

Computer Gaming can help reduce stress among minority STEM college students.

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Abstract

The purpose of this research was to explore ways in which video games and or gaming, in general, assisted STEM minority students in the reduction of stress. Student stress is generated by course attendance, participation, homework, social life, perceived parental pressure, university applications, and seemingly never-ending workloads. 59% of students play games regularly, 36% play once in a while or sometimes. 70% of college students play video, computer, and or online games at least once in a while, and 65% have been reported to be regular or occasional gamers. This study researches student stress, how students overcome their anxiety by playing games, what type of games they play, what device they play games on, and whether gaming reduces stress. 95% of minority STEM students agree that video games relieve stress. Smartphones and Xbox consoles are among the students' top systems for playing video games, and action and puzzle games are the top games STEM students play.

INTRODUCTION

Stress is a joint force in the lives of every individual; it is an individual's body reaction to a particular or series of events (WebMD, 2021). Games have always been a leisure activity among people of all ages, including college students. Identifying trends in how playing video games relates to stress is difficult because there is little data about this relationship. It has been reported that 70% of college students play video games, computer games, and online games at least once in a while, as reported from our interview protocol at Kentucky State University (KSU). Kentucky State University is one of the 107 HBCUs in the United States and its territories (Grant, 2024). Video games can be a haven for students to connect with other people positively. The relationship between gaming and education may sound strange, but it is normal and a fragment of the program coursework in the STEM environment. Science, Technology, Engineering, and Mathematics (STEM) are the academic programs of participants in this study (Fayer et al., 2017; Noonan, 2017; Popa & Ciascai, 2017). STEM Gaming is crucial in deepening student understanding and comprehension within learning. In addition to learning in its raw form, college students must simultaneously complete multiple tasks, such as classes, homework, studying, and social life. It is often challenging to take a break from these rigors of study (Abdi, 2021). Video games can be a great way to break away from the stresses of school and study, relax, and try to diminish stress. Some students struggle to fit in and make friends, further propagating stress. Video games can be a portal for students to connect with other people (Abdi, 2021) positively.

REVIEW OF LITERATURE

Stress is a particular relationship between a person and their environment. College students constantly have more multifaceted inconveniences due to academic pressures, adaptations to a new environment, fears of failure, struggle to fit in, and social unfamiliarity. College students are

vulnerable to various stress-inflicting situations, which often cause them to be continually creative in managing stress. These stressful situations for college students directly come from those environments (Yikealo et al., 2018). For instance, in a study distributed to 77 undergraduates, undergraduate students in their 2nd, 3rd, and 4th year of degree and diploma at the College of Engineering (CoE) experienced stress due to academics and a lack of time management (Yikealo et al., 2018).

Another study was conducted on academic stress among college students in the education faculty at King Saud University (Bataineh, 2013), where the study showed academic overloads, course awkwardness, wrong time to study, semester workloads, exam awkwardness, low motivation, and high family expectations to produce moderate stress among students (Bataineh, 2013). Fear of failure was the primary fear among those students (Bataineh, 2013).

Studying for students is not perceived as stressful (Bataineh, 2013). However, family expectations for their children, which may transfer to their children, are a factor that plays into the potential increase in stress levels for students (Bataineh, 2013). According to the National Crime Records Bureau, one student commits suicide every hour (Reddy et al., 2018). In addition, 1.8% of students committed suicide because of failing exams (Reddy et al., 2018).

Every human being suffers from stress, stress that can cause mental and physical harm, which can lead past a student's education and further harm them within their careers (Reddy et al., 2018). Video games could be one solution to managing those stresses (Reddy et al., 2018). Studies worldwide have shown that employees can cope with workplace stress by playing video games (Reddy et al., 2018).

According to a study from the United Kingdom (U.K.) (Wallace, 2019), 1,000 video game enthusiasts were interviewed between 18 and 30 years of age and were asked why they played video games. Of the varied reasons:

55% said the games help them "unwind and relieve stress."

47% said the games helped them see their lives in a more positive light

37% said gaming improved their confidence

27% said gaming helped them solve mental health issues and or concerns

During the COVID-19 pandemic 2020, it was the first time most adolescents and young adults experienced such a stressful situation (Wallace, 2019). The uncertainty about the situation impacts their future academic and career prospects. In addition to the stress, most students at the time of the closure of colleges were expected to take their professional course examinations (Wallace, 2019). This examination also got postponed indefinitely; this could also be a potential factor impacting the mental health of college students (Wallace, 2019).

Video game helps students deal with stress, mental health, and personal problems, but it is not just college students. The video game has been said to help people with disabilities, doctors, and nurses (Wojciechowski, 2018). Research has shown that video games are an innovative teaching strategy to improve learning outcomes for nursing (Wojciechowski, 2018). Gaming enhances knowledge retention and increases problem-based learning, and nursing students are more engaged in learning (Wojciechowski, 2018). The video game also helps identify areas needing further training and education (Wojciechowski, 2018). The world of possibilities using video games is very encouraging; whether the game is single-player, multiplayer, or virtual, a video game could be made for just about any situation and patient (Wojciechowski, 2018). Video games are teaching

tools that help explain complex information, onboard new nurses, and provide an alternative to classroom training (Wojciechowski, 2018). Using both plug-and-play games and customized games provides our nurses with the information they need when they need it in a fun, interactive format (Wojciechowski, 2018). The World of Salus is an example of a video game we use in orientation to cover critical topics pertinent to nurses starting at Mercy Hospital (Wojciechowski, 2018). Instead of sitting through 3 days of classroom lectures, new employees venture into a world where they create an avatar, earn badges, explore knowledge objects, and complete challenges to make it to the finales and receive their certificate of completion (Wojciechowski, 2018).

Another research study surveyed 1614 video game players to determine how video games can help reduce stress (Scott, 2020). The results show that video games can be used to recover from stressful situations (Scott, 2020). The research examined work fatigue, daily tasks, and recovering from this stress-related situation by playing video games (Scott, 2020). The study found that people who played video games could recover faster from stressful situations than people who did not play video games and experienced stressful situations (Scott, 2020).

In a Microsoft study within the Xbox research accessibility community Feedback program, a group of people made up of players with disabilities looked at gaming and mental health during the pandemic (Bach, 2021). The study found that 84% of the people indicated video games positively impacted their mental health, and another 71% said video games helped them feel less isolated (Bach, 2021). In addition, video can help people with mental illness by providing a way to relax and connect with others (Bach, 2021). Overall, video games play a positive role in relieving stress without the need for medication and other medical-related treatments.

METHODOLOGY

This study aims to quantitatively examine college student stress and how gaming may help them reduce or overcome it. Four types of validity will be reviewed and assessed before, during, and after this research to ensure validity: construct, internal, external, and conclusion (Bruce et al., 2008; Creswell, 2009; Cosby & Bates, 2012; Trochim, 2000). The population sample met the single criteria of computer science students currently enrolled at Kentucky State University (KSU). The sampling strategy chosen for this study was purposeful, as they were specifically selected for their participation and knowledge (Bungay et al., 2016; Crossman, 2017; Salmons, 2017). The instrumentation of this study was a semi-structured interview protocol consisting of ten multiple-choice questions (Arsel, 2017; Cruz & Tania, 2017). This instrumentation was previously reviewed and approved by the Internal Review Board (IRB) of KSU for collecting research data. The research questions focused on the stress level of students, what causes their stress, and what type of games they play to help them cope with it. The process of collecting the data took approximately two weeks. The responses to the interview protocol were analyzed for common themes (Creswell & Creswell, 2018). The interview protocol questions provided to the STEM students are listed below. The survey was primarily distributed to STEM Computer Science undergraduate students as these students were available to take the survey.

1. What is your age? (24% responded)
 - a. 18-24
 - b. 25-31
 - c. 32-38
 - d. 39-45

- e. 46-51
- f. 52 and over

2. Do you play games/video games? (24% responded)

- a. Yes
- b. Sometimes
- c. No

3. Roughly how many hours do you spend playing games daily? (e.g., gaming consoles, mobile phones, PCs, etc.) (24% responded)

- a. None
- b. 30min
- c. 1 hour
- d. 2 hours
- e. 4 hours or more

4. What device do you use to play games? (24% responded)

- a. Mobile device
- b. PlayStation
- c. Xbox
- d. Nintendo
- e. PC

5. What type of games do you enjoy? (24% responded)

- a. Action
- b. RPG
- c. Puzzle
- d. Battle royale
- e. Adventure
- f. Sports
- g. MMO
- h. Horror
- i. Fantasy

6. How often are you stressed? (24% responded)

- a. Everyday
- b. Few times a week
- c. About once a week
- d. Once a month

7. On average, how much stress do you consider yourself to have? (24% responded)

- a. None
- b. Slightly stressed
- c. Moderately stressed
- d. Greatly stressed
- e. Extremely stressed

8. What causes your stress? (24% responded)

- a. School
- b. Work
- c. Personal problems

9. How much do you consider school to contribute to your stress level? (24% responded)

- a. None
- b. Slightly
- c. Moderately
- d. Greatly
- e/ Extremely

10. Would you say playing games reduces academic stress? (Like playing games after an assignment or project) (24% responded)

- a. Yes
- b. No

DATA COLLECTION

The data was collected from Kentucky State University, a historically black college and university (HBCU) in Frankfort, Kentucky. The student population at Kentucky State University is close to 1500 students. An Internal Review Board (IRB) approved the data collection interview protocol. The data was collected anonymously from the student population chosen for the study: current STEM undergraduate students. A web form was developed and used as the interview protocol questionnaire, where identifying information such as IP addresses, names, and e-mail addresses were not attained. An e-mail was sent to each proposed participant explaining voluntary participation criteria. This e-mail stated that completing the survey was voluntary and that the student may decide not to participate at any time, even if they start to participate. The interview protocol was a multiple-choice questionnaire using a web-based tool called Survey Monkey to collect the data. Ten multiple-choice questions were given about user behavior on the internet. The survey was distributed to a total of 95 STEM students. A total of 23 participants responded to the interview protocol and completed it. The response rate was relatively low, as shown in Figure 1.

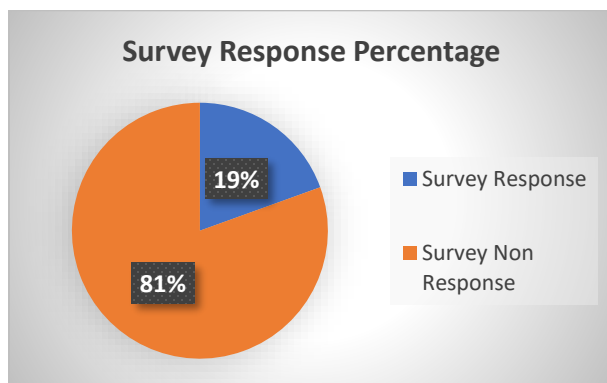


Figure 1. The response rate among STEM students at KSU

RESULT

This section discusses the survey results. For example, the data in Figure 2 shows that school and personal problems cause 90% of students' stress. In addition, factors such as homework, social life, perceived parental pressure, university applications, and never-ending workloads generate students' stress.



Figure 2. Cause of stress among STEM College students.

27% of students consider school to contribute to their stress, 32% feel it moderately affects their focus, and 18% say it slightly affects it. Overall, 88% of college students in the United States reported their school life to be stressful, and the most significant stress factor was exams (Jones, 2019).

59% of students play games regularly, and 36% play once in a while or sometimes. At least 70% of college students play video, computer, or online games at least once in a while, and 65% have been reported to be regular or occasional gamers (Jones, 2019).

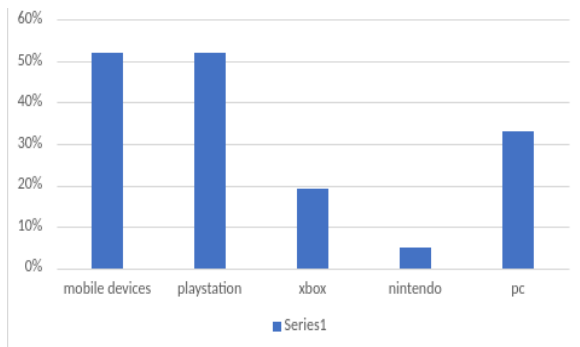


Figure 3. Devices STEM students use to play video games.

In Figure 3, 52% of students use mobile and PlayStation devices to play games, 33% use PCs, 19% use Xboxes, and 5% use the Nintendo Switch. According to an article, 85% of college students own a laptop computer (PC), with smartphones nearing 70%. Two-thirds of college students own consoles: PlayStation, Xbox, and Nintendo.

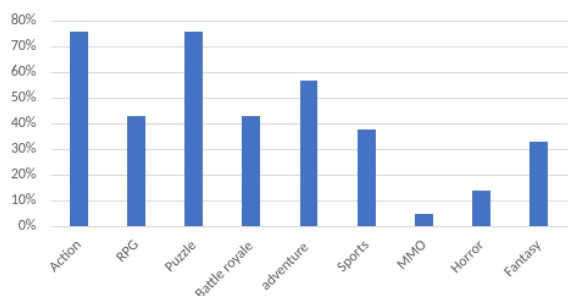


Figure 4. Types of video games played by age range 18-45.

In Figure 4, the group's ages ranged from 18 to 45, and all had experience playing video games. Only one individual reported that they rarely played video games. About 52% of the sample size said that they play on mobile devices and PlayStation, 33% play on PC, and Nintendo is the least used by students. From the chart of games played by students, we can see 76% of students enjoy playing action and puzzle video games, 57% want to play adventure games, 43% want to play RPG (role-playing game) and battle royale, and the least played MMO (massively multiplayer online game). The most popular games among college students in 2021 were GTA, Call of Duty, The Elder Scrolls Skyrim, Super Smash Bros., and Assassin's Creed, all of which are action games (Reynolds, 2022). In each of these games, you can make your own choices during the game. The best video games generally have an engaging and well-written storyline, flexibility during gameplay, or an open world. These games can be played whenever you need a stress-free break (Reynolds, 2022).

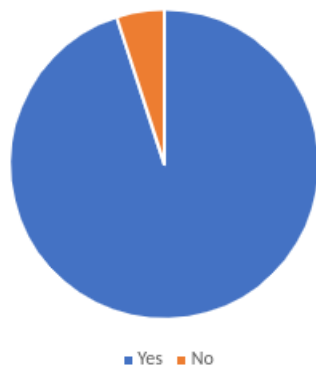


Figure 5. Respondents on whether computer games reduce stress.

In Figure 5, 95% of respondents agree that video games reduce academic stress, and 5% disagree. 66% of Americans, or 221.5 million, agree that video games positively impacted them during the COVID-19 pandemic lockdowns (Takahashi, 2022). 97% of Americans see the benefits of playing video games (Takahashi, 2022). Reports state that playing video games during the COVID-19 pandemic positively impacted people (Takahashi, 2022). 89% of players say video games help improve cognition, and 83% say games introduce people to new friends and relationships. 70% of players use their phones to play. 48% of players identify as female, and 52% as male. Games serve many functions: educational, mental health, and stress relief benefits (Takahashi, 2022).

CONCLUSION

Overall, playing games is an effective strategy for reducing stress. Most STEM students in this research agree that video games do relieve stress. STEM is a complex field that can increase pressure on students. Most students use their mobile devices and Xbox consoles to play video games. The convenience of playing video games on a smartphone makes it easier to play them without needing to be at a specific location. Action and Puzzle games are the top games STEM students play, followed by adventure games. School, work, and personal problems contribute to stress, and video games have proved to be a solution to reducing stress among STEM students.

The future study could include a broader population of other colleges and universities close to KYSU, such as the University of Kentucky (UK), University of Louisville (UofL), Midway University, and Simmons College (HBCU). The response of 23 was small due to the survey being taken during the COVID-19 pandemic. We anticipate a more significant response in the future and collecting game title information. We can also ask more survey questions to get better responses from participants regarding computer games' relation to stress reduction. This can include surrounding universities, non-HBCUs, and global universities. Additional studies can include using computer games in academics for learning purposes for STEM students to increase learning outcomes. Other areas can consist of computer games for STEM students to learn concepts.

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