

## Branching out ideas: Concept maps effect on memory and L2 writing<sup>1</sup>

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### Abstract

The purpose of this study was to develop a curriculum to teach visual concept mapping and improve student attitudes on writing and the quality of their examination essays. We used visual word and image connections to improve the working memory and language aptitude students and gathered a small amount of data. The study took place during the summer module of an English preparatory program and was voluntary. We developed the workshop and the methodology for students who were continuing the English preparatory program into summer school. We gave surveys and personal interviews to students and workshop instructors after the workshops to ascertain students' attitude and knowledge of the material as well as the effectiveness of the program. Research partners took notes and recordings of the workshops. End of course writing exams were referenced for quantitative data but was limited due to the workshops being voluntary. The workshops were peripheral to the course module and aimed to be as casual and accommodating to student's heavy workload as possible while targeting specific tasks that they were responsible for in the course and final examination. Further research is needed but the limited data suggests a correlation between student's inclusion of mind mapping techniques and their ability to complete the demands of the final exam writing rubric.

**Key words:** Mind maps, L2 writing, metacognitive, outlines.

## Fikirleri kollara ayırmak: Kavram haritalarının hafıza ve L2 üzerindeki etkisi

### Öz

Bu çalışmanın amacı, görsel kavram haritalamayı öğretmek ve öğrencilerin yazma konusundaki tutumlarını ve sınav yazmalarının kalitesini geliştirmek için bir müfredat geliştirmektir. Öğrencilerin çalışma belleği ve dil becerilerini geliştirmek ve az miktarda veri toplamak için görsel kelime ve görüntü bağlantıları kullandık. Çalışma, bir İngilizce hazırlık programının yaz modülü sırasında gerçekleşti ve gönüllü oldu. İngilizce hazırlık eğitimi programına devam eden öğrenciler için yaz okuluna atölye ve metodoloji geliştirdik. Öğrencilerin materyallerin tutum ve bilgilerini ve programın etkinliğini tespit etmek için atölye çalışmalarından sonra öğrenciler ve atölye eğitmenleri ile anketler ve kişisel görüşmeler yaptık. Araştırma ortakları, çalıştayların notlarını ve kayıtlarını aldı. Kurs sonu sınavları, nicel veriler için referans alınmış, ancak çalıştaylar gönüllü olmuştur. Çalıştaylar, ders modülüne çevre birimleriydi ve öğrencilerin ders yükünden ve final sınavından sorumlu oldukları belirli görevleri hedeflerken, mümkün olduğunca öğrencinin ağır iş yüküne rahat ve yardımsever

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olmayı hedefliyordu. Daha fazla arařtırmaya ihtiya vardır, ancak sınırlı veriler, öğrencinin zihin haritalama tekniklerini içermesi ve final sınavı yazma sınavının taleplerini tamamlama yetenekleri arasında bir ilişki olduğunu göstermektedir.

**Anahtar kelimeler:** Zihin haritaları, L2 yazma, metabilişsel, ana hatlar.

## Introduction

In examinations, essays are often limited by time constraints, precautions against cheating, and a Pandora's box of socio-economic, cognitive and cultural factors. Because of these limitations, the exams have to be closed which restricts students from using any written, electronic or verbal material to assist them. They sometimes see this as contradictory to their modern lives, or a necessary break from it. About ten times a year in Turkish universities' English prep programs the students write exam compositions with only their minds and test materials. The tasks are usually descriptions of people, places or events, opinion or persuasive essays, or compositions about current events or issues. Most programs have additional open writing assignments with multiple drafts and opportunities for research and review but their marks are usually weighted lighter than the exams writings. The process of writing is a kind of training for the main event of exam writing.

Up until exam day, students are encouraged to follow the writing process, (plan, draft, revise, proofread) research their topics, and edit their writing. They're encouraged to develop and do metacognitive reflection; however, single-draft closed writing tasks further limit the student's ability to write thoughtful ideas by restricting the writing process. Students comment, that they rely on a different kind of writing process in the exams choosing to memorize advanced level discourse markers and stock phrases. Teachers sometimes notice that they commit whole paragraphs to memory in order gap fill topical vocabulary.

We sought to teach new methods to boost motivation, creativity and confidence that emphasized examples, details and original ideas, connected by accurate discourse markers. There is extensive study into the applications of concept maps in learning (Novak & Gowin1984) and we looked for a creative brainstorm method that our students could do quickly and with limited resources. We taught an abbreviated model of the mind map method as a quick pre-writing activity that the students could use in their exams.

To this purpose, we created a brief curricula on mind maps, also known as spider-grams or concept maps to record, and display a brainstorm that could be referenced and annexed throughout the writing exam. Inspiration for the curricula was taken from similar curricula for open book reviews and literature reviews in an English for Specific Purposes course (Wette 2017), teaching vocabulary to young learners (Pua, Li, Lui & Cheng 2015), and other findings which suggests that mind maps use helps students organize their thoughts and develop their writing sub-skills (Al-Zyoud, Ayed, Al-Jamal, & Baniabdelrahman 2017).

Since its intellectual roots in the notebooks of DaVinci, al-Khwarazmi and multitudes of other philosophers and scientists, mind mapping's use and methods have developed significantly both from its greatest proponent, Tony Buzan, as well as those who have tested it critically (Farrand, Hussain & Hennessy 2002) and our curriculum was designed for our student profile, which was lower level

students who had failed at least two courses of their English prep program and were retaking one level and the proficiency exam in the summer.

As a metacognitive method, it is associated with key and concept words and their connection to memory and recall (Buzan 1971), and as a business and life planning method, it is a multifaceted mental and physiological skill that reaches far beyond the pen and paper (Buzan & Buzan 1993).

### Previous research

Mind maps are visual organizational tools in which supra-ordinate concepts subsequently link to sub-ordinate concepts as appropriate. They work by connecting and associating ideas to help generate ideas and translate the complex connections of the brain onto paper. The process stimulates thought and records it. By mimicking the brain's physiology, a mind map can generate more ideas than a standard list by stimulating the brain's synergistic way of thinking. The central node is the categorization constant and the outward branches can represent differing connections and associations (Buzan & Buzan 1993) such as causality, categorization or examples. The process works as a bridge between the complexity of our minds and the two-dimensional narrative of writing an essay, giving a speech or reading a book; linear tasks that are composed of listed series of words can be pre-written with this special kind of outline that helps us visualize the multi-spatial processes of thoughts.

Concerning mind maps and productive skills, studies have shown increased motivation among teenage students in an EFL class after mind map workshops (Al-Zyoud, Ayed, Al Jamal & Baniabdelrahman 2017). They were more comfortable with creative activities and less afraid to make mistakes. Those researchers included "color codes, pictures, key words, clues, in a proper hierarchal paragraphing structure" into their curriculum and gave the students a wide berth of time to work with their creations. Another group of researchers taught third graders to make colorful mind maps of their vocabulary lists first by example. After the students learned the format, teachers empowering them students to draw mind maps from their own associations. The children worked with vocabulary lists, and the test data concluded that, "the use of mind maps to aid vocabulary building is an effective way to help students learn vocabulary. It gives them an alternative way to memorize new words instead of rote memorization. Students have gained more confidence in using English after the introduction of mind maps." (Pua, Li, Lui & Cheng 2015). Another study in an L2 academic writing course used mind maps as an instructional tool to teach book review and literature review genres. In addition to boosting motivation, it was concluded that their use helps raise awareness of textual and rhetorical components of conceptual knowledge (Wette 2017). This in-depth curricula dealt with high level university students and their analysis of research papers. It introduced mind mapping as a metacognitive tool that expands writing into the new genres.

Receptive skills are the yin to the productive yang and mind maps impact on reading comprehension has been examined as a tool to help digest textbooks (Phantharakphong 2013). Another study worked with computer-assisted mind maps and found they're most beneficial for low level students than high (Liu, Chen, & Chang 2010). Not all studies however, have heaped praise on the mind map method. One such study (Farrand 2002) has shown that the 'mind mapping method' may lead to a reduction in intrinsic motivation for some students, due to a heavy-handed curricula. There is a risk that insisting subjects cease using their tried and tested study methods in favor of a new one can demotivate them. The study goes on to suggest this limiting factor might be mitigated if the new method is taught in

conjunction with an extrinsic motivating factor that totes validity and usefulness. The books by Mr. Buzan are a good source for this praise.

It's also a potential distraction if the types of words noted down on the mind map are too vague and don't trigger our memory. The metacognitive process that support memory deals with the theory of recall words, which trigger specific memories as opposed to multi-ordinate words which associate with too many concepts and thus the specific concept becomes lost in the multitude (Buzan 1971) Take for example the word, 'way' which can mean 'road', 'style' or 'method' (and many phrases like, "in the way", "anyway" "go your own way", etc.). If multi-ordinate words are used to recall a lecture after the short term memory has cooled down, it could evoke any or all of these concepts and it won't effectively recall the information. Key words are strong verbs or nouns that act as stepping stones and assist our ability to recall.

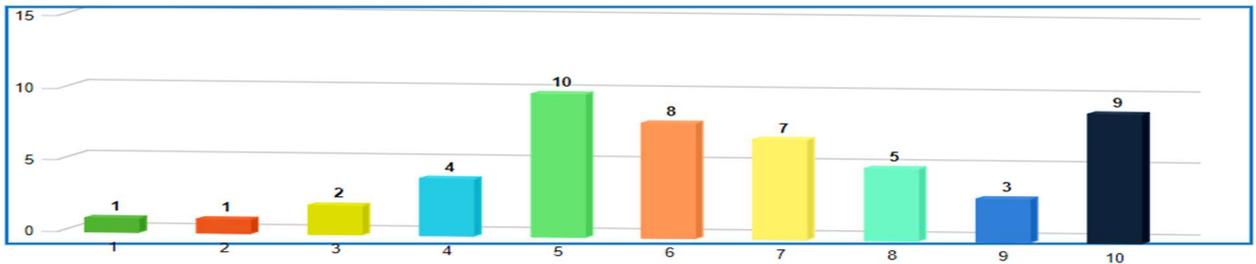
## Methodology

To consider our student profile we used our experience grading their compositions from the preceding year including a small corpus, our experiences with the students and an online survey. After setting the time and scope of the workshop, (four 30-minute sessions during the summer module). We formed the curricula and invited the summer school students to join and make mind maps. We often spoke the student's L1 (Turkish) and explained that mind maps are a thinking tool that can be used in any language.

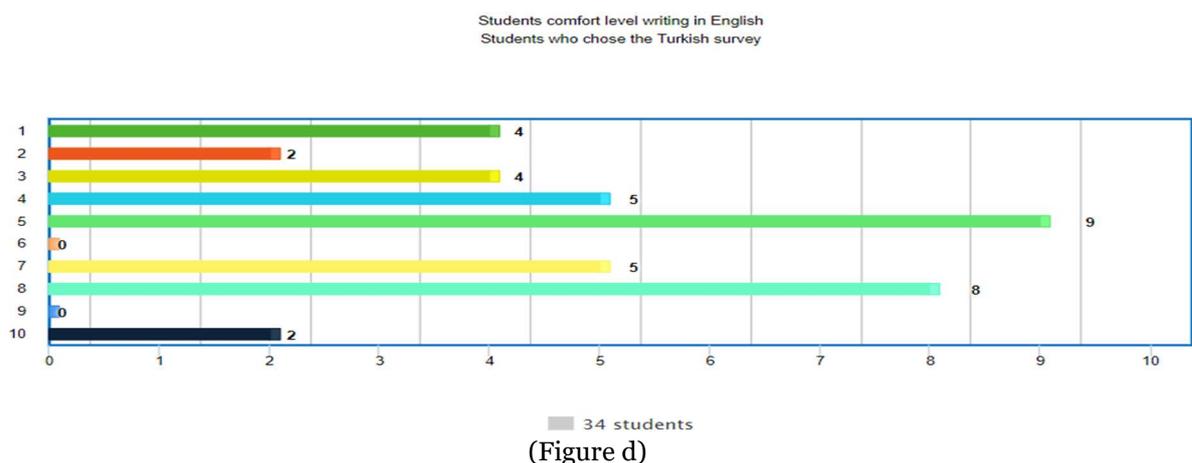
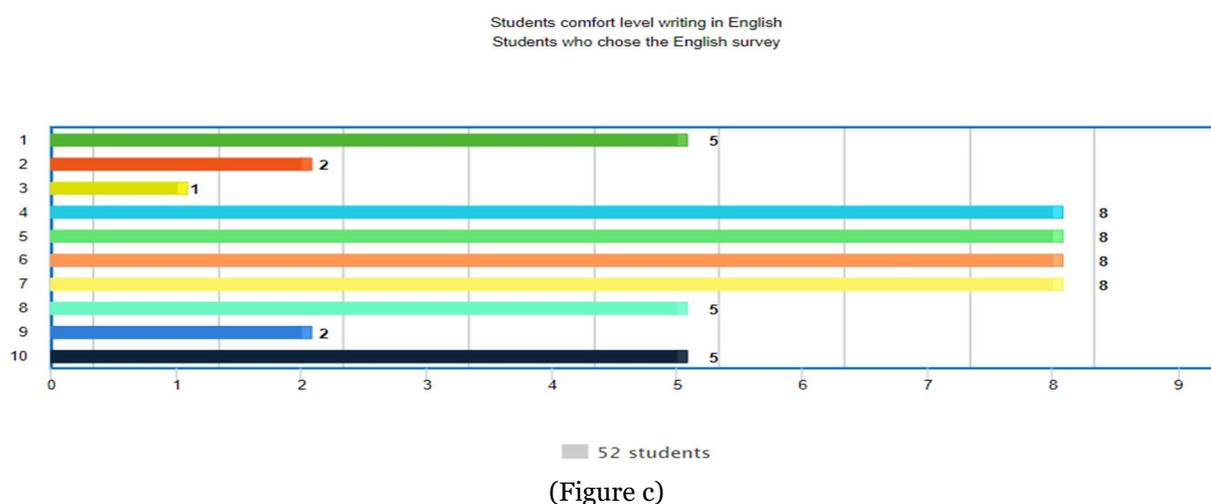
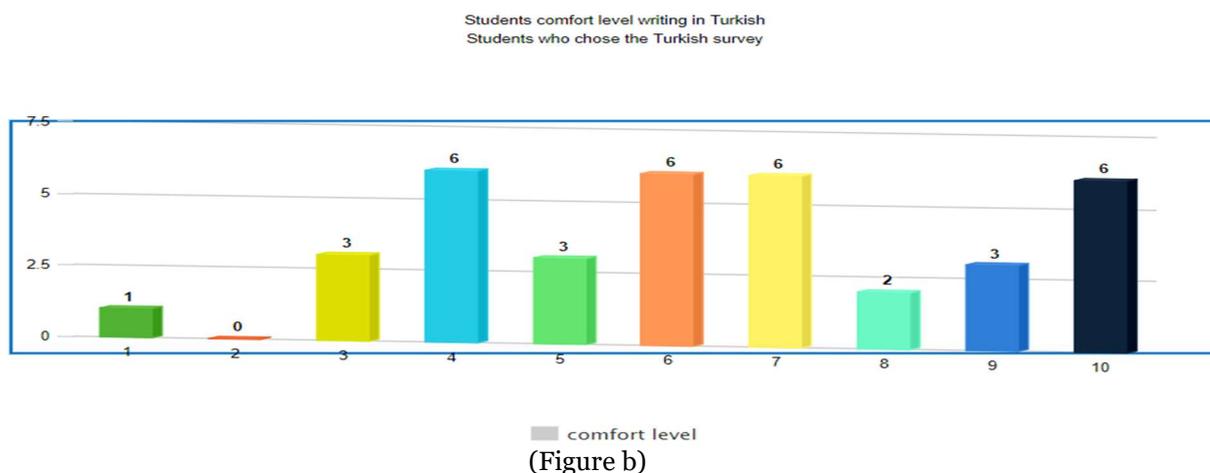
## Survey result

The optional survey asked about students' values and experiences with writing. Only a few of the participants in the survey would join the summer workshops. We offered the survey both in English (figures a&c) and Turkish (figures b&d) and gave them the option to take the survey in either language. We asked the students to rate their comfort level on a scale of one to ten with one being very low and ten being very high. The survey contained other questions about their writing skills and experiences. Some students mentioned that they valued their writing skills, but had the low confidence in L2 writing. We observed that students often relied on L1 language when organizing their thoughts, and this did not always translate on paper.

Students comfort level writing in Turkish  
Students who chose the English survey



(Figure a)



The survey didn't give unexpected results. Most of the students felt very comfortable writing in their L1 and moderately comfortable writing in their L2.

## Curricula

After our survey and a cursory analysis of the student profile, we started to create the curricula. A week-by-week analysis is provided and a summary (figure e). We knew our participants would come from the summer school but were motivated enough to join a workshop with no bearing on their final grades, so we designed it to encourage heuristic learning but contain A2 content. We decided to emphasize free and confident association of ideas and, as we explained the form (branching hierarchy) and function (improve memory and creative thinking), we wanted to gradually explain that some words are better for note-taking than others and that the best words might not be the first ones that come to mind.

In the first week (week 1) we introduced mind maps as a wide-reaching topic with applications in business, science and education. We introduced it through the quotes of Tony Buzan and talked about well-known people who have used them. We started graphically with a large white board to explain the significance of nodes and subordinate, exemplary or otherwise categorical groupings. To draw parallels between natural order of the mind and the protocol we were promoting, we selected participants to converse about a topic. As they spoke, we centered the main topic on the whiteboard and drew secondary nodes with each new idea they discussed, and tertiary nodes for the details, points and examples. We then asked the students to form groups of three. Two of them would speak and the third made a mind map outlining the conversation as we had demonstrated. The students made very descriptive mind maps in groups and seemed to enjoy the group work. They understood the concept quickly and in an interview session afterwards they noted that this can be used as an essay outline. We believed their interest would motivate them to continue to learn and ultimately, help them write essays.

Instruction in the second and third weeks expanded on the productive and receptive uses of mind maps for outlining and note-taking, respectively. Unfortunately no students came to both of these workshops and learned of this dichotomy. Lesson two (figure f) focused on selecting vocabulary from a text and drawing it into mind maps. It was crucial that students understand that the important element was categorical organization, and that that was analogous to the neural connections that we'd introduced in the first lesson. We used a relatively easy text (a simplified news article about sports), but

Week 1: A visualization tool	teach basic terminology, demo the method, show how a mind maps can record the details of a conversation
Week 2: Mind map your notes	read a text and highlight keywords, explain how strong nouns and verbs stick in our memories, sts make a mind map of another article
Week 3: Minimize notetaking	play pictorial, visual concepts and images catch the imagination
Week 4: Productive skills	essay topics, brainstorms, creative associations, hierarchical structure

(Figure e)



(Figure f)

due to the student's low level, we still spent a lot of time explaining vocabulary. We told them that note-taking can be improved with the use of intentional foresight. We asked the students to imagine that a month from then, they would have look at their mind map and remember what the article was about. Would the be able to? Most of the students found that the words they'd written could associate with too many other ideas and that they didn't create a vivid connection between their intention (recalling the content) and what they had on hand (their notes). Our intention wasn't to discourage students by showing the futility of the task but to explain the counter-intuitive nature of low ordinate words, and how the the most attractive words are often the most useless. In future iterations of mind map projects we will try harder to optimize the text at the student's level so we can spend less time focusing on meaning and comprehension and more time focusing on memory and cognition.

In the third week we delved into memory and key words. We drew a metaphor thusly: Memory is like crossing a raging river and you must place stepping stone in the path to help you cross. Strong memories are like sturdy stones that won't move even if the stream of consciousness is heavy or chaotic. To inspire optimum recall of source material, the words used in the mind map (or any type of notes) should be low-ordinate words (strong nouns and verbs) which associate specifically to the intended concepts. We'd expected the content of the week 2 workshop to lead into the third but ran into a problem when we found that an entirely different set of students had come to the third workshop, so we had to adjust our material and reteach some week 2 content. We gave them some topics (traffic, rural areas, technology, ect.) and asked them to brainstorm and draw mind maps. We corrected them with careful heuristic questioning to show how to categorize and structure ideas hierarchically. The students again chose many descriptive words but we believe that, as if students are repeatedly exposed to the idea that note-taking can be optimized and more time should be devoted to listening, they will get accustomed to writing low-ordinance words in their notes. A lot of the third workshop was solo-work and we walked around asking students about the kinds of connections they were placing in each node and suggesting words.

The final day of the workshop was the most practical application but contained the least amount of theory or explanation. We summarized the key ideas of the previous workshops (mind map's analogy to neural networks, hierarchical structure, memory, low-ordinance words, ect.) and told them to make a

mind map of an essay outlining tactic quickly as if they were in an exam. In fact, it was the week before their proficiency test and we brought essay topics from previous exams such as “What can be done to reduce traffic in Istanbul?” and “What can be done to encourage people to move out to the country?” We encouraged them to take their brainstorm a step further and begin an essay.

Ultimately, we felt a bit discouraged by the loose structure of the workshops but we solidified our resolve to continue our research with more structure and a higher intensity of participation. In each workshop we taught the method by example and reiterated the function (memory and creative thinking). Unfortunately, we weren't able to get much data from our students but we were happy with the progress that they showed.

### Conclusion

As a foray into the curricula and methodology that we intend to use in further studies, we were satisfied. We were successful in creating a four-course curriculum to teach visual concept mapping. We did not gather any substantial data as to the improvement on student attitudes on writing after the course was over. We spoke to students casually after their exam, and they projected a positive outlook on their end of module exam and exit exam. As we continue our research, we will need to improve our test procedure to measure working memory and language aptitude. Furthermore, we will need more students that allow us to examine their scores from the entire school year. During the next research session, we will use the same students from the entire school year. We would also like to get more teachers involved in the process as to have feedback about the curriculum, and have further development in the positives and negatives in the curriculum. We believe in continuing the casual atmosphere as students felt receptive to this atmosphere. It also felt good for us, as we did not have formal restrictions of classroom management upon us. Further research is needed to make a conclusive correlation between student's inclusion of mind mapping techniques and their ability to complete the demands of the final exam writing rubric.

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