

“We Are Now Getting More Relaxed”: Students Perception in Using Android Based Fatigue Measurement

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Abstract. Android based fatigue measurement is the application invented by the author to measure the fatigue level. Besides measuring the fatigue level, this application is also completed with the relaxation movement to reduce the fatigue. During the breakout of Covid-19, the writers applied this application to the students who performed online learning. This study explored the students’ experiences using this application. There were 180 students used this application. But only 15 students were chosen to be interviewed about their experiences while using the application. It was determined by the frequency of application usage. The results show that this application helps them in reducing their fatigue. The movement in the application is suitable for the students who stay in front of the computer all the day. The music instrument also helps them to get more relaxed and comfortable after studying. This application is useful for the fatigue relief during the online studying. Improvement is needed to the application for the display.

Keywords: Fatigue, university student, online learning, application.

1 Introduction

In the study literature, definitions of fatigue vary and largely depend on the specialty of the researcher team. Fatigue is described as a lack of efficiency, lassitude, or tiredness caused by physical or mental exertion that limits the motivation to exert any effort [1, 2]. Due to the complexity and multidimensionality of fatigue, there is continuous research into its measurement. Researchers have frequently substituted the causes and effects of weariness for fatigue itself [2, 3]. Previous research has identified causes of fatigue, including sleep deprivation, long work shifts, and physically or mentally taxing activities [4, 2]. Several researchers have observed that excessive weariness decreases safe working behavior, job performance, productivity, teamwork, and morale [5, 2].

Common parlance for the concept of fatigue falls short of the scope of the afore-mentioned definitions. Fatigue is defined by most dictionaries as a post-exercise state characterized by

mental or physical weakness and a brief decline in functioning skills [6]. The concept of fatigue was not defined in the research at hand. Instead, individuals' actual experiences were used to create a definition of tiredness. Since the release of COVID-19, studying fatigue in all its forms—central, regional, and peripheral—has been an urgent priority. One of the most important and well-studied topics is fatigue during exercise, and not simply from a psychological or physiological perspective. [7] Huge health and economic consequences may result from the COVID-19 pandemic. As of February 2021, the disease had been recorded in 215 countries and territories [8] after having been introduced in China in November 2019. It was responsible for the deaths of at least 2.4 million people. Almost 30 percent of all coronavirus confirmed cases occur in the United States, Brazil, India, and Russia. In the Western Pacific, Indonesia had the most confirmed cases and deaths, accounting for nearly half of the total cases and 40% of the total deaths (WHO, 2020).

Many countries have instituted disease management measures like social isolation and mandatory lockdown or stay-at-home orders in an effort to slow the spread of the coronavirus. [9, 10] In March of 2020, the government of Indonesia implemented a mandatory lockdown across the country. This policy, also known as a "community quarantine," mandated that all citizens stay inside their homes and were forbidden from leaving their properties for any reason other than work or emergency situations. Furthermore, physical school closures began in the middle of March 2020 and have yet to be lifted as of this writing; hence, virtual teaching and learning settings have been built as a stopgap measure. The number of confirmed cases and deaths from COVID-19 in the United States and other nations was assessed to be significantly reduced because to these strategies, which were used in concert with other disease control measures. [11]

The lockdown regulations may have stopped the spread of the coronavirus, but they have had serious consequences for people's mental and psychological health and well-being, especially among adolescents. One of the most commonly reported negative impacts of the lockdown or home confinement restrictions that necessitated online study during the COVID-19 pandemic was fatigue [12]. Weary of being locked down can manifest itself in a variety of ways, including physical, mental, and emotional signs [10]. It's triggered by things like persistent disruptions to daily life, feeling alone and unsafe, worrying about an immediate threat to one's health, and not knowing what the future holds.

In the vocational and labor sphere, several technology applications that permit analyzing the response of students to their impression of online education are being developed, the application that can give an appropriate instrument for this objective. Even cutting-edge technologies, such as the eye-tracker, have demonstrated their utility in diagnosing mental and physical fatigue [13]. The adoption of certain detecting technologies may be useful in determining both types of weariness. This study produced a fatigue-relieving Android application and solicited student feedback on it.

Several researches have examined the usefulness of measuring fatigue applications for the objective measurement of construction students' or workers' weariness. Ricardo et al. [14] present a mobile phone application called BAlert that enables monitoring and regulation of the body's tiredness processes based on Stroop effect scores and heart rate variability. A pilot research including 63 persons who have utilized the program 942 times has been conducted. 74% of the time, the data permit us to classify the subjects according to their fatigue levels

using logistic regression analysis. These findings demonstrate the significance of this mobile application for managing work fatigue processes in a variety of possible circumstances (military, health, sports, business, etc.). Seong et al. [15] measure construction worker weariness using EMA application and wearables. The results of this study indicate that EMA is a practicable and valuable technology with prospective applications in the construction sector. The method of measuring construction worker fatigue utilizing a smartwatch with EMA can offer subjective and objective fatigue symptoms in real time. The main goal of this research is to analyze the usefulness of the TOM's Model application for the detection of fatigue processes under the perceptions of students studying online.

2 Literature Review

2.1 Fatigue during online learning

Worldwide, educational institutions are adopting online learning to give students with continuing education amid the COVID19 epidemic. It is a worldwide issue that has an impact on educational institutions. Since the beginning of this pandemic, students have been alarmed and disturbed. As a result of the outbreak, schools have been closed, and pupils are now obtaining their whole education online. Isolation resulting from online education can be detrimental to student progress [16]. Not all students are successful with this method. The great majority of educational institutions are currently experiencing difficulties with online education [17].

During the COVID-19 pandemic, numerous varieties of technologically-induced weariness have emerged. For instance, "Zoom weariness" refers to the occurrence of persons becoming fatigued after participating in lengthy video calls. It is driven in part by "experiencing loss" [18], which means that people miss the way in-person encounters used to be. Even though the individuals are visible on screen, it is not the same as a meeting in person. Additional reasons of "Zoom weariness" include technological difficulties, which can irritate the other party and induce stress in individuals [18]. These arguments can also be applied to school settings, where pupils miss engaging with teachers and fellow students as they once did and where issues with students' electronic devices might upset teachers.

The desire to learn is what motivates students to perform well in their courses, which is why it is so vital alongside their enjoyment of studying. However, it depends heavily on the instructional immediacy of the pupils, which is conduct that makes them feel "physically or psychologically closer" [19] to their professors. This can be exceedingly challenging to accomplish in online classrooms, which may lead to online learning weariness.



Fig. 1. The icon for the application

The icon for this program is titled Tom's Model. When he initially devised this soothing approach, the researcher gave it this moniker. It had been established that relaxation therapy alleviated worker fatigue. The relaxation treatment comprises of stretching our muscles and joints after work. The movements are straightforward to duplicate. This movement is accompanied by an instrument whose composition was influenced by folk music. This traditional musical instrument reduces stress and fa-tigue in the working.



Fig. 2. Home feature

The homepage of this application consists of three sections: content, profile, and referrals. In the material portion, participants can learn about fatigue, including its definition, causes, effects, and treatments. The profile section contains details regard-ing the researchers. All

burned during each activity. This application assists users in calculating the daily caloric intake required for their activities. It is crucial since excessive calories have adverse effects.

3 Method

This study is qualitative in nature and is conducted through online chats. This online interview study intends to evaluate the viewpoints of how effective the application used to alleviate fatigue from students studying online. In-person interviews with research participants were replaced by online WhatsApp interviews [21] due to the pandemic. Saving time and minimizing transcribing errors are two benefits of electronic data collecting [22]. The researcher was able to accommodate the needs of the interviewees by adapting the timing of the interviews to their schedules. The purpose of online interviews for research purposes is to conduct background checks on respondents. By conducting interviews with individuals through the internet, researchers can learn more about their motivations, experiences, and perspectives.

3.1 Participant

Ten male and five female students, for a total of twenty, were recruited for this study. They were chosen based on their age and engagement with online learning activities.

The participants are students from Universitas Negeri Medan in Indonesia. They are students enrolled in the English Department's Art and Language Faculty. With the professors' consent, the participant recruitment announcement for this study was sent via WhatsApp. Since the authors are also their instructors, it is simpler to acquire authorization. Their ages ranged from 19 to 22 years of age. Table I shows the demographics of the participants.

Table 1: Participant Demography

Participant	Gender	Age	Department	Semester
	Male	20	English	4 th
P2	Male	20	English	4 th
P3	Male	21	English	6 th
P4	Male	21	English	6 th
P5	Male	20	English	4 th
P6	Male	22	English	6 th
P7	Male	22	English	6 th
P8	Male	22	English	6 th
P9	Male	20	English	4 th

P10	Male	20	English	4 th
P11	Female	19	English	2 nd
P12	Female	19	English	2 nd
P13	Female	21	English	4 th
P14	Female	20	English	4 th
P15	Female	20	English	4 th

3.2 Research Procedure

Data collection procedures were carried out in stages. The authors initially introduced the study's goals and asked for students' participation. Subjects who agreed to take part in the study were given access to a survey created in Google Forms. The next step, following the completion of the Google form-based written online interview, was to arrange for the online interview itself.

The interview took place online at a time convenient for all participants. Whatsapp video calls were used to conduct the virtual meeting. The applicant was able to review the recorded online interview. Twenty to thirty minutes were devoted to every single online chat. The material from the online interviews was listened to several times and then transcribed into tables for easier identification and classification. The language of the online interview was English.

3.3 Data Collection

Two approaches were used to gather information. You can either fill out a Google form for a written online interview or use Whatsapp's video chat feature to conduct a virtual online interview. The virtual online interview was semi-structured to probe the participants' perceptions and evaluate their perspectives on the efficacy of the program utilized to reduce online student fatigue.

Participants did not hesitate to respond to questions posed during the online interview. Since a close friendship already existed between the author and the internet interviewer. There is a teacher-student dynamic between the author and the audience members. Non-academic issues were a regular part of their conversations. The author would have access to more data on the participants. Analyzing the data from the online interviews with participants came next. However, the authors gave the interviewees a chance to look over their data before analyzing it (member checking). This action was performed to ensure the reliability of the data and to safeguard the honesty of the reconstructed data.

4 Results and Discussion

Students who were found to be using an application based on TOM's model were proven to be able to have their levels of fatigue measured, as a result of this study. This is due to the fact

that some features of this program have been designed to greatly drastically reduce on the mental and physical fatigue experienced by students. The statements that follow are some that were made by participants in the interview regarding how successful this form of application is to alleviate mental and physical fatigue.

4.1 Relaxation movement

This application's relaxing exercises include stretching exercises that can be performed by students experiencing physical fatigue while studying online. According to the opinions of the participants in this study, relaxing movement can lessen their degree of fatigue. One participant said:

"The movements in this application are fairly simple to duplicate, yet the benefits of online learning have helped me lessen my fatigue level" (P2).

Several studies have proved the benefits of yoga and meditation as stress management techniques for students. Warnecke E [23] discovered students' documented commitment to a daily, eight-week yoga intervention. In comparison to home study, dual yoga and meditation practice may result in a larger reduction in student stress.

In addition to the point made by the previous participant, calming movement in this application also guides students to the correct posture, especially those who spend a great deal of time sat at a desk or working on a computer due of excessive home study activities. The respondent stated:

"During this pandemic, I can only engage in learning activities while seated, as there are no designated rest periods, such as in class. It caused some back discomfort. However, this program reminds me to move correctly, so enhancing my posture when studying" (P1).

This statement is also supported by research from Deok Ju Kim et al [24], who found that exercise can be used to improve the work efficiency of students and people engaged in sedentary work, as well as changes in musculoskeletal pain in students following participation in an exercise program for posture correction.

Another participant said that calming movement in this application reduces weariness and boosts energy and motivation. Participant said:

"Because I stretch prior to working out, I am able to study for longer periods of time in front of the computer" (P15).

Nicholas T [25] discovered that exercise before studying can enhance blood flow to the brain, thereby enhancing concentration and promoting wakefulness, thereby allowing students to study for longer periods of time.

4.2 Relaxation music

It is claimed that music might aid in reducing mental weariness and enhancing work efficiency. Several researches have concluded that music influences cognitive functions [26]. Jing et al. [27] discovered that the effect of listening to soothing music on mental fatigue generated by an arduous cognitive motor activity was unknown. The purpose of the present study was to investigate this issue and the accompanying neurobehavioral mechanisms.

Arikan et al. [28] observed that hearing familiar music during memory updating processes in an auditory oddball task boosted the allocation of attentional resources. In addition, it has been demonstrated that listening to soothing music is an effective strategy to recuperate from exercise-induced exhaustion. The results of those researches are relevant to the claims made by some participants in this study.

"Listening to music not just decrease my fatigue, but also help my anxiety lower" (P5).

In addition, it demonstrates that music helps students concentrate on their studies. *"I'm able to concentrate better thanks to the app's background music."*(P9).

This participant's comment is comparable to the conclusion of a Stanford study [29] that "music causes the brain to pay attention." This study utilized musical works from the 1800s and discovered that "music stimulates the brain regions responsible for paying attention, formulating predictions, and updating memory" [29]. "The purpose of the study was to examine how the brain sorts out events, but the research also demonstrated that musical strategies utilized by composers two centuries ago assist the brain in organizing incoming information" [29]. This can aid pupils in classifying material, which is an important study skill. A participant added,

"Music will not only help me focus on my schoolwork during this epidemic, but it will also help me relax and get into a good frame of mind for learning." (P4).

Several studies have also demonstrated how music may affect and cultivate an individual's mood. One of them, the University of Maryland Medical Center [30], explained that music is a great stress reliever for both healthy people and those with health issues. According to research, listening to calming music can reduce blood pressure, pulse rate, and anxiety levels in the heart. This statement demonstrates the profound effect music can have on the human body.

This study makes a variety of claims about the impact of music on weariness, one of which relates to the effect that music has not only on one's mood but also on the human brain. One participant stated,

"I find that my memorization skills are enhanced when I use this program in conjunction with music. I have a better ability to memorize new material." (P14).

Additionally, music enhances our capacity for memorization. However, it depends on a variety of things, such as the style of music, the degree to which the listener appreciates it, and his musical education. According to Boksem [31], less musically educated individuals memorized information better while listening to upbeat music, perhaps because such songs produced more pleasant feelings and did not inhibit memory formation. On the other hand, musically trained learners scored better on learning tests when they listened to neutral music, most likely because it was less distracting and easier to ignore.

Lastly, this application demonstrates that despite learning online, pupils remain motivated to learn due to the application's background music. Participant said

"Having to do so much individual work at home while studying online makes me a bit slothful. But when I put on some tunes from this application, I feel a surge of inspiration to study" (P4).

This conclusion is also consistent with prior research by Naveen Kumar [32], which found that 78 out of 80 students reported that listening to music while studying helps them concentrate and increases their motivation to study for longer.

5 Conclusion

The newly developed application known as TOM'S MODEL for relaxing contributes greatly to efforts to combat fatigue. This application is only available on mobile devices. According to the findings of the study, the use of an Android-based relaxation application considerably reduces participants' physical and mental fatigue. It implies that relaxation has been proved to reduce online students' fatigue levels because it has relaxation movement and music features inside. It was determined from the interview that the traditional instrument helped them relax. The instrument indicates that the motion is also easy to imitate. They can complete the assignment without problem. All participants have android-based devices, making the use of an android-based application highly effective. They do not need a separate device for relaxation as it is integrated into their smart phones. This program can be utilized by students and other folks to the advantage of a vast number of people.

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