

Introduction

Chem21 is an online chemistry pedagogy tool which provides programs for teachers to apply to their classrooms to aid students in developing “expert skills.” To help challenge student’s knowledge, comprehension, and application, Chem21 developed Timed Repetitive Quizzes (TRQs). What if we were to apply TRQs to fundamental music theory pedagogy?

Timed Repetitive Quizzes

The concept for TRQs comes from Harvard psychologist B.F. Skinner’s Teaching Machine. Skinner testified that five features made the Teaching Machine a revolutionary pedagogical tool. These features describe the machine that Skinner developed, but they fail to explain what is happening inside the student’s mind to help them learn the material. Chem21 lists three criteria of which one must be met for learning to occur:

1. New pieces of knowledge are introduced, and re-introduced, until a transient memory construct is created in long-term memory
2. Transient memory constructs are fortified so their life expectancy in long-term memory is increased
3. New connections between memory constructs are formed

TRQ Research

Chem21 took care when designing the TRQ system that it would be beneficial for students. One study shows the use of the TRQs versus students’ best methods in retaining Mongolian vocabulary. The Mongolian language was used to prevent selection bias, as no participant knew Mongolian. Students were presented with 50 Mongolian words and their English counterparts and asked to study for two hours. The students’ abilities to spell Mongolian words when given the English counterparts would then be tested at 2 hours, 24 hours, and 1 week after studying. Results revealed that not only would TRQ method students average more answers correct each testing, but disparity between averages grew as time passed, solidifying TRQs as a better tool to store more information in long-term memory than the previously best-known study methods.

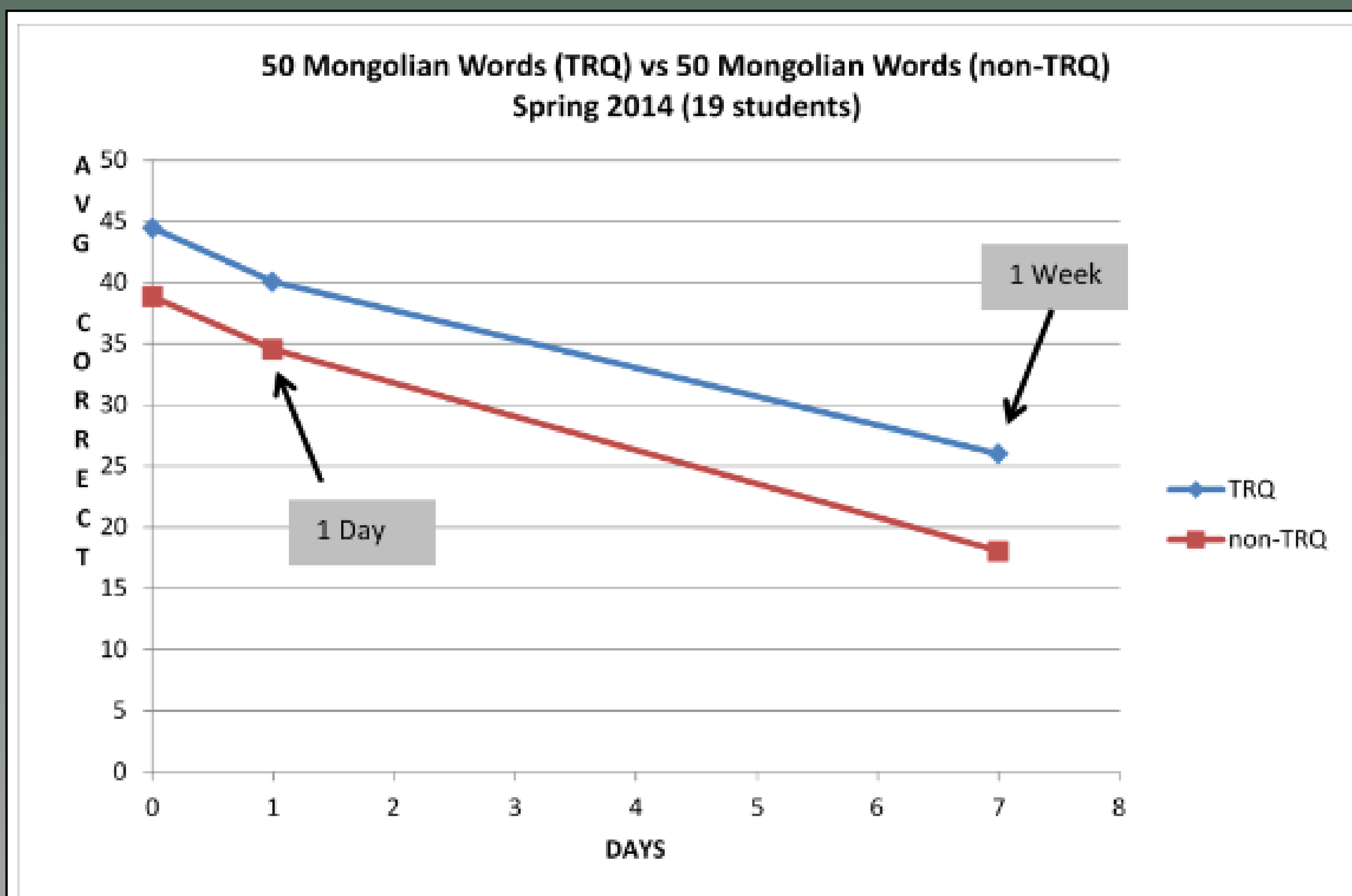


Figure 2: Interdisciplinary study showing TRQ effectiveness

Set Initial TRQ Parameters

Hide Questions

Questions per Quiz:

Option 1

Number of 100% Correct TRQs Per Set:

Time to Beat:

Option 2

/ 10

< 100% correct in ≤ Quiz Time:

Times

Option 3

Total Correct:

Minimum Correct:

Set Final TRQ Parameters

Times Set is Repeated:

Intermission Between Sets:

Points:

Total Points for this assignment:

Figure 1: TRQ customizing menu via Chem21

Selected Bibliography

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TRQs in Fundamental Music Theory Classrooms

Chem21 has done much of the work explaining what TRQs are and why they are beneficial to implement into a chemistry classroom. I argue that the method would transition well into use within the field of Music Theory, specifically fundamental-level courses like Music Theory I. The biggest hurdle to cross when implementing this method is creating questions that can be answered quickly and are formatted in multiple-choice or fill-in-the-blank style. Here are some sample questions:

1. Q: What key signature has [3 flats](#)? A: Eb Major
2. Q: What key signature has [3 flats](#)? A: c minor
3. Q: What is the [pitch](#) of this note? A: F#
[This question and many that follow would include a musical example.]
4. Q: What is the [duration](#) of this note? A: Quarter note
5. Q: What is the [quality](#) of this triad? A: Major
6. Q: What is the [root](#) of this triad? A: Bb
7. Q: What is the [third](#) of this triad? A: D
8. Q: Name the [interval](#). A: m3
9. Q: Which pitch is a [P5](#) above the given pitch? A: G
10. Q: Name the [Roman Numeral](#) of this chord. A: V
11. Q: What would be the [7th](#) of a [Bb^{Δ7}](#)? A: A
12. Q: What [quality](#) is the [7th](#) of a [Bb^{Δ7}](#)? A: Major

As a pilot study, I have only just begun implementing a music theory TRQ prototype in a functioning classroom. In a spring semester Music Theory I class, I have formulated TRQ homework assignments to be taken in Canvas as an optional, extra credit assignment. Framing the TRQ as “extra credit” assists with the incentivized “pleasurable” studying core to Skinner’s teaching machine. The data currently shows a positive correlation between TRQ completion scores and scores on benchmark tests.

Conclusion

I could provide countless sample questions based in various fundamental music theory topics. There is so much potential for TRQs focused on fundamental music theory curriculum. I have plans to continue researching the benefit of the music theory TRQ prototype, and hope to develop ways to incorporate an aural component to the online timed quizzes. I expect in future years to show more extensive research and develop a more comprehensive program than the current prototype. TRQs have been proven by studies performed by their developer, Chem21, to positively impact development of long-term memory connections in students. TRQs can help beginning music students better learn fundamental music theory knowledge outside of the classroom, so that more of class time with the professor can be spent looking at broader, more complex topics that should ultimately interest the students more.