Innovation in English Language Teaching for EFL Context: Students' Perceptions Toward Writing Story Activity Using Computational Thinking Process

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Abstract

This study aims to introduce computational thinking (CT) process as a strategy in writing stories. Students from South China Normal University were asked to write chapters of a narrative story using 4 steps of CT: decomposition, pattern recognition, abstraction and algorithm design. By interviewing 3 participants, the results stated that computational thinking strategy in writing story activity is a good learning strategy which helped students to be more cooperative, more aware of managing time, learning some new words, and also increase their speaking skill. The difficulties were examined and solved by all participants independently. It is believed that the findings emerging from this inquiry will inform our efforts to improve the implementation of English teaching strategy in EFL context.

Keywords: computational thinking, innovative teaching, perceptions, writing story activity

1. Introduction

Teaching writing for students in the country where English is not their native actually will give some difficulties rather than native speakers country. The first and second language that students acquire actually affect students in learning English as their foreign language. They have to be taught sometimes in their native in order to understand the meaning. Also when it comes to the 4 skills, writing, listening, reading and speaking, more research should be done on how to deliver the contents and achieve the competence. Therefore many of the teachers still enriching the suitable approaches or methods to teach their students.

When the writing activity is delivered to the students there are some issues that must be taken into considerations. Teachers should know that it is not only the matter of the language but it also must acquire students to be able to compose a story which is coherence in each paragraph. The right choice of words and the expression in writing must be delivered well for the purpose of the readers' sake. However, still many students, especially in English as a foreign country, cannot express their thoughts, opinions, and ideas well

In this 21st century, educators and many researchers implied computational thinking process into teaching and learning process in the classroom. The inventor of this strategy believed this skill is one of the basic skills that students must have. The skill to think computationally is formed as a thinking process which makes students can break through the problems into small and simple ones. Through small parts, problems or steps, It hopes they can understand the system, find out the solutions and make instructions that can be applied to the other similar problems.

Based on the benefits of computational thinking strategy, finding the students response toward this strategy is the purpose of this research. The researcher conducted this qualitative research through a help from participants in South China Normal University. They are from various major and had been asked to willingly give their response toward writing activity by using computational thinking process. This research will examine the difficulties they encounter, the advantages of computational thinking process activity especially in writing story and also their experiences during the activity. All the aspects which are analyzed are from Feldman's theory of perceptions.

Following the purposes of this research, this research has 4 questions:

1. What are the perceptions of South China Normal University students toward writing activity using computational thinking process activity that conducted in March 2017?
2. What are the factors that cause the perceptions?
3. What are the difficulties that South China Normal University students encounter in writing activity using computational thinking process activity?
4. How do South China Normal University students overcome the difficulties that they face in writing activity using computational thinking process?

2. Literature Review

2.1 Computational Thinking Process as Teaching Writing Method

The computational thinking process is a thinking process that divided by some steps. It is basically the way of

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thinking to solve the problems and be critical. The problem-solving process includes some characteristics and dispositions.

Computational Thinking involves solving problems, designing systems, and understanding human behavior, by drawing on the concepts fundamental to computer science. The vision is a fundamental skill used by everyone in the middle of the 21st century (i.e., like reading, writing, and arithmetic) (Wing, 2006).

Based on Yadav (2011) how human thinking is divided by two, first, is thought it through in our head which is called mental model and second is developed step-by-step route which is called algorithm. The algorithm model actually includes efficiency to make people think the route which has big impacts by reflectively asking what is the best way to get the there or solve the problems.

In computational thinking strategy, there are 4 elements to be learned as a whole process. Through these process, people would definitely think to break through problems into the small ones and make a fix solution which can be applied to the other similar problems. For the detail information, here are 4 elements of computational thinking (In Weinberg, 2013, Google, 2011), those are:

1. Decomposition
It is the way of thinking where people breakdowns problems, data or processes into smaller manageable parts.
2. Pattern Recognition
It is the solving problem process where the data should be observed the patterns, trends, and regularities in data.
3. Pattern Generalization or Abstraction
It is the way of thinking where people identifying the general principles to generate the problems pattern.
4. Algorithm Design
It is the way of problem-solving where people already solved the problems and try to develop the step by step some solving problems instructions for the next or same problems in the future.

Based on the steps of analyzing the problems, this research used a lesson plan that asks students to compose a narrative story in a cooperative way. This lesson plan had been downloaded from Exploring Computational Thinking website developed by the Exploring Computational Thinking team at Google. The activities actually had been adjusted for the students in South China Normal University. The learning process is divided as in the lesson plan (Appendix 1).

2.2   Students' Perception

The focus of this study is about perception. Perception is the process by which people interpret and organize sensation to produce a meaningful experience of the world (Lindsay & Norman, 1977, in Pomsuwan, 2007). Based on Feldman (2009, p.125) perception is a process by which people interpret the stimuli that are presented to them and attempt to construct the meaningful situation. Brignal (2001) stated that perception is the process by which people attach meaning to the world around them. In this research people in here are the learners and environment or stimuli that are presented is a learning strategy called computational thinking strategy. Those researchers stated that people get stimuli using their senses to have their perception which is from sight, sound, smell, taste, and touch. From those senses, people can have their interpretation of the stimuli into something meaningful based on prior knowledge and experiences (Pastorino and Doyle-Portillo, 2009). When people have those two aspects, they are likely to be able to interpret something easily. Therefore interpretation is also influenced by knowledge, experiences, hopes, and motivations (Feldman, 2009).

In this perception toward writing activity using computational thinking process, learners put their understanding by processing the information through knowledge, experiences, hopes, and motivation as the consideration. Then, they take the information condition or stimuli, transform, organize, and retrieve it by analyzing and do interpretation using prior knowledge or experiences (Feldman, 2009, see also Pomsuwan, 2007). Therefore, the outcomes will be broad and wide interpretations which are in positive and negative perceptions focus on the factors that create perceptions, the difficulties, and way to overcome it after it has been experienced

3. Methodology

This research is a qualitative research. Researchers conducted an activity by asking some volunteers to participate in the learning activities. Therefore there were 15 participants from various majors were ready to experience computational thinking strategy using writing narrative activity. They were asked to compose a narrative story using computational thinking process. We had provided the teacher a lesson plan that focuses on the composing a narrative story using CT. After that researcher randomly chose 3 students to represent their group to be interviewed right after the activity finished. The basic interview questions are based on the perceptions theory from Feldman's theory and some follow up questions. There are 4 aspects that researcher points out, knowledge, experiences, hopes, and expectations. Their perception towards the activity after the class is taken to be analyzed.

4. Result and Discussion

From the interview session, the results had been analyzed into 4 aspects which are knowledge, experiences, hopes, and expectation. In experiences, researchers pointed out some points like benefits, difficulties, solutions, a part they like or dislike. In hopes and expectations, because the results from interview session are answered in similar opinions, therefore, we combine two parts into one.

4.1 Knowledge Aspect

The first aspect is knowledge. From all the participants' answers, all of them know the computational thinking process in writing a narrative story. They said by explaining the steps in the writing process. Instead of telling the researcher the name of the 4 steps in the computational thinking process, they explained it in general explanations based on what they experienced in the teaching and learning process. It starts from elicitation, making a sentence or story points, combining story points and creating a story based on the sentences. They also mentioned the reflection activity is to solve their writing problem and developed it into instructions. From those participants' answers, we know that they understood how CT works and how it is conducted from the first step into the last one. They already acquired CT strategy in writing a narrative. Therefore we assumed that they already have they knowledge into this strategy.

4.2 Experiences

In experiences, there are many sub-parts that are analyzed to see students' perceptions which are opinion, benefits, difficulties and how to solve them, roles or part that they like and dislike.

4.2.1 Opinion

All of the participants said computational thinking process in writing activity is a good learning strategy to be implemented in the classroom. It seems the learning process went well and they experienced a good learning process.

4.2.2 Benefits

Participants through interview said they got so many benefits after doing the activity. They enjoy the writing process because they can learn from each other in the group. It helps them in choosing the correct words and composing sentences. In the beginning, students focused on composing sentences which are grammatically correct. In the process, all students accomplished the goal cooperatively. They were not only depending on their English ability in making a story but they also actively asked their group's members and also the teacher. In this situation, students could learn from group members easily without feeling anxiety.

In this writing activity using computational thinking process is also likely to be done in a group to improve their management skills and communication skill. By asking some correct words in English, together arranging the sequences of the story and other group activities, it nurtures their self-confidence to speak. It also will reduce their anxiety in the learning process as well as help them to improve their English by knowing some new words. Then, by making sure they catch the given time to finish the story, will sharpen their ability in managing time. Based on Pomsuwan (2007) who stated that when something gives the person some knowledge, more positive experiences and benefits, it is likely known that it has positive impacts for the person. Then it is definitely called as a positive perception.

4.2.3 Challenges

From three participants, two of them stated that computational thinking process is a little bit difficult worked in a group while the other one said it is challenging. Two participants argued it is difficult actually emphasizing the time and the writing process as their problems. Both of them agreed that 60 minutes to have from elicitation to the writing result was very short. They said they did not have problems in writing a sentence but when they combined 5 sentences into a story they got a problem to make a coherence story. The flow of the story should be smooth and so that that they said they need more time. When they had finished making the story coherence, it also turned out to be an unexpected story. However, the third participant said although her group did not finish the story in the writing process, she enjoyed combining one story point to the other points. She finds when her group read loudly those story points, she thought it does not make sense at all but yet the group had eager to make it match each other. Three of them found out sometimes they cannot find the appropriate words in sentences. They had to think deeply to find the correct one, that is why they need more time to do it.

4.2.4 Likes and Dislikes

All participants stated that they like the decomposition part. They like writing sentences and expected their story points connected to each other. They said it turned out hilarious when they combined those into a story line. They also like algorithm design where students and the teachers develop the instructions to solve similar problems together. It was in the reflection session when students tell the teachers how they make a good narrative story through the computational thinking process.

Two of the participants stated that they do not like pattern recognition or abstraction and pattern generalization part. It is because in the process of writing after they found the anchor, they must get through

arguing process to set the story line. In this part, some members tried to convince the other members to determine the story. The result of the interview stated that, in the process of arguing, one of the two participants felt dominated by others while the other participant in stated that to lead or dominate the other members in a group is a must. Hence, based on one participant who thinks take a leadership role had a positive impact. The result is they could work efficiently like asking directly to delete some sentences, change a lot of words into the appropriate ones, and revise the story lines. It is in line with Yadav (2011) stated that in CT person will automatically work to find the efficient route to solve the problem. It is shown in the solution taken by that participant by commanding other members to act as her suggestion. Last, one participant said she just dislike pattern generalization process because they spent most of their time on matching and writing the story from five different story points. She stated that the process took too much time which made her group could not finish the task.

4.2.5 Solutions

Brignal (2001) and Feldman (2009) stated that perception is the process by which people interpret the meaning using some senses and basic knowledge to the world around each of people. The initiative to take a leadership role is a result of a student in handling the situation. And it was really helpful for the group to finish the story. Then, by persuading other members, they definitely could finish composing a narrative story through computational thinking process as fast as they could. The other solution is regarding words and grammar. Students took initiative to open the dictionary for choosing the correct words. The participants said the correct meaning could be delivered easily. Then, when participants were feeling like to be dominated, they try the best to actively involved in the group.

In the writing process, as students who English as a foreign language, they required more helps in making sentences. First is about the duration of this activity. Teacher conducted 60 minutes activity for them to understand the process of computational thinking in writing activity. This is far from the common teaching duration in the classroom which is 2x45 minutes. Researchers believe if it will be conducted again in the classroom at the appropriate time, this problem is likely less to appear. In responding their difficulties in encountering grammar error and incorrect word choices, each of student has to bring a dictionary with them or school provides them with it. This will lead them to compose the correct and appropriate words in the narrative story.

4.3 Hopes and Expectations

Participants hope computational thinking process can be taught by giving some detailed explanations and instructions from the teacher. Each of members should have a role which part of writing a narrative story that they should write for story point so the process would go easier. One of them should be chosen to be a leader to handle the situation. This will be helpful if they start arguing. They also want the time is approximately 2x45 minutes.

It seems writing a narrative story using computational thinking process really needs to acquire more detailed explanations. The teacher should provide them a topic and asks them to compose a narrative story based on the generic structures of narrative text which are consist of orientation, complication, resolution, and re-orientation/coda. It might help guide students in writing and also saving their time. They can observe, identify and extract relevant information to define main ideas while creating models of observed patterns to test predicted outcomes (pattern recognition and pattern generalization).

5. Conclusion

After doing writing a narrative story activity using computational thinking process and having interview sessions, it shows that this teaching strategy can be implemented in higher education context. However, besides the need to enrich vocabulary and how to use it, they are some technical issues that obstruct students in doing activities, mostly it is because of the short learning time, having limited words, and did not have a specific role in a group. Fortunately, some the problems could be solved by themselves, while the other problems should be solved by the teacher. By giving some suggestions for the educators who want to implement computational thinking strategy in writing a narrative story, researchers hope these findings might help them to improve the result of learning activity especially for students where English as their foreign language. Moreover, from the discussion, we know that this activity helps students to be more cooperative, more aware of managing time and learning process, learn some new words and also increase their speaking skill. However, teachers must have a big role in delivering the computational thinking process in writing activity and guiding the students in order to make the learning process run well.

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Appendix 1
Table.1 Lesson Plan

Warm-up Activity: Point of view Instruct the students to answer the question **"What might be hard or easy about writing a story with someone else when you can't talk to each other first?"** in one of two ways, encouraging them to consider how a **point of view** is important when writing creatively: 1.　　Journaling: Students respond in their journal or word processor: 2.　　4-S Brainstorming: ●　　Four students will be selected by the teacher to play a specific role in helping the rest of the class generate the maximum number of responses to the question. ○　　*Accelerator* - Student encourages classmates to generate more ideas ("Let's get more ideas, only two minutes left") ○　　*Acceptor* - Student helps classmates commit to an idea ("All ideas are OK, write that one down") ○　　*Exaggerator* - Student encourages classmates to generate different kinds of ideas ("We need some silly ideas") ○　　*Connector/recorder* - Student makes the connection between different ideas and writes them down ("Which ideas are connected to that?")	15 minutes
Activity 1: Writing the story chapters ●　　Each student in the group consists of 5 writes their own chapter without consulting or sharing with the other students. ●　　Each chapter must advance the story by starting from the previous story point and ending at the next story point. The first chapter starts with Story Point 1 and ends with story point 2. Chapter 2 starts with Story Point 2 and ends with story point 3, and so on. The length of each chapter can be decided based upon the skill level of each student group.	15 minutes
Activity 2: Creating a logical and cohesive story In this activity, students will combine their separate chapters into a single story. The chapters might be radically different, requiring students to **decompose** the story points, a point of view, and overall story, and **recognize patterns** in the chapters to create one cohesive story. 1.　　Everybody in the group reads all of the chapters for that group, paying attention to the differences. 2.　　The group picks one chapter as the anchor. They will make minimal changes to that chapter. 3.　　The group revises the other chapters so that they logically fit with the anchor chapter. While revising chapters, try to keep each chapter as unique as possible. The final goal is to make the entire story more cohesive by blending each chapter, not to rewrite everyone's chapters.	30 minutes
Wrap-up Activity: Analysis Discuss the following questions with students in a large group: ●　　What was the most difficult part of repairing your story? Did entire chapters need to be adjusted, or could you manage to reconcile the chapters by making only minor changes? ●　　What would you have changed about your initial storytelling process to make the repairing process easier? Would you have made your story more straightforward and logical, or more ridiculous and imaginative? Essentially, how would you go about writing the story so that it includes the fewest number of errors? (**algorithm design**) ●　　How would you change the rules of this activity to guarantee that a minimal number of errors are created? Assume that all chapters must still be written independently by different students at the same time. ●　　Identifying errors is recognizing patterns. Can you describe some of the common errors that could be useful for other writers to use to repair their story? This is relevant to **pattern recognition**, and **pattern abstraction and generalization**	30 minutes

Interview questions

Note :

Date :

No.	Questions	Notes V (list) for answering the question
1.	What is computational thinking process (as known as CTP)?	
2.	What is your opinion toward CTP in writing activity? (Do you think it is good or not to be implemented? Why?)	
3.	Do you get benefits in doing CTP? (if yes, what are they?, If no, why?)	
4.	Do you have difficulties in writing essay using CTP activity? (If yes, what are they? Why?) How do you solve your difficulties?	
5.	In the process of writing activity which part of CTP is the most difficult one or the difficult one? (What are they? Why?) How did you overcome it?	
6.	In the process of writing activity which part of CTP is the easiest one? (What are they? Why?)	
7.	What is your recommendation for future CTP implementation in writing essay activity? Can it be implemented in other activities?	