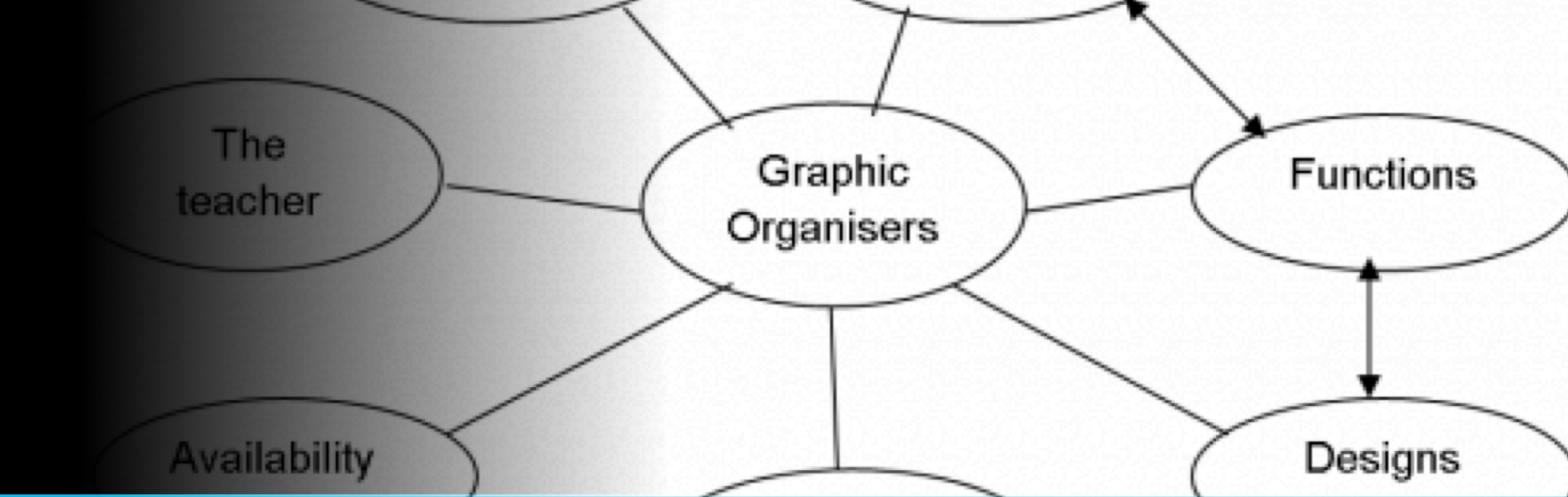# A 'synthesized' text mapping approach to teaching basic rhetorical organization and technical language structures

Mike Sharpe | Kochi University of Technology | sharpemike1970@gmail.com

Introduction

This project was motivated by a need to develop ways to encourage beginner level undergraduate engineering students at Kochi University of Technology to

- Engage in assigned reading tasks
- Learn to identify the basic scientific/technical genres in English language texts – Description, Cause/Effect, Compare/Contrast, and Sequence
- Learn to identify basic rhetorical patterning in English language texts

In order to achieve these objectives the researcher has in the past experimented with several approaches. Of these approaches the most successful in both observable and quantifiable terms has been one based on graphic representation of text using graphic organizers or text maps.

Text map based pedagogy

- Currently, teaching based on text maps is used extensively in many fields of L1 learning, including for teaching science. Text map-based instruction is one of seven strategies recommended by the US National Reading Panel.

- However, while 'the recommendations to use text maps as part of reading instruction are commonly found in the first language (L1) reading literature' they are 'generally less common in second language (L2) contexts'. As yet they are neither well-researched or nor widely adopted in L2 teaching. Jiang and Grabe (2007) and Howard and Ellis (2011)

Synthesized Text Maps

Over the past few years, the researcher has experimented with a 'synthesized' approach to text mapping (STM). This approach draws on two traditions in text mapping, and is also informed by key findings in the research.

- Synthesized Text Maps were developed in accordance with **Novak's Concept Mapping** principles (Novak and Cañas, 2006) i.e. they focus on drawing reader's attention on the selection of main ideas, on showing how these ideas are connected and also on displaying the rhetorical framework of the text. In addition, the maps follow Novakian principles of spatial arrangement by having a hierarchical concept array, in which general information is at the head and more specific information below.

- Each map was constructed around 'sub-maps' or structural arrays, also arranged hierarchically, corresponding the order of the paragraphs in the text. Within the visual framework of the main structural arrays, there are a series of boxes, or nodes.

- Map nodes are linked graphically through a system of words and/or symbols - as in **Hunter's IS maps** (www.lawriehunter.com)

- Maps follow the evidence that teacher generated/student completed maps are more effective than either wholly student generated or teacher generated maps (Howard and Ellis, 2011)

References

Howard, P. and Ellis, E. (2011). Summary of Major Graphic Organizer Research Findings. Available: http://www.hoover.k12.al.us/hcsnet/rfbms/makessense%207.4/dontopenfolder/implimnf/dontopen/msstrats/stuf/GOMatrix.pdf

Hunter, L. (2015). http://www.core.kochi-tech.ac.jp/hunter/professional/conceptmapping/index.html

Jiang, X. and Grabe, W. (2007). Graphic organizers in reading instruction: Research findings and issues. Reading in a Foreign Language 19 (1):34–55

National Reading Panel (US). National Institute of Child Health, & Human Development (US). (2000). Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction. National Institute of Child Health and Human Development, National Institutes of Health.

Novak, J.D., and Cañas, A.J. (2006). The theory underlying concept maps and how to construct and use them. Technical Report IHMC Cmap Tools 2006-01. Florida Institute for Human and Machine Cognition.

Materials: Sample text

Kansai International Airport (Sharpe, M. 2007. *Technologies of Today and Tomorrow*, Cengage)

'Since the 1950s traveling by air has become very popular. Air travel today is now much cheaper and more convenient. It's possible to fly anywhere in the world on business or for a holiday.
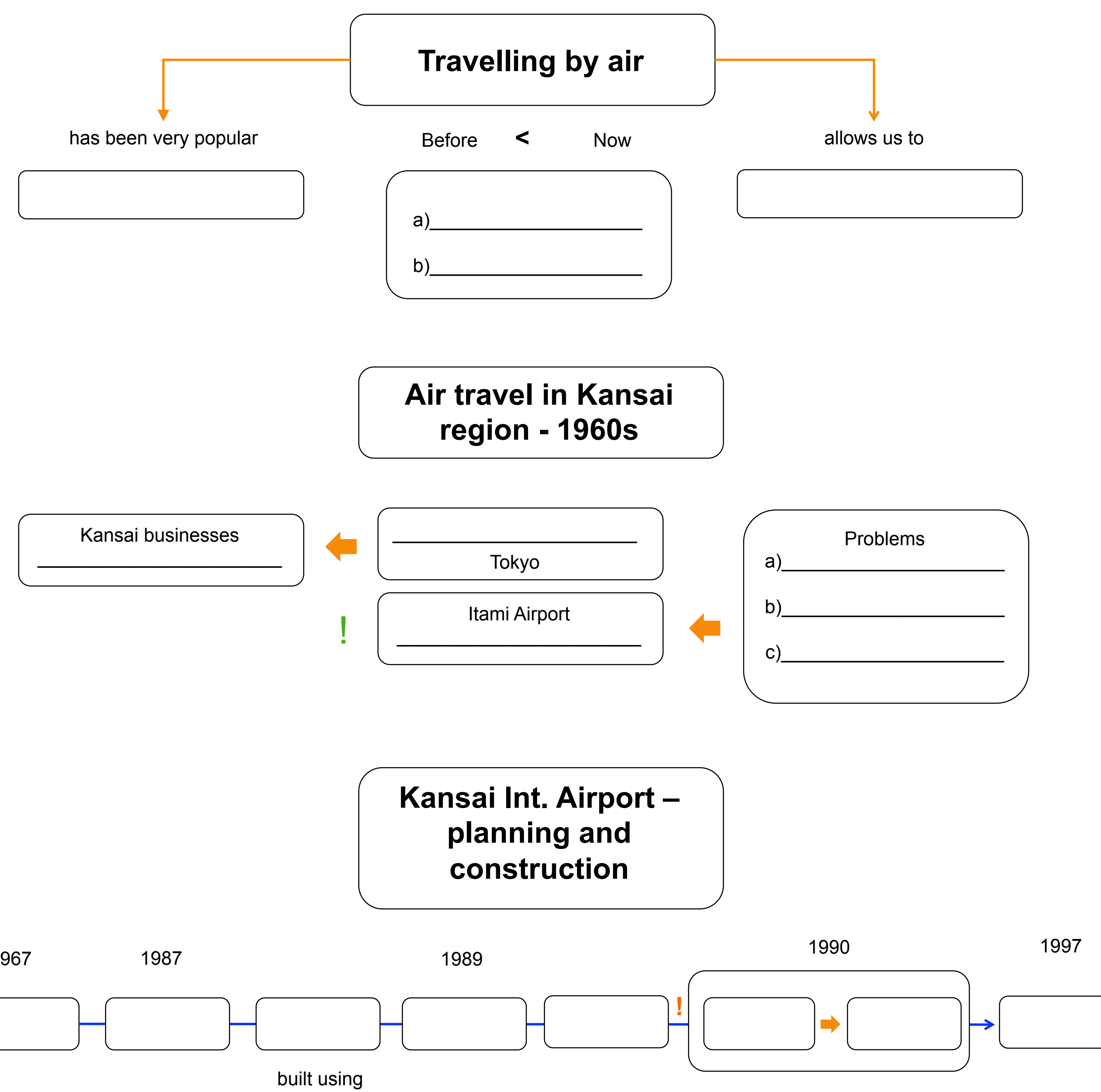
Air travel is very important to business. In the 1960s, businesses in the Kansai region wanted to improve air travel to the Kansai region because they were losing business to Tokyo. However, it was impossible to expand Osaka International Airport at Itami for two reasons. First, there were too many buildings around Itami. Also, many of the people living near the airport didn't like the noise and pollution from the aircraft.

Planners decided to build a new airport for the Kansai region on a man-made island in the middle of Osaka Bay. The advantage of building the airport in Osaka Bay was that it could stay open 24 hours a day. Itami Airport has to close at night. The main disadvantage was the very high risk of earthquakes and typhoons.

After 20 years of planning, construction of Kansai International Airport started in 1987. First, workers constructed a seawall using rocks and 48,000 concrete blocks. The seawall was finished in 1989. Then, workers put a 33-metre layer of earth infill over the seafloor inside the seawall. They used 21 million cubic metres of soil from three mountains. In 1990, a three-kilometre-long bridge was opened between the artificial island and the mainland. However, by then, the island had sunk eight metres. As a result, the project was delayed and the costs increased.

Kansai International Airport finally opened in September 1994. The man-made island is four kilometres long and one kilometre wide. The terminal building at Kansai International Airport is the longest in the world. The terminal is 1.7 kilometres from end to end. A people mover system moves passengers from one end to the other..
The terminal roof has two interesting features. It is shaped like an aircraft wing, to improve air circulation through the building. Also, because the island is sinking, it is necessary for engineers to raise the roof. To do this, engineers put thick metal plates under the roof supports.'

Materials: STM

Travelling by air

has been very popular   Before < Now   allows us to

a)_____
b)_____

Air travel in Kansai region - 1960s

Kansai businesses   Tokyo   Problems
                         Itami Airport   a)_____
                                              b)_____
                                              c)_____

Kansai Int. Airport – planning and construction

1967   1987   1989   1990   1997

built using
_____

Key to symbols: Description   Cause/Effect   Compare < + > Contrast ! Sequence

2013 study using STM approach with 1st year engineering students at KUT

This study investigated the effects of direct instruction and guided practice in using Synthesized Text Maps (STMs) as an expository text comprehension strategy in a college level EFL reading context. Participants were two intact groups (n =21, n =31) of 1st year undergraduate engineering students at Kochi University of Technology. The study utilized a mixed method research design, based on quantitative and qualitative data collection and analysis techniques. The researcher examined if using STMs transferred into quantitative and qualitative improvements in learner's comprehension of EL expository text at the end of a six-week study period. During the study period, treatment group received instruction in and practiced using teacher-generated mapping templates when reading. Control group was given general text-based comprehension questions. The effects of using STMs were examined in two ways. Before and after the study participants were asked to read a 350-word expository text and complete an 18-item test containing literal and inferential items. Participants also completed a post-study survey on the efficacy of STM-based reading in improving reading confidence, understanding of text structure and organization, motivation and interest.

Table 1: (Graph) Results of tests

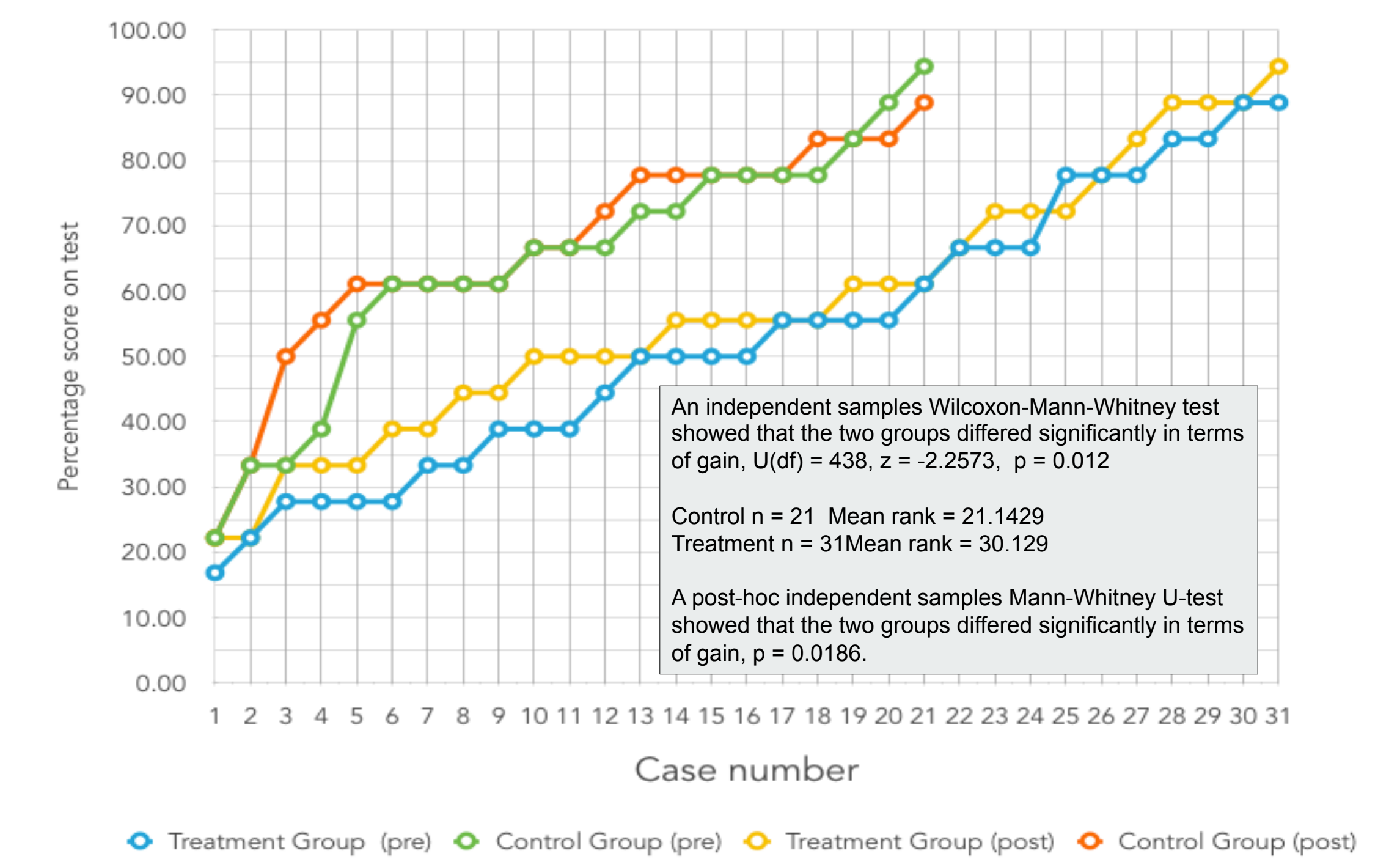(Inset) Pre- and post-text non-parametric analysis of gain scores

An independent samples Wilcoxon-Mann-Whitney test showed that the two groups differed significantly in terms of gain, U(df) = 438, z = -2.2573, ˆp = 0.012

Control n = 21 Mean rank = 21.1429
Treatment n = 31Mean rank = 30.129

A post-hoc independent samples Mann-Whitney U-test showed that the two groups differed significantly in terms of gain, p = 0.0186.

Table 2: Results of post mapping questionnaire

	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
Q1. I could understand the information maps that were provided by the teacher	2.9%	68.6%	22.9%	5.7%	0
Q2. I could understand the texts that were provided by the teacher.	5.7%	60%	25.7%	2.7%	0
Q3. Using information maps improved my knowledge of text organization	11.4%	48.6%	34.3%	2.7%	0
Q4. Using information maps improved my knowledge of sentence structures	5.7%	40%	48.6%	5.7%	0
Q5. Overall, using information maps improved my English reading skills	8.6%	51.5%	28.7%	5.7%	0
Q6. Using information maps encouraged me to interact more closely with the texts	8.6%	34.3%	40%	17.2%	0
Q7. Using information maps improved my reading confidence	5.7%	31.4%	48.6%	11.4%	0
Q8. Using information maps encouraged my interest in reading English	5.7%	40%	48.6%	2.7%	0
Q9. Overall, information mapping was a useful activity for me	5.7%	71.5%	17.2%	2.7%	0

Conclusion

- Results provide positive evidence as to the effectiveness of STMs as an instructional strategy in L2 reading classrooms, supporting and adding to the findings of previous studies, namely that using STMs help EFL learners to overcome their difficulties in comprehension and to build reading proficiency. Additionally, the positive experiences reported by the participants indicate potential benefits for STM-based reading instruction approaches in motivating learners to engage in reading activities. Overall, perhaps the clearest indication is that students respond positively to methodologies they have not encountered before in language learning.