International Journal of Contemporary Issues in Social Sciences
Volume 3, Issue 1, 2024 ISSN(P):2959-3808 | 2959-2461

IMPACT OF LISTENING TO FAVORITE MUSIC ON THE COGNITIVE LOAD OF GRADUATE-LEVEL STUDENTS AT KARACHI

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Received: 29 February, 2024 **Revised:** 05 March, 2024 **Accepted:** 09 March, 2024 **Published:** 15 March, 2024

ABSTRACT

All Working and professional individuals to continue their higher education generally prefer a weekend program; mostly, there are 6 to 9 hours of classes, which causes a high cognitive load after the first three hours of class, where there remains no further mental capacity to process additional information. Based on the cognitive load theory and technique "desuggestopedia" suggested by Dr Georgi Lozanov, the action approach was used in an experiment by introducing listening to the favourite music to release the cognitive load after the hours of study. With a mixed method approach, N=100; participants from SMIU, IOBM, and Bahria University rated their cognitive load on the subjective loadometer by Fabio Pereira and Galdino (Pereira, 2021), and in words, the key themes were drawn out from the words responses about their cognitive load before, and after listening to their favourite Music. The findings from this research validate the cognitive learning theory and the use of desuggestopedia in de-suggesting the higher education setting, using active listening to release cognitive load and increase the intellectual productivity of students in higher education. Hence, playing at the beginning of the class and during the break effectively improves students' intellectual productivity in processing given information.

Keywords: Cognitive Load, active listening, desuggestopedia, Information processing, medicine, passive Listening.

INTRODUCTION

In the current scenario, more and more working individuals are turning towards weekend programs to continue their higher education for their academic and professional progress. Every learner at the higher education level deals with a situation in learning called "cognitive load", which causes working memory capacity to have less with a vast amount of information to process due to the excessive intrinsic and extraneous loads. As Dr Georgi Lozanov (Jones, 2010) suggested, it effectively aids cognitive processes over hours. Music listening at the higher education level is not adopted as a strategy to deal with student cognitive load (Lashari et al., 2023) in the higher education academic setting, where the learners undergo a lot of intrinsic and more extraneous load, causing cognitive load, as the cognitive overload theory (CLT) suggests. There is ongoing research-related work, class le ctures, long hours of study one class after another, meeting the tight deadlines of assignments, and anxiety before exams and related situations (Fayaz et al., 2023). Action research needs to be conducted on how actively listening to music can help higher education learners manage their cognitive load. Also, listening to music assists students in managing their cognitive load (Lashari et al., 2023). Active Listening to Music is compelling (Kumar et al., 2016). According to the book "*This Is Your Brain on Music*," Music stimulates and gets processed in most brain regions. Music taps into the primitive structure of the brain, which involves motivation, reward, and emotion (Levitin, 2006, p. 187).

This study aims to determine if using active music while listening at intervals may help students manage their cognitive load. This research aimed to conduct action research on how active listening to

music can assist graduate students in managing their cognitive load and making the best out of their working memory capacity.

This study is significant in facilitating students enrolled in weekend programs who have to cover the courses on weekends.

Literature Review and Theoretical Framework:

Cognitive Learning Theory: CLT cognitive learning theory is the updated version of the information processing model concerning working memory, which gets into a situation in which the information processing becomes heavily constrained. The cognitive load is intrinsic and extraneous; intrinsic load refers to the mental effort to learn, whereas the extraneous load refers to external noises, distractions, and thoughts of failure (Fayaz et al., 2023). Cognitive learning theory deals with methods of managing the working memory capacity of learners by intervening in instructional practices.

More effort is required to reduce the extraneous load to enhance the ability of the working memory and maximize the learner's outcome (Paas & Merrienboer, 2020). Socrates suggested he would teach music first among all art forms (Levitin, 2006). Music is a way to stimulate the brain (Lashari et al., 2023). Eyes get closed, but ears are always open. Voices were the first musical instrument. Music stimulates most parts of the brain and provokes a response. Music is accepted as the language of feelings (Trimble & Hesdorffer, 2018). The University of Windsor, Canada, conducted a study in which Active Listening to music positively impacted cognitive performance, unlike those who did not actively listen to music before the test (Kumar et al., 2016). Passive Listening to Music is common among students; commonly, students listen to background music while studying, which is a positive mood changer and motivator (Kumar et al., 2016).

Most students enjoy listening to music, which is considered a positive mood changer that causes them to concentrate while studying and eliminates extraneous distractions. Most students prefer slow Music to fast and loud Music while studying (Kumar et al., 2016). Listening to music has no adverse effect on concentration or cognitive performance. It significantly assists concentration while eliminating extraneous distractions (Kumar et al., 2016). Music evokes and stimulates both the human heart and mind as the heart breaths and the mind has cognition/working memory. In other words, the cognitive domain and affective domain are interconnected (Lashari et al., 2023). Dr Georgi Lozanov, an educator and psychiatrist, recommends that soft music effectively improves cognitive function and mental processing. He suggested a technique known as 'desuggestopedia', which means de-suggesting limitations on learning using Music as a learning aid. Students may have different types of music preferences, but 100% of students like Music Listening. Some teachers in higher education use music playing at the beginning of their class to set a positive atmosphere and student engagement in the classroom and to increase learner readiness for processing and assimilating new information (Mowreader, 2023).

Research conducted at the University of Kyushu, Japan, identifies six reasons why students listen to MusicMusic: it helps them to concentrate, allows them to relax during their Studies, Helps them to study smoothly, and helps them feel motivated. They had a good emotional state while listening to Music during their studies. The study also showed the students' perception that 69.4% did not like to listen to Music in the classroom during their studies as it caused distractions while listening to the lecture. The researcher concluded that students unaware of brain functions voluntarily chose Music while studying. In contrast, students aware of brain function consciously choose Music to activate cognitive functions (Jones. A., 2010). Music is an aid to mental processes (Jones, 2010).

Three frameworks of music listening suggest music emotion, mood regulation and music medicine as a source of stress reduction (Tervaniemi et al., 2021). Cortisol is the chemical in the body that causes stress. Music works as music medicine to reduce stress by decreasing cortisol (Levitin, 2020; Haikal et al., 2021). Music medicine's framework suggests the difference between favourite and neutral music listening. Listening to favourite music is always expected to evoke positive emotions, whereas neutral music does not. Actively listening to favourite music causes a decrease in cortisol. (Tervaniemi et al., 2021; Banerjee et al., 2015). Listening to music with attention significantly reduces the cortisol levels known as stress hormones. (Tervaniemi et al., 2021; Haikal et al., 2021)

Background music (BGM) could lead to worse performance in reading comprehension.

Where BGM has an enhancing effect on working memory capacity, the negative impact of BGM resulted in an overload of processing capacity (Wang, 2023). The neurobiology perspective of music suggests that music triggers reward systems in the brain by releasing the happiness hormone dopamine. Listening to pleasurable music increases the dopamine level and leads to rewarding experiences (Wang, 2023), so music results in a better outcome of cognitive performance (Wang, 2023).

The cognitive load was characterized in 1988 by psychologist John Sweller as "the total amount of mental effort used in the working memory" (Skelton & Pais, 2021). Sweller defines three kinds of cognitive load: Intrinsic cognitive load—relates to aspects of the task fundamental to the problem space. Extraneous cognitive load—relates to the environment in which the task gets done. Germane cognitive load—refers to aspects of the task that need special attention for learning or high performance.

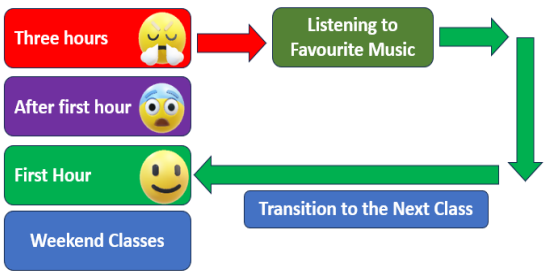
The reviewed study utilizing the desuggestopedia by Music Listening to help manage cognitive load has yet to be implemented in the Pakistan scenario for local students.

Data and Methodology:

The method was mixed, Quantitative-Qualitative. N=100, a hundred participants from different universities in Karachi, Pakistan, provided the data after taking more than 3 hours of class and are now going to another class. The data before and after listening to their favourite music listening was collected; the participants rated their cognitive load on a scale of 1-5 and expressed their mental state on

the opinion about taking the next class.

Once the data was collected from the participant's ratings and responses in words about their cognitive load after taking three hours of class, then they were encouraged to listen to their favourite song or Music from their smartphone or to playback the song in their head; we collected data again after they listened to their favourite music.



(Researchers suggested study model)

Research Questions:

- What is the relationship between listening to favourite music and the cognitive load of graduation-level students?
- How were participants' subjective experiences on their cognitive load before and after listening to music?

Research Hypothesis

- Ho: Taking a three-hour class does not significantly affect graduate-level students' rising cognitive load.
- Ho1: No significant effect of listening to favourite music on releasing the cognitive load among graduate-level students.
- Ha: There is a significant effect of taking three-hour-long classes on rising cognitive load among graduate-level students.
- Ha1: Listening to favourite music significantly releases the cognitive load among graduate-level students.

Results and Discussion: The quantitative data was collected from 1-5 on the cognitive load scale before and after listening to the participant's favourite music. Since the music listening and the 1-5 rating on the mental load meter are categorical variables,

the quantitative data will be analyzed using a simple chi-square suitable for a sample size.
The data in words (qualitative) were thematically analyzed.
Since P(**0.000)** was less than alpha**(0.05)**, the Ho was rejected, and the alternative hypothesis was accepted; we concluded that taking three-hour classes significantly affects the rising cognitive load among graduate-level students.
P**(0.000)** was less than alpha **(0.05)**, so Ho1 was rejected. The alternative hypothesis was accepted. We concluded that a significant relationship exists between listening to favourite music and the release of cognitive load among graduate-level students.

Descriptive Statistics

	N	Mean	Std. Deviation.	Minimum	Maximum
Cognitive Load before Music listening.	100	3.76	1.372	1	5
Cognitive Load After Music listening.	100	1.27	0.446	1	5

Cognitive Load before Music Listening.

	Observed N	Expected N	Residual
I can focus and get things done, but I still have time to learn.	10	20.0	-10.0
2	11	20.0	-9.0
3	15	20.0	-5.0
4	21	20.0	1.0
I feel so overloaded, cannot focus, and tired.	43	20.0	23.0
Total	100		

Cognitive Load After Music Listening.

	Observed N	Expected N	Residual
I can focus and get things done, but I still have time to learn.	73	50.0	23.0
2	27	50.0	-23.0
Total	100		

a. 0 cells (0.0%) have expected frequencies less than 5.
The minimum expected cell frequency is 20.0.

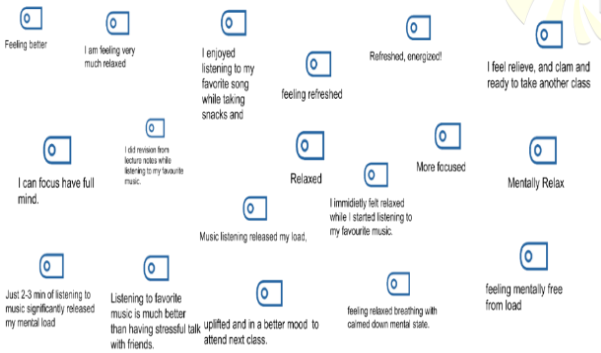
b. 0 cells (0.0%) have expected frequencies less than 5.
The minimum expected cell frequency is 50.0.

Participants expressed their cognitive load in words before and after listening to their favourite music.

Cognitive Load Before Listening to Favourite Music

"In a hurry to review notes for the next class", "I need some time to get mentally relaxed", I am exhausted", Much information in mind", "my mind is still processing the information", "drained mind", "Stressed", Hungry and mentally overloaded", "Intrinsically motivated but tired", "So tired and angry", I am trying hard and preparing myself for the next class", "Mentally occupied with the newly learn lesson", and "Motivated".

After Listening to Favourite Music



"Relaxed", "I feel refreshed", "Listening to favourite music is much better than having a stressful discussion with friends", Feeling better", "More focused", "I can focus with the full mind", I revised my lecture notes while putting on my headphones listening to instrumental music", Just 2-3 minutes of listening to Music listening significantly released my mental load", feeling mentally free from the load, "refreshed! and energized", Feeling relaxed breathing with calmed down mental state", I enjoyed listening to my favourite song while taking snacks and tea", "feeling uplifted and in a better mood for studying", "I immediately felt relaxed", "energized".

Findings

The quantitative analysis shows a significant impact of listening to favourite music on the effective management and release of cognitive load among graduate-level students.

The qualitative analysis of the participant's responses in mental load state of mind is such words: *"In a hurry to review notes for next class", "I need some time to get mentally relaxed", I am exhausted" Much information in mind", "my mind is still processing the information", "drained mind", "Stressed", Hungry and mentally overloaded", "Intrinsically motivated but tired", "So tired and angry", I am trying hard and preparing myself for the next class", "Mentally occupied with the newly learn lesson", and "Motivated".*

Moreover, after music listening, they responded with words such as: *"Relaxed", "I feel refreshed", "Listening to favourite music is much better than having a stressful discussion with friends", Feeling better", "More focused", and "I can focus with the full mind", I revised my lecture notes while putting on my headphones listening to instrumental music", Just 2-3 minutes of listening to Music listening significantly released my mental load", feeling mentally free from the load, "refreshed! and energized", Feeling relaxed breathing with calmed down mental state", I enjoyed listening to my favourite song while taking snacks and tea", "feeling uplifted and in a better mood for studying", "I immediately felt relaxed", "energized".*

Discussion:

N=100, quantitative and qualitative, shows the impact of listening to favourite music on releasing the cognitive load.

In the cognitive load state of mind, i.e., before listening to their favourite music, the participants In this study responded in words and rated their cognitive load on a scale of 1-5 from (I can easily focus, so I cannot focus at all), The statistical data analysis show that the null hypothesis which stated that taking long hours of the class has not affected the student's cognitive load, which got rejected as the **P(0.000)** is less than alpha (0.05). 17.9% And using the words "Tired" after taking the first class, 7.14% said "Exhausted", 3.6% "Frustrated", 21.4% said "Mind is still processing the information and needs a

break, 3.6% "depends on the subject and interest.", 3.6% responded "Hungry and Overloaded".

After listening to their favourite music, they rated their cognitive load on a scale of 1-5 (I can easily focus - I cannot focus), and they rated their cognitive load, which statistically P**(0.000)** is less than alpha **(0.05)**, rejected the null hypothesis and the alternative hypothesis got accepted. There is a significant relationship between listening to favourite music and the release of cognitive load among graduate-level students. They responded in words: 14.28% responded that their cognitive load has released, 21.42% answered that they are feeling relaxed and ready to take the next class, 7.14% responded that they felt refreshed and calm, 7.14% answered that they are more focused and in a much better state of mind, 57.14% responded that listening to their favourite Music is very effective in releasing cognitive load, 21.42% answered that they got relaxed after listening to their favourite music.

Conclusion:

This study concludes that cognitive load is the reality of higher education studies. The student's responsibility to manage their cognitive load while taking one class after another is their choice; listening to their preferred favourite music may release their cognitive load and enable them to be mentally prepared for the next class. One of the three frameworks of music listening can be utilized, such as using Music for stress reduction, listening to favourite music as it decreases cortisol (stress hormone), and using background music during activities to enhance students' working memory.

Recommendations

Teachers

- Teachers should play Music during/before/or after class to relax and rejuvenate students' minds.

Institutional

- Universities should consider that continuous classes can reduce students' productivity levels. Classes should have adequate breaks.

Policy Makers

- Policy makers should plan to provide creative intervention during class transitions.

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