TECHNICAL REPORT

Effect of Video Game Usage on Academic Performance of Medical Students in King Abdulaziz University

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Abstract

Habitual playing of video games is believed to have a harmful effect on the academic performance of students. This study tracks the effect of video game playing on the academic performance of medical students in Saudi Arabia. During May through August 2013, 307 medical students in their final years filled a cross-sectional survey to collect data on the use of video games at King Abdulaziz University. Results showed female students played video games less than male students. Additionally, video game users were more likely than non-users to have scores between 4.0 and 4.4 on a 5 point grade point average scale. While higher scoring students were less likely to play video games, only 25.6% of the surveyed students could be included in that category, and 71.8% of those students played video games for < 1 hr /day. Students who played video games for > 1 hr/day had a lesser chance (50.4%) of scoring within the highest range of grade point averages. The results indicate that while limited use of video games may improve grade point average scores, video gaming could not be recommended for students who want to score in the highest tier of grade point averages. A large-scale multi-institutional study is required to confirm these observations.

Keywords

Academic performance, Grade point average (GPA), Medical students, Saudi Arabia, Video game.

Introduction

Playing video games has become a very popular pass time activity over the last several decades, and a recent study showed that 59% of Americans play video games[1]. Use of video games has been successfully incorporated into patient care regimens. For instance, it was reported that video game usage improves visual attention and cognitive control in older adults[2,3]. Similarly, video games are also used for educational purposes. For example, video games have been developed and used to educate medical students in geriatrics and improve laparoscopic skills[4,5]. However, it remains inconclusive whether educational video games can be effectively incorporated into the education of medical students[6].

Previous studies have found that continuous video game playing resulted in a pathological condition termed "video game addiction," in which game playing affects the individual's psychological and behavioral health, and disrupts their normal life routine[7,8]. Furthermore, continuous use of violent video games may increase aggressive behavior and hostile expectations[9]. The harmful effects of video games on educational performance and social behavior are most

apparent in children, adolescents, and students; hence, use of conventional video games may be detrimental to the performance of a medical student[10-12]. However, the effects of video game playing may also be influenced by factors such as the types of games played, the amount of time spent playing, and the time spent playing while studying for exams. As a counterpoint, video games may also have a beneficial effect on student performance by providing an important form of entertainment and psychological rejuvenation, resulting in improved concentration during study time. This study evaluates the effect of video game usage on the academic performance of medical students in Saudi Arabia.

Methods

Responses were obtained from a cross-sectional survey of 307 medical students enrolled in their fourth, fifth, or sixth year of clinical studies at King Abdulaziz University, Jeddah, Saudi Arabia. Each student provided a signed written informed consent prior to enrolling in the study. All participants were assured of the confidentiality of their responses, and that all findings would be used solely for research purposes. No incentive was provided for their participation. Permission to conduct this study was granted by the Biomedical Ethics Research Committee of King Abdulaziz University.

Initially, the questionnaire was emailed to 342 4th-year students, 328 5th-year students, and 403 6th-year students. A second request to complete the survey was sent eight weeks after the initial attempt in order to enhance the response rate. The survey was disseminated using the online survey program at www.surveymonkey.com. Then, all students were given paper-based questionnaires through their class leaders to maximize the response rate. All questionnaires included questions on demographics, their preferred video game, the average duration of playing per day, and their grade point average (GPA) as a measure of performance. Other questions addressed the amount of time spent on studying, their class attendance rate, and studying patterns during examination seasons.

The data were analyzed using IBM SPSS Statistics for Windows, Version 20.0. (IBM Corp. Armonk, NY USA). Descriptive statistics is used for presenting the majority of prevalence related data. The 2-tailed chi-square (χ^2) test was used to test relationships between two categories of variables, and P-values < 0.05 were regarded to be statistically significant.

Results

This survey was conducted during May-August, 2013 at King Abdulaziz University, Jeddah, Saudi Arabia. The final response rate for students across all classes was 28.6% with a total of 307 students out of 1073. There were 178 (58%) female respondents. The age range of students was 20-24 years, with 48.5% aged 23-24 years. The majority of the surveyed students (85%) lived with their family while 10.7% lived alone, and 3.9% lived with a roommate. The majority of participants (42%) had GPA

Table 1. Participants' demographics.

Variable	Frequency (N)	Percent (%)
Age (Years)		
20-21	34	11.1
21-22	81	26.4
23-24	149	48.5
> 24	43	14.0
Gender		
Male	129	42.0
Female	178	58.0
Residency		
Your family	262	85.3
Roommate	12	3.9
Alone	33	10.7
Class (Year)		
Fourth	58	18.9
Fifth	87	28.3
Sixth	162	52.8
GPA		
< 3.0	2	0.7
3.0-3.4	34	11.1
3.5-3.9	63	20.7
4.0-4.4	128	42.0
4.5-5.0	78	25.0

Table 2. Study Habits of the surveyed students.

Variable	Frequency (N)	Percent (%)
Do You Study?		
All Year	177	57.7
Only for Exams	130	42.3
If you study all year, how many hours do you study?		
< 2hrs	70	22.8
2-4 hrs	79	25.7
4-6 hrs	18	5.9
> 6 hrs	4	1.3
Only on weekends	21	6.8
NA	115	37.5
On weekends, how many hours do you study?		
< 2hrs	29	9.4
2-4hrs	62	20.2
4-6hrs	54	17.6
> 6hrs	26	8.1
Only on weekends	19	6.2
NA	118	38.4
Before exams, how many hours do you study?		
< 2 hrs	8	2.6
2-4 hrs	25	8.1
4-6 hrs	202	65.8
> 6 hrs	72	23.5
Your attendance at lectures, sessions, and rounds?		
< 50%	9	2.9
50-75%	56	18.2
> 75%	242	78.8

Table 3. Demographics relevant to video game usage.

Variable	VG Players		Non-VG Players		P-Value
	N	%	N	%	
Age					
20-21	18	52.9	16	47.1	0.004
21-22	33	40.7	48	59.3	
23-24	85	57.0	64	43.0	
> 24	32	74.4	11	25.6	
Gender					
Male	95	73.6	34	26.4	< 0.001
Female	73	41.0	105	59.0	
GPA					
< 3.0	2	100	0	0.00	0.200
3.0-3.4	24	70.6	10	29.4	
3.5-3.9	33	52.4	0	47.6	
4.0-4.4	69	53.9	59	46.1	
4.5-5.0	39	50.0	39	50.0	

Table 4. Timing and extent of video game usage.

Variable	Frequency (N)	Percent (%)
You Play more on:		
Weekends	84	50.00
Weekdays	19	11.31
Both Equally	65	38.69
How many Hours do you play video games?		
> 35 hrs/w or >5 hrs/d	4	2.4
20-35 hrs/w or 3-5 hrs/d	9	5.39
14-20 hrs/w or 2-3 hrs/d	30	17.96
7-14 hrs/w or 1-2 hrs/d	31	18.56
< 7 hrs/w or < 1 hr/d	94	55.89

Table 5. Relationship between hours spent video gaming and High GPA tier.

GPA	Hours Playing		Total (N)	P - Value
	< 1 hr /d	> 1 hr/d		
< 4.5	63	64	127	0.019
> 4.5	11	28	39	
Total	74	92	166	

scores between 4.0 and 4.4 on a 5 point GPA scale, and 25.6% had GPA scores of 4.5-5.0 (Table 1). A slight majority of students (57.7%) reported studying throughout the year, while the remaining students reported that they studied only during examination seasons. The largest cohort (25.7%) reported studying 2-4 hrs/day, and only 6.8% of students studied on weekends. The majority of students (65.8%) reported studying 4-6 hrs/day during examination times. Importantly, 78.8% of the students surveyed had an attendance rate of > 75% at the curriculum's scheduled lectures and educational sessions (Table 2).

The results of the survey show that 54.7% (n = 168) of the students played video games, and the majority of those students (73.6%) were male (P < 0.001). Additionally, most of the gamers (74.4%) were aged > 24 years (P < 0.004) (Tables 3 and 4) and most video gaming occurred on weekends, rather than throughout the week. Finally, among the video gamers, 55.9% reported playing < 1 hr/day or < 7 hrs/week (Table 4).

Of the 39 students who scored in the highest tier of GPA (GPA > 4.5), 71.8% played video games for < 1 hr/day (P = 0.019) (Table 5).

Discussion

These findings can be summarized as follows: (1) Video gamers mostly achieved GPAs in the range of 4-4.5. (2) Students in the highest tier of GPAs (4.5-5) reported spending < 1 hr/day playing video games. (3) Most students spent < 7 hrs/week or < 1 hr/day playing video games. (4) Approximately 50% of students in their final years of medical school were video gamers. (5) Video gaming is more prevalent among older students. (6) Male students play video games more often than female students.

While numerous negative effects of playing video games have been reported, the positive effects of habitual video gaming have received little attention. Especially the use of tailor-made games may have beneficial effects on medical students and doctors [13]. In the USA 50% of medical students are reported to play video games, and 98% of them want to use tailor-made technical games to enhance their medical education[14]. In the current study, 54.7% of the medical students surveyed were video gamers; however, no attempt was made to determine how many of them used the games for education purposes.

Consistent with previous studies, playing video games is more prevalent among male medical students (73.6%) than female medical students (41%) (P < 0.001) [15] . However, one study found that equal numbers of men and women in college play video games[16]. This difference may be attributable to access, psychosocial characteristics of the study population or preferences for various types of games [17]. This study also found that video gaming was significantly more common among older students, in their final year of education, versus younger students (P = 0.032). These results agree with those reported by Kron et al., indicating that the mean age of medical students who play video games is ~ 25 y (Table 4) [14]. Furthermore, the mean age of American video gamers is reported to be 30 years [1]. These findings are in contrast to the traditional belief that video gaming is mostly practiced in younger age groups. This difference between traditional beliefs and actual findings is likely due to the rapidly evolving video game industry, which is trying to accommodate different age groups.

College students in the USA play video games > 2 hrs/w, and medical students report playing ~ 1 h/day for

fun and relaxation[14,15]. In contrast, this study found that while 54.7% of medical students play video games, most of those students (55.9%) play < 7 hrs/week.

Data regarding the effects of video gaming on academic performance remains contradictory. Video gaming has been reported to adversely affect the academic performance of school age and college students [18,19]. In contrast, a positive relationship between video gaming and GPA has also been documented[20]. In that study, university students who reported being habitual players had significantly higher GPA scores than non-gaming students [20]. Medical school education is thought to be very challenging, requiring dedication and strict time management. Therefore, it is reasonable to assume that video gaming may negatively impact the academic performance of medical students. However, these results suggest a positive effect, as there were more video gamers among students with a GPA between 4 and 4.4 on a 5-point scale (53.9%) (Table 3). Recently, a large multicenter study of 192,000 students showed that video gaming did not negatively impact the academic performance of adolescents studying science, mathematics or reading. The differences in results reported by various studies might be attributable to characteristics of the different study populations [21].

Numerous factors can impact the academic performance of students. These include the amount of time spent studying, availability of study material, individual variations, and the process used to evaluate academic performance. Therefore, the exact connection between the amount of time spent playing video games and a student's GPA is complex. Problem-solving is an essential activity in videogame playing. Hence, any increased exposure to challenging problem solving activities, such as those presented in video games, might help prepare students for challenges encountered in their education, which in turn would be reflected in better academic performance.

Ventura *et al.*,[20] reported that habitual players who spent 11-50 hrs/week playing video games had a higher GPA compared to students who played for 0-10 hrs/week. In contrast, this study found that, of the students with a high GPA, most spent < 7 hrs/week or < 1 hr/day playing video games. Furthermore, the highest tier students (GPA > 4.5-5) reported spending < 1 hr /day on video gaming (P = 0.019). These findings suggest that video games should be played in moderation to receive the potential benefits on academic performance [20].

This study has certain limitations that should be mentioned. First, the results were based on responses provided in a self-administered questionnaire, and such information may be viewed as subjective and subject to faulty recollection. Second, the low response rate (28.6%) raises the issue of respondent bias. The likely reasons for the low response rate include the voluntary invitation to participate and lack of incentive. The repeat electronic invitation and the dissemination of the paper questionnaire increased the response rate to 28.6% from an initial response rate of 15 %. Third, although a positive relationship between GPA and video gaming was found, this relation cannot be considered as a causal association. Fourth, as a single-center study, the findings might not represent the academic performance of medical students enrolled at other universities.

Conclusions

Although habitual video gaming can affect academic performance, these results suggest that limited playing of video games is associated with moderate improvement in the GPA scores of medical students in Saudi Arabia. However, the author does not recommend video gaming to students who intend to score in the highest tier of GPAs. These results need to be verified in a large-scale study involving medical students enrolled at multiple universities.

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Disclosure

No competing financial interests exist

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تأثير ألعاب الكومبيوتر على الأداء العلمي لطلاب طب جامعة الملك عبدالعزيز

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المستخلص. من المتوقع أن يكون لألعاب الكومبيوتر المختلفة تأثير سلبي على مستوى التحصيل العلمي. أجريت هذه الدراسة لتقييم تأثيرات اللعب بألعاب الكومبيوتر المختلفة على الأداء العلمي مقاساً بالمعدل التراكمي للطلاب. تضمنت الدراسة إجراء مسح بياني لثلاثمائة وسبع طالب وطالبة في المراحل الدراسية الأخيرة لكلية الطب وتم جمع المعلومات المتعلقة بلعب ألعاب الكومبيوتر وعدد ساعات الدراسة ومعلومات أخرى. أظهرت نتائج الدراسة أن الطالبات أقل ممارسة لألعاب الكومبيوتر من الطلاب وأن أكثر الطلاب ممن يمارسون هذه الهواية يكون معدلهم التراكمي ما بين الجيد جداً إلى بداية درجة الامتياز ولكن طلاب الامتياز المرتفع هم أقل لعبا لهذه الألعاب وهم يمثلون ربع شريحة الطلاب الذين يمارسون هذه الهواية ويبدو أن معظمهم أيضاً يصرفون أقل من ساعة يوميا في هذه الألعاب . وأيضا أوضحت الدراسة أن من يصرف أكثر من ساعة يوميا في هذه الألعاب لديه فقط فرصة خمسين بالمائة لكي يحصل على معدل الامتياز. أوضحت الدراسة بالعموم أنه بالرغم من أن لعب ألعاب الكومبيوتر قد يكون سبب لحصول الطلاب على معدل جيد جداً ولكنه لا يمكن أن يكون سبباً للحصول على معدل تراكمي لدرجة الامتياز . نقترح بإجراء دراسات أخرى تضم أكثر من جامعة لإثبات هذه النتائج.