitioners and English teachers reflect all the demands that challenge students with their second language. This condition affects students' L2 reading proficiency (Kuperman et al., 2023; Limeranto & Subekti, 2021), where *L2 knowledge* becomes an important term for the individual mastery of L2 component skills.

In line with that, the teaching and learning process should allow students to achieve critical thinking, communication, collaboration, and creativity (Fadel, 2008). So, the transformation of pedagogy will affect teachers' professional development to apply essential skills, which is an intellectual process activity carried out actively to conceptualize, apply, analyze, synthesize, and evaluate information obtained to make students critical thinkers to practice collaborative communication and authentic problem-solving (Naidoo, 2021; Namaziandost et al., 2022; Sari & Prasetyo; 2021). The preliminary study through classroom observation conducted by the researcher showed today's teaching of reading still uses the old-fashioned strategy that has been going on for a long time. The teacher provided English text and instructed students to read it individually. After that, they were asked to do a task related to answering the comprehension questions.

Moreover, this old strategy does not strongly impact students' understanding and mastery of reading material. Students were confused and found understanding each sentence or word challenging without the teacher's feedback. Furthermore, it will lead them to boredom, a negative emotion that will negatively affect their success in the reading classroom (Irianto, 2021; Shehzad et al., 2020). In line with that, those problematic learning situations may influence the students' success, especially the struggling readers who often feel alone in practicing reading English texts. Meanwhile, the debates among educators and stakeholders about best practices in reading instructional models become significant in fulfilling the EFL students' or classroom needs.

So, the researcher believes that students need something new, challenging, and helpful in reading collaboratively as collaboration may enable students to work together

and engage in mutual correction, feedback, and praise. In this case, the teachers must become good resourceful, and creative figures to break this monotony strategy into a meaningful one since the best techniques in teaching will improve students' engagement which is essential to help them become strong readers (Isaqjon, 2022). Then, collaboration becomes an alternative to the myriad obstacles EFL students face, especially in reading classrooms. In this study, the reseracher applied collaborative strategic reading (CSR), in which students will do reading activities collaboratively. As Klingner & Vaughn (1988) stated, improving reading comprehension, conceptual learning, and student involvement in the classrooms becomes the urgency of CSR.

One of the reasons that CSR is considered appropriate for collaborative reading is that several phases can be used as guidelines for students in carrying out activities. The students will practice CSR's four comprehension strategies (before, during, and after reading), namely (1) Preview, (2) Click and Clunk, (3) Get the gist, and (4) Wrap up (Klingner & Vaughn, 1988; Vaughn et al., 2011). The clear syntax of the CSR procedure can be seen in Table 1.

	Strategy	Description			
Before Reading	Preview	Students activate <i>prior knowledge</i> and predict what they will learn from the text.			
During Reading	Click and Clunk	Students monitor their vocabulary comprehension as they read, applying fix-up strategies to infer the meaning of unknown words by their context.			
	Get the Gist	Students identify the most <i>important information</i> contained within each section of the text.			
After Reading	Wrap up	Students <i>generate questions</i> and <i>answers</i> based on the information in the passage they read.			

Table 1. Collaborative Strategic Reading (Klingner & Vaughn, 1988)

The researcher believes that CSR is appropriate and relevant to be involved as the component of the reading scenario.

2. METHODS

The researcher applied a quantitative approach by presenting numerical data and analysis (Creswell & Clark, 2018). The numerical data were the pretest and posttest scores during the quasi-experimental with one group pretest-posttest design that was not involved the control group (Fraenkel & Wallen, 2022; Gay et al., 2012) to investigate the effects of CSR on the students' reading skills. In the study, one group, the experimental group, received treatment using CSR. The researcher participated in this study by participating 36 EFL students (Male= 19 and Female= 17) from a senior high school in Yogyakarta, Indonesia. They were the eleventh grader of the Science program who were mapped to learn Explanation text in the even semester. Before conducting the study, the researcher distributed consent letters to the participants and invited them to cooperate, and all participants agreed to participate in this study without coercion.

Procedure

The research lasted three weeks in March 2023 in the academic year 2022/2023. Table 2 shows the schedule of the one-group pretest-posttest design held by the researcher.

Pretest	PBRI Model		Postest
	Implementation		
Х	0		Х
March 13, 2023	March 20	0, 2023	March 27, 2023

Table 2. The schedule of the one-group pretest-posttest design

Based on the timeline in Table 2, the first agenda was a pretest, then CSR implementation as the treatment, and finally, a posttest. In this case, the researcher did not teach the students. The English teacher at that school played her role in teaching students using CSR. Thus, the researcher fully observed and monitored all research activities, covering teacher and students' interaction, students and students' interaction, how the teacher teaches Explanation text using CSR, and how students used collaborative reading.

Data Collection Technique

As articulated earlier, this quasi-experimental study used pretest-posttest to collect the quantitative data. The pretest and posttest were designed in essay reading comprehension questions related to Explanation texts. Each pretest and posttest covered five question items (see Appendix A and B). Tests were used to collect the research data about learning results to measure individuals' abilities through the question (Widoyoko, 2012). Additionally, as written exercises that measure students' learning outcomes (Gay et al., 2012), the questions for the pretest-posttest must be validated before being tested on the students.

Data Analysis Technique

The pretest-posttest scores as the quantitative data were analyzed using SPSS version 25. The researcher did some actions to analyze the data. Firstly, the researcher did a normality test to assess the assumption that the data was drawn from a normally distributed population. If it was fulfilled, she continued to do homogeneity tests to conclude whether two populations have the same distribution. The variable could be considered normal and homogeneous only if the Sig. value was more significant than 0.05 (Asrial et al., 2022). After that, if the data were proven normal and homogeneous, the paired samples test could be held to reveal the effectiveness of the CSR for reading proficiency. If the Sig. 2-tailed value in the paired samples test output was less than 0.05 (p < 0.05), so the null hypothesis (H0) was rejected.

3. RESULTS AND DISCUSSION

This section provides the findings of the research question, "*Is there a significant difference between the mean scores of the pretest and the posttest in reading performance obtained by the students using the CSR?*" Therefore, the researcher formulated two hypotheses called H0 and Ha for interpreting the effectiveness using a paired-sample test.

H0 said, "There was no significant difference between the mean scores of the pretest and the posttest in reading performance obtained by the students using the CSR."

Ha said, "There was a significant difference between the mean scores of the pretest and the posttest in reading performance obtained by the students using the CSR."

The pretest and posttest scores data reached the normality and homogeneity test criteria (P > 0.05). At this point, she conducted paired samples test using SPSS version 25.

					Std.	Error
		Mean	Ν	Std. Deviation	Mean	
Pair 1	Pretest	50.89	36	12.384	2.064	
	Posttest	70.83	36	9.703	1.617	

Table 3. Paired Samples Statistics

Table 3 provides the mean difference between the pretest (50.89) and the posttest (70.82) of 36 students, accompanied by the standard deviation and standard error mean values. The students' posttest score is higher than the pretest. The increase point is 19.94.

Table 4. P	Paired Sam	oles Test
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Paired Differences								
				95% C	onfidence			
				Interval	of the			
				Difference				
	Mean	Std.	Std.	Lower	Upper	t	df	Sig.
		Deviation	Error					(2-
			Mean					tailed)
Pretest-	-19.944	11.474	1.912	-23.827	-16.062	-10.429	35	.000
Posttest								

The paired samples test shows the test's calculated t-value, degrees of freedom, and p-value. The sig. 2-tailed 0.000 was less than 0.05, so the null hypothesis (H0) was rejected. The results showed *a significant difference between the mean scores of the pretest and the posttest in reading performance obtained by the students using the CSR.* In other words, the students performed better in their reading proficiency after being taught by using CSR.

Furthermore, this decision was supported by the score of the t-table. The t score was -10.429, with the degree of freedom (df) 35. The t score found in the output did not indicate the score was negative, yet the negative sign in the value -10.429 indicated the posttest mean score was higher than the pretest. For Sig. 2-tailed, the result of the t-table was 2.030. The t score was more significant than the t table (10.429 > 2.030). Thus, it could be concluded that there was a significant difference between the mean scores of the pretest and the posttest in reading obtained by the experimental group using CSR. The researcher implied that CSR effectively facilitated students in enhancing their reading performance.

Implementing collaborative reading scenarios of Explanation texts using CSR created different student learning experiences. Based on the researcher's observation during the implementation, students and teachers showed enthusiasm for learning Explanation texts using CSR. Even the teacher admitted that before this learning style was implemented, students tended to be selfish in their daily learning and ignored all tasks the teacher gave. Teachers realized that appropriate reading strategies could motivate students to familiarize themselves with L2 texts. As a predictor of reading performances, intrinsic and extrinsic motivations were much needed in a reading classroom (Kanonire et al., 2022). A study by Sutter and Campbell (2022) investigated the role of academic self-determined reading motivation that proved students' reading self-concept was the strongest predictor of reading achievement.

Conversely, when students are unmotivated to read the text, they seem frustrated to continue the process, which will result in their achievement. The researcher believes those are the logical things to deal with students reading motivation. Furthermore, motivation is related to human needs, and the same students' basic psychological needs should be considered according to the self-determined theory (SDT) posited by Ryan & Deci (2017), consisting of needs for autonomy, competence, and relatedness. Besides the relevant and appropriate reading comprehension strategy used in the learning process, authentic reading materials are also needed here. The experimental study by Namaziandost et al. (2022) suggested that authentic texts significantly improved EFL learners' anxiety in the experimental group since using authentic materials enhanced students reading motivation and reading comprehension ability.

In this context, the researcher provided and thoughtfully considered the authentic Explanation texts as the main sources in the one-group pretest and posttest design. This effort was more authentic for teachers and EFL students since authentic materials direct to authentic assessments demonstrating students' reading knowledge to perform real-world tasks in their real and meaningful context (Herda et al., 2022), especially in their Science program focusing on the real phenomenon. However, reading performances in the collaborative reading covered before, during, and after reading in one treatment, students experienced the comprehension procedure: *Preview, Click and Clunk, Get the Gist,* and *Wrap-up.* When students did *preview*, they activated background knowledge and made predictions about the Explanation text. Their prior knowledge affects what is understood, remembered, or learned (McCarthy & McNamara, 2021). The help of clues such as headings and pictures allowed students to explore their prior knowledge activation.

The next strategy was *click and clunk*, where students listed the unfamiliar vocabulary in the text. The students monitored the vocabulary they did not know and then applied a fixup strategy to get the meaning of the unfamiliar words. As students still struggle to make meaning of the L2 reading material, they need to list their unknown vocabulary and try to activate their competence in making meaning through a fix-up strategy (Suhermanto, 2019). This second strategy in CSR allows students to transform themselves into autonomous learners. Mastering L2 vocabulary was an important thing for EFL students. However, Hardiyanti and Herda (2019) argued the more students master and understand the L2 vocabulary, the easier they apply it to the English context.

After the strategy deals with identifying vocabulary, students identify the text's main idea as one of the highest-impact instructional practices that teachers can apply to improve reading comprehension (Solis et al., 2021; Wilawan, 2012). They elaborate on them in the *get the gist* phase with their language to ensure they understand better. Finding the main ideas is challenging for EFL students since the activities concern the application of various reading strategies (Grabe, 2009). The last CSR strategy is the *wrap-up*. In this stage, the students reviewed what they had learned by trying to generate questions and answers based on the material to improve their knowledge, understanding, and memory (Riyawi, 2018). All

the steps in every comprehension phase benefit students because they are trained to do the simplest action to the complex ones dealing with reading comprehension.

4. CONCLUSION

This study concludes that CSR is an effective strategy in collaborative reading classrooms. It effectively enhanced EFL students' reading skills. Additionally, it significantly affects students' reading achievement, as shown by the mean score of the pretest and posttest, supported by the paired sample t-test of the analysis result. Each phase of CSR consists of a strategy that trains students to practice critical thinking: Preview, Click and Clunk, Get the Gist, and Wrap up. Nevertheless, the absence of a control group is a limitation in this quantitative study because the one-group pretest-posttest design only involves the experimental group being given CSR treatment. The researcher recommends other researchers interested in a similar topic conduct broadened experimental research involving the control groups to achieve a better result that can affect teacher pedagogy in teaching reading skills. Besides that, the text type also can be varied, not limited to Explanation texts.

REFERENCES

- Asrial, A., Syahrial, S., Kurniawan, D. A., Alirmansyah, A., Sholeh, M., & Zulkhi, M. D. (2022). The Influence of Application of Local-wisdom-based Modules toward Peace-loving Characters of Elementary School Students. *Indonesian Journal on Learning and Advanced Education (IJOLAE)*, 4(2), 157-170. 10.23917/ijolae.v4i2.17068
- Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and Conducting Mixed Methods Research* (3rd ed.). Thousand Oaks, CA: Sage Publications Ltd.
- Fadel, C. (2008). 21st Century skills: How can you prepare students for the new Global Economy? In Partnerships for 21st century skills. Retrieved from https://www.oecd.org/site/educeri21st/40756908.pdf.
- Fraenkel, J. R., Wallen, N. E. & Yun, H. H. (2022). *How to Design and Evaluate Research in Education* (11th Ed.). NY: McGraw-Hill.
- Gay, L. R., Mills, G. E., & Airaisan, P. W. (2012). *Educational Research: Competencies for Analysis and Applications* (10th Ed.). US: Pearson.
- Grabe, W. (2009). Reading in a Second Language: Moving from Theory to Practice. New York: Cambridge University Press.
- Hamiddin, H. & Saukah, A. (2020). Investigating metacognitive knowledge in reading comprehension: The case of Indonesian undergraduate students. *Indonesian Journal of Applied Linguistics*, 9(3), 608-615. doi: 10.17509/ijal.v9i3.23211.
- Hardiyanti, R. L. P., & Herda, R. K. (2023). Teaching vocabulary using flash cards in Indonesian ESP Classroom: A one-shot case study. *JELITA: Journal of Education*,

Language Innovation, and Applied Linguistics, 2(1), 1-11. https://doi.org/10.37058/jelita.v2i1.6466

- Herda, R. K., Widyastuti, I., Castro, M. C. S. A., & Damayanto, A. (2022). Going beyond the EFL teachers' beliefs on authentic assessment: Reframing the five-dimensional approach. *Tamansiswa International Journal in Education and Science (TIJES)*, 4(1), 1–19. https://doi.org/10.30738/tijes.v4i1.13346
- Irianto, I. (2021). The Influence of Collaborative Strategy Reading (CSR) toward Students' Reading Comprehension in Narrative Text At the Ninth Grade Students of SMP Negeri 10 Kotabumi. *Griya Cendikia*, 6(2), 225-236. https://doi.org/10.47637/griyacendikia.v6i2.99
- Isaqjon, T. (2022). Strategies and techniques for improving EFL learners' reading skills. https://doi.org/10.5281/zenodo.7277769
- Kanonire, T., Lubenko, J., & Kuzmina, Y. (2022). The effects of intrinsic and extrinsic reading motivation on reading performance in elementary school. *Journal of Research in Childhood Education*, 36(1), 1-13. https://doi.org/10.1080/02568543.2020.1822961
- Klingner, J. K., et al. (2004). Collaborative Strategic Reading: "Real-World" Lessons from Classroom Teachers. *Remedial and Special Education*, 25(5), 291–302. https://doi.org/10.1177/07419325040250050301
- Klingner, Janette K., & Vaughn, S. (1988). Using Collaborative Strategic Reading. *Teaching Exceptional Children*, *30*(6), 32–37.
- Klingner, J. K., et al. (2004). Collaborative Strategic Reading: "Real-World" Lessons from Classroom Teachers. *Remedial and Special Education*, *25*(5), 291–302. https://doi.org/10.1177/07419325040250050301
- Kula, S. S., & Budak, Y. (2020). The effects of reciprocal teaching on reading comprehension, retention on learning and self-efficacy perception. *Pegem Journal of Education and Instruction*, *10*(2), 493–522. https://doi.org/10.14527/pegegog.2020.017
- Kuperman, V., Siegelman, N., Schroeder, S., Acartürk, C., Alexeeva, S., Amenta, S., & Usal, K. A. (2023). Text reading in English as a second language: Evidence from the Multilingual Eye-Movements Corpus. *Studies in Second Language Acquisition*, 45(1), 3-37. https://doi.org/10.1017/S0272263121000954
- Limeranto, J. T., & Subekti, A. S. (2021). Indonesian Theology students' foreign language reading anxiety and reading performance: A correlational study. *Studies in English Language and Education*, 8(1), 131-142. https://doi.org/10.24815/siele.v8i1.17398
- McCarthy, K. S., & McNamara, D. S. (2021). The Multidimensional Knowledge in Text Comprehension Framework. *Educational Psychologist*, 56(3), 196–214. doi:10.1080/00461520.2021.1872379
- Naidoo, J. (Ed.). (2021). *Teaching and Learning in the 21st Century: Embracing the Fourth Industrial Revolution*. Boston: Brill Sense.
- Namaziandost, E., Razmi, M. H., Ahmad Tilwani, S., & Pourhosein Gilakjani, A. (2022). The impact of authentic materials on reading comprehension, motivation, and anxiety among Iranian male EFL learners. *Reading & Writing Quarterly*, *38*(1), 1-18. https://doi.org/10.1080/10573569.2021.1892001
- Riyawi, M. R. (2018). The Effect of Applying Collaborative Strategy Reading (CSR) toward Students' Reading Comprehension at the Eighth Grade of Mts Hubbulwathan Duri. *Al-Ishlah: Jurnal Pendidikan*, *10*(1), 69-78. https://doi.org/10.35445/alishlah.v10i1.69
- Sari, D. M. M., & Prasetyo, Y. (2021). Project-Based-Learning on critical reading course to

enhance critical thinking skills. *Studies in English Language and Education, 8*(2), 442-456. https://doi.org/10.24815/siele.v8i2.18407.

- Shehzad, M. W., Ahmed, R., Razzaq, S., Akhtar, A., & Hasan, M. K. (2020). Do reading boredom and reading boredom coping strategies predict reading comprehension performance? An empirical investigation of Saudi EFL learners. *Indonesian Journal of Applied Linguistics*, *10*(2), 445-459. https://doi.org/10.17509/ijal.v10i2.28616
- Solis, M. et al. (2021). Vocabulary and Main Idea Reading Intervention Using Text Choice to Improve Content Knowledge and Reading Comprehension of Adolescents with Autism Spectrum Disorder. *Behavior Modification*, 45(1), 66–98. https://doi.org/10.1177/0145445519853781
- Suhermanto, H. (2019). The effect of fix up strategy in enhancing students reading comprehension in IAIN Curup. *ENGLISH FRANCA: Academic Journal of English Language and Education*, 3(01), 1-14.
- Sutter, C. C., & Campbell, L. O. (2022). The role of academic self-determined reading motivation, reading self-concept, home reading environment, and student reading behavior in reading achievement among American Indian and Hispanic students. *Contemporary Educational Psychology*, 70, 102093. https://doi.org/10.1016/j.cedpsych.2022.102093
- Vaughn, S., et al. (2011). Efficacy of collaborative strategic reading with middle school students. *American Educational Research Journal*, 48(4), 938–964. https://doi.org/10.3102/0002831211410305.
- Widoyoko, E. S. (2012). *Teknik Penyusunan Instrumen Penelitian*. Yogyakarta: Pustaka Pelajar.
- Wilawan, S. (2012). Fostering main idea comprehension among EFL learners through cognitive and metacognitive strategies. *International Journal of Humanities and Social Science*, *2*(14), 46-54.

Appendix 1. Pretest Instrument

A PRETEST FOR THE ELEVENTH GRADER

Read the following Explanation text, "HOW DO BEES MAKE HONEY," then answer the questions thoughtfully!

HOW DO BEES MAKE HONEY

Unlike many other bees, honeybee species don't hibernate in winter. Instead, they stay active in their hives. During the coldest months, honeybees cluster together to keep warm and survive on the sweet substance they have hoarded for weeks. That substance is honey.

Honey bees make honey to store food over winter when *do-basic-math-study-finds.html* they cannot forage and there are fewer flowers to gather food.

All of the <u>bees</u> in a hive benefit from the honey haul, but the job of honey production lies with

the female worker bees, according to biologists at <u>Arizona State</u> <u>University</u>. These forager bees fill their stomachs with nectar from flowers before returning to the hive to convert it into honey. Male honeybees, comprising about ten percent of the hive population, eat this honey before leaving the hive to mate.



https://www.thejakartapost.com/life/201 9/02/09/honeybees-smart-enough-to-

Many factors determine how much honey a single bee

colony will need to produce for a <u>winter</u> period. It depends on the climate where the bees live, how much ventilation the hive has, and the number and kind of bees in the hive. According to the <u>Italian Journal of Animal Science</u>, honey will be made by honeybees until every cell in their hive is full. You probably already know about the essential ingredient to make honey: flowers. A colony of bees can visit up to 50 million flowers daily, with as many as 60,000 bees in each colony.

Briefly, honeybees create delicious honey and help pollinate flowers to keep them alive. And while it's interesting to see how bees make honey, they can also sting if they feel threatened. If you see a honeybee or hive, observing it from a safe distance is essential.

Modified from: Harvey, A. (2022). How do bees make honey? From the hive to the pot. Live Science. https://www.livescience.com/how-do-bees-make-honey

Questions:

- 1. Why do honeybee species not hibernate in winter?
- 2. It is written in the text that *Many factors determine how much honey a single bee colony will need to produce for a <u>winter period</u> (paragraph three). What do you know about the word 'colony'?*
- 3. Write the main idea of the second paragraph!
- 4. According to the text, what do you know about male and female honeybees?
- 5. Mention the factors determining how much honey a single bee colony will need to produce for a <u>winter</u> period!

Appendix 2. Posttest Instrument

A POSTTEST FOR THE ELEVENTH GRADER

Read the following Explanation text, "WHY DO VOLCANOES ERUPT?" then answer the questions thoughtfully!

WHY DO VOLCANOES ERUPT?

Volcanic eruptions are among the most stunning phenomena in the natural world. Volcanoes are just a natural way that the Earth and other planets have of cooling off and releasing internal heat and pressure. They erupt because of density and pressure. The lower density of the magma relative to the surrounding rocks causes it to rise (like air bubbles in syrup). It will rise to the surface or a depth determined by the magma's density and the weight of the rocks above it.

As the magma rises, bubbles start to form from the gas dissolved in the magma. The gas bubbles exert tremendous pressure. This pressure helps bring the magma to the surface and forces it in the air, sometimes to heights. In other words, volcanoes erupt because of how heat moves beneath Earth's surface. Heat is conveyed from the planet's interior to its surface largely by convection, transferring heat by moving a heated fluid. In this case, the liquid is magma molten or partially molten rock formed by partially melting Earth's mantle and crust. The magma rises and erupts at the surface through volcanoes.

As the magma rises, bubbles start to form from the gas dissolved in the magma. The gas bubbles exert tremendous pressure. This pressure helps bring the magma to the surface and forces it in the air, sometimes to heights. In other words, volcanoes erupt because of how heat moves beneath Earth's surface. Heat is conveyed from the planet's interior to its surface largely by convection, transferring heat by moving a heated fluid. In this case, the liquid is magma molten or partially molten <u>rock</u> formed by partially melting Earth's mantle and crust. The magma rises and <u>erupts</u> at the surface through volcanoes.

Magma is formed when the Earth's mantle melts. Melting may happen where tectonic

plates are pulling apart or where one plate is pushed down under another. Magma is lighter than rock and rises towards the Earth's surface. As the magma rises, bubbles of gas form inside it. Runny magma erupts through openings or vents in the Earth's crust before flowing onto its surface as lava. If magma is thick, gas bubbles cannot easily escape, and pressure builds up as the magma rises.

However, volcanologists know



these processes but cannot predict a volcanic eruption yet. But they have made significant

advances in forecasting volcanic eruptions. When the pressure is too much, an explosive eruption can happen, which can be dangerous and destructive. Another way an eruption happens is when water underneath the surface interacts with hot magma and creates steam. This can build up enough pressure to cause an explosion.

Modified from https://www.bbc.co.uk/newsround/44100737

Questions:

- 1. Why can volcanoes erupt? Please explain briefly!
- 2. What makes the gas bubbles cannot easily escape?
- 3. It is written in the text that *runny magma erupts through openings or vents in the Earth's crust before flowing onto its surface as lava* (paragraph four). Why is it called **runny magma**?
- 4. What is the main idea of the first paragraph?
- 5. According to the text, what do you know about volcanologists?