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Development of a self-report questionnaire for evaluating the occupational performance and satisfaction in daily occupations in seven occupational areas of university students with game addiction

Sithikorn Surintaramon, Naphatsorn Phuprasoet, Wannipa Bunrayong, Savitree Thummasorn*

Department of Occupational Therapy, Faculty of Associated Medical Sciences, Chiang Mai University, Chiang Mai Province, Thailand.

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ABSTRACT

Background: Nowadays, the prevalence of internet usage for university students' game playing is increasing worldwide. However, overabundant gaming may lead to game addiction. Studies have demonstrated that game addiction increases the risks of health problems. Moreover, it also decreases occupational performance via cognitive and psychosocial skill reduction. In occupational therapy, cognitive and psychosocial performance are necessary for daily activities. Furthermore, occupational satisfaction also correlates positively with participation in occupations. Thus, occupational therapists should know the occupational performance and satisfaction in daily occupations of university students with game addiction to explore occupational issues and plan interventions. However, an instrument for evaluating the occupational performance and satisfaction in daily occupations of university students with game addiction has never been investigated.

Objective: This study developed a questionnaire to evaluate the occupational performance and satisfaction in the daily occupation of university students with game addition.

Materials and methods: The questionnaire, comprising 22 items, assessed the impacts of game addiction on occupational performance and satisfaction in daily occupations of seven occupational areas. Afterwards, the psychometric properties of the questionnaire were investigated in 78 university students with game addiction.

Results: This study showed that the questionnaire had sufficient content and construct validity for evaluating the impacts of game addiction on occupational performance and satisfaction in the daily occupations of university students. Moreover, the internal consistency of the questionnaire in occupational performance is good (Cronbach's alpha coefficient =0.812). Also, the internal consistency of the questionnaire in satisfaction of daily occupation is good (Cronbach's alpha coefficient =0.82).

Conclusion: The questionnaire is valid and reliable for evaluating the occupational performance and satisfaction in daily occupation of university students with game addiction. Screening these components can provide a new occupational therapy tool for such students.

Introduction

Nowadays, the amount of internet usage is increasing in all areas of life[1], and the prevalence of playing games on it is growing among children and adolescents worldwide (the prevalence rate 62.1%)[2]. However, overabundant gaming may lead to game addiction.[3] Currently, the World Health Organization (WHO) classifies gaming disorder, or game addiction, as a mental health disease according to the 11th revision of the International Classification of Diseases.[4] The

* **Corresponding contributor.**
Author's Address: *Department of Occupational Therapy, Faculty of Associated Medical Sciences, Chiang Mai University, Chiang Mai Province, Thailand*
E-mail address: savi_ps@hotmail.com
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WHO defines game addiction as an impairment of gaming behavior, including uncontrolled gaming, prioritizing game playing over other activities, and continuing game playing despite the negative consequences.[5] Studies showed that game addiction increases the risks of health problems such as depression, emotional distress, or memory and attention deficits via decreased cognitive and psychosocial skills.[6-9] It is established that cognitive and psychosocial skills are necessary for performing daily activities.[10,11] Thus, a severe level of game addiction possibly impacts the performance of individuals in their everyday lives.

Occupational performance is the ability to choose, organize, and satisfactorily perform meaningful occupations.[12] In occupational therapy, the importance of occupational performance can be described in occupation-based models.[13] For example, the Person-Environment-Occupation-Performance (PEOP) model describes the importance of the occupational performance of individuals via the interaction between the person, environment, and occupational characteristics.[14] In contrast, the Canadian Model of Occupational Performance and Engagement (CMOP-E) describes the correlation between the person, environment, and occupation, leading to the ability and engagement of individuals to perform occupations. This is consistent with the problems of game addiction, as impairment of gaming behavior correlates negatively with several issues such as impairments of school engagement, cognition, and emotion, possibly leading to poor educational performance in adolescents and young adults.[15-16] For this reason, occupational therapists must know the level of occupational performance in the population with game addiction to explore health problems as well as plan interventions in occupational therapy. In addition, it is known that poor occupational performance correlates with low satisfaction in occupations when performing daily occupation.[17] Occupational satisfaction is contentment with the current engagement, or absence of engagement, in different daily occupations, such as work, leisure, home maintenance, and self-care. Hence, low occupational satisfaction can decrease the participation in individuals' occupations.[18] The population with game addiction may have a low level of satisfaction in performing other occupations, which leads to a lack of occupational participation via decreasing occupational performance. Therefore, occupational therapists must know the level of occupational satisfaction in individuals with game addiction to explore occupational participation and plan interventions for these people.

This study aims to develop an assessment tool in occupational therapy for evaluating occupational performance and satisfaction in daily occupations of individuals with game addiction. This assessment tool was developed based on the concept of the CMOP-E model. It was described that the ability of individuals to perform occupations and occupational engagements occurs from the relation between the person, environment and occupation. The CMOP-E model focuses on the client-centered approach and the ability of clients to perform occupations in three occupational categories: work, self-care and leisure. Recently, occupational therapists have been able to use the Canadian Occupational Performance Measure (COPM) for evaluating occupational performance and satisfaction in three occupational areas (work, self-care and leisure) via self-scoring by the client.[12] However, the occupational areas in the COPM may not cover the types of occupations affected by game addiction such as education, health management, or social participation. Therefore, the items of a questionnaire in this study were developed based on a broad range of occupations in the fourth edition of the Occupational Therapy Practice Framework: Domain and Process (OTPF-4).[19]

Additionally, the question of how severity of game addiction impacts occupational performance is controversial. For example, a study reported that game playing can increase cognitive performance via increasing attention, memory, and planning.[20] Therefore, occupational therapists need to know the level of vulnerability in occupational performance and satisfaction in daily occupations among the university students with game addition, which would lead to an intervention plan in occupational therapy. In the process of COPM tool scoring, the client can self-rate scores in occupational performance and satisfaction in a range from 1 point (poor performance and low satisfaction) to 10 points (good performance and high satisfaction). After that, occupational therapists can use the change in average occupational performance and satisfaction scores between pre- and post-intervention for measuring intervention outcome in occupational therapy.[12] However, no assessment tool evaluates the level of vulnerability in occupational performance and satisfaction in daily occupations of university students with game addiction. Therefore, this study developed the 5-point Likert scale for self-measuring occupational performance ranging from 1 point (unacceptable level) to 5 points (excellent level), and for the levels of self-measuring occupational satisfaction ranging from 1 point (very dissatisfied) to 5 points (very satisfied). Information from a developed questionnaire can help occupational therapists to know the levels of vulnerability in the occupational performance and satisfaction in daily occupations of university students with game addiction, which leads to intervention plans in the future.

In addition, this study focused on designing a self-report questionnaire for young adults, especially university students. It is established that university students move from adolescence into young adulthood at transitional age[21], which is considered a critical period in human development, characterized by several physical, cognitive, and psychosocial changes. Therefore, skills of adaptation to a new learning environment are challenging at transitional age, especially in university students. This study focused on designing a self-report questionnaire for university students with game addiction. Evidence reported that the prevalence of game addiction (54.3%) is increasing in university students.[22] Moreover, game addiction was negatively associated with the psychosocial well-being and school performance of university students.[23] Thus, a self-report questionnaire was developed to evaluate

occupational performance and satisfaction in the daily occupation of university students with game addiction and test its psychometric properties. This information can provide a new occupational therapy tool for evaluating the levels of vulnerability in the occupational performance and satisfaction in daily occupations of university students with game addiction, which leads to the exploration of problem lists and intervention plans in occupational therapy.

Materials and methods

Participants

In this study, the sample size was calculated based on the aims of the study: the construct validity and reliability of internal consistency. The sample size calculation for construct validity was conducted by a known group technique using G*Power software 3.1.9.7, and input parameters consisting of 0.4 effect size, 0.05 alpha, and 0.8 power of test. Of 156 undergraduate students, 78 with game addiction and 78 without taking part in testing known-groups validity. Game addiction was screened by an occupational therapist by using the game addiction self-evaluating test for children and adolescents.[24] The value of Cronbach's alpha of game addiction screening test was 0.92. Moreover, the sensitivity and specificity of game addiction screening test for children and adolescents were 68.5 and 89.3, respectively.[24]

For reliability of internal consistency in the participants with game addiction, the sample size was calculated by Bonett's formula. This study used a single coefficient of Cronbach's alpha test. According to Bonett's formula, the value of Cronbach's alpha at null hypothesis (CA0) and the expected value of Cronbach's alpha (CA1) were set as 0.6 and 0.75, respectively.[25] Moreover, the power value of tests, number of items in the questionnaire (k) and probability of type I error (alpha) were set as 0.8, 22, and 0.05, respectively.[25] Finally, 77 participants with game addiction were tested for internal consistency.

For the process of data collection, 1st year undergraduate students with and without game addiction were invited to attend research study via online advertisement poster. The interested volunteers can register to participate in the research and choose a convenient date for collecting data with researchers (face to face) via a register link on an advertisement poster. In this study, simple random sampling was used for recruiting the participants. Once enough volunteers had done this, the recruiting participant was stopped immediately. For the inclusion criteria, male and female participants with game addiction screening test scores of less than 24 and 16 points, respectively, were classed as without game addiction, while those with scores of more than 24 and 16 points, respectively, were considered as with game addiction. When recruiting the participant, interested volunteers were informed that they needed to meet the inclusion criteria to ensure equality. The exclusion criteria of this study were the interested volunteers who are not able to read questionnaires and miss scheduled appointments for collecting data.

Research design

Phase 1: Development of the self-report questionnaire for evaluating the occupational performance and satisfaction in daily occupations of university students with game addiction

The items of a self-report questionnaire were developed based on the concept of client-centered practice in the CMOP-E model. The participants can self-evaluate via scoring their own occupational performance and satisfaction in daily occupation. Additionally, all items in the questionnaire were designed in the occupational areas affected by game addiction. For the initiation process, game addiction was evaluated among 30 university students. After that, five university students with game addiction will be chosen by simple random sampling by a lottery method and will receive an invitation by email for participating in a focus group discussion. For the inclusion criteria of 5 participants with game addiction, university students with game addiction test scores of more than 24 points in male and 16 points in female were considered as with game addiction. The date of the focus group will be within 2 weeks after the invitation. An offline focus group was conducted for 2 hours to discuss a given topic for exploring the opinions, perceptions, and concerns of the individuals regarding their health issues and well-being. In addition, they were also interviewed to find out the affected occupations from game addiction as well as their perceptions on performance and satisfaction in daily living activities. This discussion is supervised and monitored by occupational therapists. For specific open-ended question examples are as follows: 1) how often do you play games? and how to play? 2) What leisure activities that you like or are interested in performing besides game playing? 3) What daily activities are affected by your game playing? 4) Do you think playing games affects your ability to perform daily activities? And how? 5) Are you satisfied with your ability to perform daily occupations? And how? After that, the information from focus group discussion was analyzed and designed the components of the questionnaire in two parts including the occupational performance and satisfaction in daily occupation. Moreover, the affected daily occupations from game addiction were categorized, based on a broad range of occupations in the OTPF–4 including activities of daily living (ADLs), instrumental activities of daily living (IADLs), health management, rest and sleep, education, play, work, leisure, and social participation.[19] Finally, the 22 items of the questionnaire focused on the occupational performance and satisfaction in daily occupations of university students with game addiction in seven types of occupations, including activities of daily routine, the daily activities related to environments, activities of health promotion, sleep, recreational and leisure activities, activities relevant to the person's role, and social participation.

In scoring the questionnaire, the participants gave scores of their own performance and satisfaction in each item. The 5-point Likert scale was used for self-measuring

occupational performance ranging from unacceptable (1 point), needs improvement (2 points), acceptable (3 points), good or exceeds expectations (4 points) to excellent or fully competent performance (5 points). A score of occupational performance ranging from 1 to 2 of each item represented a low level of occupational performance in that occupational area, while that of occupational satisfaction ranging from 1 to 2 of each item, represented a low level of occupational satisfaction. The low levels of occupational performance and satisfaction indicated the levels of vulnerability in the occupational performance and satisfaction in daily occupations of university students with game addiction. The information from this questionnaire can help occupational therapists to know the levels of vulnerability in the occupational performance and satisfaction in daily occupations of university students with game addiction, which leads to intervention plans in the future.

Phase 2: Study of the psychometric properties of the questionnaire

Content validity of the questionnaire

After developing a self-report questionnaire, the content validity was evaluated by five experts using the index of item-objective congruence (IOC). These experts consisted of a psychiatric physician, two occupational therapists with experience in treating psychiatric patients, and two occupational therapists who had experience in developing assessment tools in occupational therapy. Subsequently, the questionnaire was tested in a pilot group of university students with game addiction to assess their opinion on understanding of language, language integrity, clarity of the question, and volume and response of time in assessment. For the process of recruiting participants in a pilot study, 50 university students were screened for game addiction. After that, we found that 12 university students with game addiction test scores of more than 24 points in male and 16 points in female were considered as with game addiction. Then, 12 university students with game addiction were invited by email to attend a pilot study and to try out the developed questionnaire. Feedback from the pilot study found that one student lacked clarity of the question (items of questionnaire: No. 10 and 11), while two students lacked language understanding and clarity of the question (items of the questionnaire: No. 6, 10, and 11). After revising the feedback, the self-report questionnaire consisted of five Likert rating scales with 22 items to evaluate the occupational performance and satisfaction of university students with game addiction, as shown in Table 1.

Table 1. Items of the questionnaire.

Items	The level of occupational performance					The level of occupational satisfaction					N/A
	5	4	3	2	1	5	4	3	2	1	
Questions: At present, what is the level of your performance and satisfaction in daily occupations when participating in the following activities:											
Daily routine activities											
1. Dressing											
2. Bathing											
3. Activities of personal hygiene (for example: brushing your teeth, washing your face, nail and hand hygiene, etc.)											
4. Toileting											
5. Eating food											
Daily activities related to environments											
6. Caring for others (for example: family members, friends or a lover)											
7. Caring for pets											
8. Home management (for example: cleaning, organizing, laundering, etc.)											
9. Cooking											
10. Financial management (for example: cash management, bank transactions, financial reporting, etc.)											
11. Activities of risk management and response to emergency											
12. Shopping											
13. Religious activities											

Table 1. Items of the questionnaire (*continued*).

Items	The level of occupational performance					The level of occupational satisfaction					N/A
	5	4	3	2	1	5	4	3	2	1	
Questions: At present, what is the level of your performance and satisfaction in daily occupations when participating in the following activities:											
Health promotion activities											
14. Healthcare activities											
15. Physical activities											
16. Activities of taking medicine											
17. Activities of nutrition management											
Sleep											
18. Appropriate sleep management											
Activities relevant to the person's role											
19. Education											
20. Work											
Recreational and leisure activities											
21. Recreational and leisure activities											
Social participation											
22. Social activities (for example: joining a party, concert, team sports, etc.)											

***Note**: Level of occupational performance; 1 = unacceptable (1 point), 2 = needs improvement (2 points), 3 = acceptable (3 points), 4 = good or exceeds expectations (4 points), and 5 = excellent or fully competent performance (5 points),Level of occupational satisfaction; 1 = very dissatisfied (1 point), 2 = dissatisfied (2 points), 3 = neutral (3 points), 4 = satisfied (4 points), and 5 = very satisfied (5 points).*

Additionally, the characteristic data of the respondents is designed in the questionnaire. The characteristic data of the respondents consists of the gender, age of the respondents and the time spent playing games per day. It is known that occupational satisfaction is associated with participating in occupations.[18] Hence, the increased level of time spent on game playing possibly decreases occupational satisfaction and leads to occupational imbalance or occupational dysfunction.

1) Construct validity of the questionnaire

The known group technique was used for testing the construct validity of the questionnaire between the participants with and without game addiction. The significant difference (5% margin of error at a 95% confidence level and a 0.05 significance level) between the two groups represented good construct validity by using the independent-t-test.[26] For the process of independent t test, the data is checked for normality tests (with a p<5%). If normality is approved, the independent-t-test was performed to compare means between two groups.

2) Internal consistency of the questionnaire

Cronbach's alpha coefficient was used for testing the reliability of internal consistency of the questionnaire. In this study, the internal consistency of the questionnaire was tested in university students with game addiction. Reliability of internal consistency greater than or equal to 0.7 was considered as the acceptable level.[27]

Ethic approval

This study was approved by the Ethics Committee at the Faculty of Associated Medical Sciences, Chiang Mai University (Ethic number: AMSEC-66EX-023). The consent form was obtained from all participants before collecting data. The participants in this study comprised 1st year undergraduate students from Chiang Mai University, and they all completed a consent form before the data were collected. In this study, all participants had never been diagnosed with a psychiatric disorder or had physical disabilities. The history of illness was confirmed by interviewing all participants.

Results

Demographic data of the participants

The demographic characteristics of the participants are shown in Table 2. Overall, the percentage number of males and females in the with game addiction group was 41.03 and 58.97, respectively, while that in the without game addiction group was 43.59 and 56.41, respectively. The average age of the participants in the with and without game addiction group was 18.70±0.73 and 18.51±0.55 years, respectively. In addition, the average time spent on game playing per day in the with and without game addiction group was 4.78±1.60 and 1.07±1.27 hours, respectively.

Table 2. Demographic data of the participants.

Variables	Group with game addiction (N=78)	Group without game addiction (N=78)
Gender		
Male (N, %)	32, 41.03 %	34, 43.59 %
Female (N, %)	46, 58.97 %	44, 56.41 %
Age (years)		
Average	18.70±0.73	18.51±0.55
Time spent on game playing (hour/day)		
Average	4.78±1.60	1.07±1.27

Content validity of the self-report questionnaire for evaluating occupational performance and satisfaction in daily occupations

The content validity of the questionnaire (Table 3) was conducted by experts using IOC values. The IOC scores provided three scales of rating for consistency and congruencies of each item (the IOC score; 1 = consistent, 0 = somewhat consistent, -1 = not consistent). Average scores for each item must have a consistency value equal to or above 0.50. After that, the IOC average score of the questionnaire was calculated and interpreted. The result showed that the developed questionnaire had good content validity (IOC=0.95). Moreover, the content validity of each item also was acceptable level.

Table 3. Content validity of the questionnaire

Questionnaire	The IOC scores of five experts						Interpretation
	Expert No. 1	Expert No. 2	Expert No. 3	Expert No. 4	Expert No. 5	Average score of IOC	
Item 1	1	1	1	1	1	1	usable
Item 2	1	1	1	1	1	1	usable
Item 3	1	1	1	1	1	1	usable
Item 4	1	1	1	1	1	1	usable
Item 5	1	1	1	1	1	1	usable
Item 6	1	1	1	1	1	1	usable
Item 7	1	1	1	1	1	1	usable
Item 8	1	1	1	1	1	1	usable
Item 9	1	1	1	1	1	1	usable
Item 10	1	1	0	1	1	0.8	usable
Item 11	1	0	1	1	1	0.8	usable
Item 12	1	1	1	1	1	1	usable
Item 13	1	0	1	1	1	0.8	usable
Item 14	1	1	1	1	1	1	usable
Item 15	1	1	1	1	1	1	usable
Item 16	1	1	1	1	1	1	usable
Item 17	1	1	1	0	1	0.8	usable
Item 18	1	1	1	1	1	1	usable
Item 19	1	1	1	1	1	1	usable
Item 20	1	1	1	1	1	1	usable
Item 21	1	1	1	1	1	1	usable
Item 22	1	1	1	0	1	0.8	usable
Total items						**0.95**	**usable**

***Note**: IOC score; 1 = consistent, 0 = somewhat consistent, -1 = not consistent*

Construct validity of the self-report questionnaire for evaluating occupational performance and satisfaction in daily occupations

The construct validity was tested as shown in Table 4. The average score of all items in the questionnaire was calculated according to the 5-point Likert scale, and it was significantly different between the with and without addiction groups. The results showed that the total items of occupational performance had good construct validity. The construct validity of each item in occupational performance was seen as also good after testing. Results showed that total items of the questionnaire in occupational satisfaction had good construct validity. However, only 19 items of the questionnaire were found with good construct validity in occupational satisfaction, whereas the average scores of three remaining items (question number 6, 8, and 22) were not significantly different between the with and without game addiction groups.

Table 4. Construct validity of the questionnaire.

Questionnaire	Occupational performance (Mean±SD)			Occupational satisfaction (Mean±SD)		
	Group with game addiction	Group without game addiction	*p* value	Group with game addiction	Group without game addiction	*p* value
Total items	77.63±10.66	94.45±10.54	**0.00***	83.87±11.91	94.78±10.37	**0.00***
Item 1	3.90±0.78	4.42±1.04	**0.00***	3.81±0.93	4.42±0.88	**0.00***
Item 2	4.05±0.79	4.74±0.61	**0.00***	4.08±0.89	4.74±0.57	**0.00***
Item 3	3.72±0.87	4.67±0.73	**0.00***	4.24±0.84	4.69±0.69	**0.00***
Item 4	3.95±0.97	4.65±0.66	**0.00***	4.01±1.02	4.61±0.67	**0.00***
Item 5	3.91±1.12	4.51±0.77	**0.00***	3.87±1.28	4.49±0.80	**0.00***
Item 6	3.54±1.04	4.04±1.02	**0.00***	3.89±1.10	4.10±1.13	**0.21**
Item 7	3.49±1.36	4.38±0.79	**0.00***	3.87±1.13	4.38±0.77	**0.01***
Item 8	3.71±1.05	4.18±0.88	**0.01***	3.88±1.13	4.17±0.99	**0.08**
Item 9	3.32±1.20	4.53±0.60	**0.00***	3.87±1.06	4.42±0.59	**0.00***
Item 10	3.40±1.05	4.32±1.01	**0.00***	3.49±1.20	4.38±1.01	**0.00***
Item 11	3.61±0.76	4.34±0.87	**0.00***	3.77±0.91	4.38±0.83	**0.00***
Item 12	3.88±0.82	4.46±0.79	**0.00***	3.94±1.06	4.36±0.88	**0.01***
Item 13	2.18±1.17	4.15±1.02	**0.00***	3.08±1.30	4.29±0.94	**0.00***
Item 14	3.95±0.89	4.35±0.82	**0.01***	4.05±1.02	4.35±0.80	**0.01***
Item 15	3.63±1.01	4.31±0.79	**0.00***	3.91±1.12	4.36±0.78	**0.00***
Item 16	3.57±1.23	4.29±0.86	**0.00***	3.72±1.16	4.32±0.90	**0.00***
Item 17	3.50±1.11	4.35±0.67	**0.00***	3.91±1.22	4.50±0.69	**0.00***
Item 18	3.25±1.28	4.40±0.74	**0.00***	3.71±1.32	4.39±0.78	**0.00***
Item 19	3.65±0.94	4.53±0.58	**0.00***	3.85±1.11	4.53±0.72	**0.00***
Item 20	3.51±1.00	4.39±0.70	**0.00***	3.71±0.94	4.29±0.78	**0.00***
Item 21	3.59±0.86	4.62±0.63	**0.00***	4.09±0.86	4.54±0.64	**0.00***
Item 22	3.70±1.17	4.39±0.81	**0.00***	4.42±0.86	4.38±0.83	**0.82**

***Note**: *p<0.05 represents the significant difference of average questionnaire scores between the two groups.*

Reliability of the self-report questionnaire for evaluating occupational performance and satisfaction in daily occupations of university students with game addiction

The reliability of internal consistency of the questionnaire in university students with game addiction is shown in Table 5. Internal consistency of the questionnaire was found by Cronbach's alpha coefficient. Total items of the questionnaire in occupational performance of university students with game addiction had good internal consistency. Also, the internal consistency of each item was seen as good after testing. In addition, reliability of the self-report questionnaire was tested for evaluating the occupational satisfaction of university students with game addiction, and results showed that total items and each item of the questionnaire had good internal consistency.

Table 5. Internal consistency of the questionnaire in university students with game addiction.

Questionnaire	Cronbach's alpha coefficient	
	Occupational performance	Occupational satisfaction
Total items of questionnaire	0.812	0.820
Item 1	0.819	0.819
Item 2	0.820	0.820
Item 3	0.820	0.818
Item 4	0.819	0.818
Item 5	0.817	0.817
Item 6	0.816	0.818
Item 7	0.818	0.818
Item 8	0.817	0.818
Item 9	0.818	0.817
Item 10	0.815	0.814
Item 11	0.821	0.820
Item 12	0.820	0.818
Item 13	0.823	0.820
Item 14	0.816	0.814
Item 15	0.817	0.819
Item 16	0.816	0.815
Item 17	0.816	0.814
Item 18	0.818	0.816
Item 19	0.818	0.817
Item 20	0.818	0.817
Item 21	0.819	0.817
Item 22	0.818	0.817

Discussion

Recently, many studies showed that game addiction increased the risks of physical and mental health issues, leading to a decrease in school or work performance in adolescents and young adults.[16,28-29] Interestingly, studies showed that game addiction also decreased the performance of cognitive and psychosocial skills.[7-9] It is known in occupational therapy that cognitive and psychosocial skills are necessary for performing daily activities.[10-11] Thus, game addiction possibly decreases the efficiency and competence required in occupations.

This study developed a self-report questionnaire for evaluating occupational performance in university students with game addiction. Studies showed that game addiction increases the risks of health problems such as depression, emotional distress, or memory and attention deficits via decreased cognitive and psychosocial skills.[6-9] This study developed a self-report questionnaire for evaluating occupational performance in university students with game addiction. Studies showed that game addiction increases the risks of health problems such as depression, emotional distress, or memory and attention deficits via decreased cognitive and psychosocial skills.[6-9] Moreover, a study demonstrated that game addiction correlates negatively with the ability to participate social activity and the college grade point average of university students.[15] For this reason, young adults with game addiction, such as university students, may be unable to complete their daily activities or perform required occupations due to spending too much time on game playing. Thus, it is necessary for occupational therapists to know the level of occupational performance in university students with game addiction and to explore occupational problems as well as plan intervention. In this study, the questionnaire was developed

as Thai language, based on information from interviewing university students with game addiction on the types of occupations affected by game addiction as well as their perception of occupational performance. Then, the items of the questionnaire were categorized as seven types of occupations. Moreover, the 5-point Likert rating scale was used for self-measuring the level of occupational performance in each item. For scoring occupational performance in each item, the individual who had the score of occupational performance as 1 (unacceptable) or 2 (needs improvement) represents as individual who had a low level of occupational performance in that activity. After that, the psychometric properties of a questionnaire were tested and the results showed that the questionnaire had good validity and reliability for assessing occupational performance in game addicts. However, this study did not measure the construct validity and reliability for 7 sub-domains (activities of daily routine, daily activities related to environments, activities of health promotion, sleep, recreational and leisure activities, activities relevant to the person's role, and social activity). In this future, this information needs to be tested. In clinical applications of the questionnaire, a low level of occupational performance can be used as information for exploring health problems, setting intervention goals and planning intervention for university students with game addiction in occupational therapy.

Additionally, this study also developed a self-report questionnaire for evaluating occupational satisfaction in university students with game addiction. It is known that occupational satisfaction is associated with participating in occupations.[18] Occupational satisfaction is defined as contentment with the current engagement, or absence of engagement, in different daily occupations, such as work, leisure, home maintenance, and self-care. Hence, low occupational satisfaction can decrease the participation in occupations of individuals.[18] Therefore, game addiction possibly decreases occupational satisfaction and leads to lack of participation in other occupations. Moreover, poor occupational performance correlates with low satisfaction when performing daily activities (17). Thus, game addiction possibly leads to a low level of occupational satisfaction through reduced occupational performance. Therefore, it is necessary for occupational therapists to know the level of occupational satisfaction in individuals with game addiction when exploring occupational participation and planning future intervention.

In this study, the 5-point Likert scale was used for measuring occupational satisfaction, which ranged from very dissatisfied (1 point), dissatisfied (2 points), neutral (3 points), satisfied (4 points) to very satisfied (5 points). A score of occupational satisfaction, ranging from 1 to 2 for each item, represents a low level of occupational satisfaction. In clinical application of the questionnaire, the low level of occupational satisfaction can be used as information for exploring occupational participation, setting intervention goals and planning intervention in occupational therapy. The results of this study found that the questionnaire had good validity and reliability for assessing occupational satisfaction. However, when considering construct validity in each item of the questionnaire, it was found that only 19 questions could be used to assess occupational satisfaction in university students with game addiction, while the levels of occupational satisfaction in the three remaining questions were not different between the with and without game addiction groups. It is possible that game addiction may not affect satisfaction in performing three occupations, including taking care of others, home management, and social activity. However, it is still necessary to test this hypothesis.

Overall, this study showed that the questionnaire had good validity for evaluating occupational performance and satisfaction in daily occupations via testing content validity and construct validity in university students with game addiction. Moreover, the questionnaire had an acceptable level of internal consistency for evaluating occupational performance and satisfaction in daily occupations in university students with game addiction. Although COPM is widely used as a tool for assessing occupational performance via self-scoring in range from 1 point (poor performance) to 10 points (good performance), no assessment tool evaluates the level of vulnerability in the occupational performance of university students with game addiction. For this reason, the information from this developed questionnaire can help occupational therapists to know the level of vulnerability in occupational performance (1 point: unacceptable or 2 points: needs improvement) of university students with game addiction, and lead to intervention plans in the future. Moreover, it can provide a new occupational therapy instrument for exploring health problems in people with game addiction, as well as evaluating individual's perceptions on occupational performance and satisfaction in daily occupations. In the future, other psychometric properties of the questionnaire, such as confirmatory factor analysis, need to be tested for ensuring that the instrument represents the underlying construct well.

Conclusion

The questionnaire has validity and reliability for evaluating the occupational performance and satisfaction in daily occupations of university students with game addiction. This information can provide a new occupational therapy tool for evaluating the levels of vulnerability in the occupational performance and satisfaction in daily occupations of university students with game addiction, which leads to intervention plans in the future.

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Declaration of competing interest

The authors declare no conflict of interests.

References

[1] Cotten SR, Goldner M, Hale TM, Drentea P. The importance of type, amount, and timing of internet

use for understanding psychological distress. Soc Sci Q. 2011; 92(1): 119-39. doi: 10.1111/j.1540-6237.2011.00760.x

[2] Alrahili N, Alreefi M, Alkhonain IM, Aldakhilallah M, Alothaim J, Alzahrani A, et al. The Prevalence of Video Game Addiction and Its Relation to Anxiety, Depression, and Attention Deficit Hyperactivity Disorder (ADHD) in Children and Adolescents in Saudi Arabia: A Cross-Sectional Study. Cureus. 2023; 15(8): e42957. doi: 10.7759/cureus.42957

[3] Derevensky JL, Hayman V, Lynette G. Behavioral Addictions: Excessive Gambling, Gaming, Internet, and Smartphone Use Among Children and Adolescents. Pediatr Clin North Am. 2019; 66(6): 1163-82. doi: 10.1016/j.pcl.2019.08.008

[4] Rumpf HJ, Achab S, Billieux J, Bowden-Jones H, Carragher N, Demetrovics Z, *et al*. Including gaming disorder in the ICD-11: The need to do so from a clinical and public health perspective. J Behav Addict. 2018; 7(3): 556-61. doi: 10.1556/2006.7.2018.59.

[5] Vaccaro AG, Potenza MN. Diagnostic and Classification Considerations Regarding Gaming Disorder: Neurocognitive and Neurobiological Features. Front Psychiatry. 2019; 10: 405. doi: 10.3389/fpsyt.2019.00405

[6] Gulu M, Yagin FH, Gocer I, Yapici H, Ayyildiz E, Clemente FM, *et al*. Exploring obesity, physical activity, and digital game addiction levels among adolescents: A study on machine learning-based prediction of digital game addiction. Front Psychol. 2023; 14: 1097145. doi: 10.3389/fpsyg.2023.1097145

[7] Wong HY, Mo HY, Potenza MN, Chan MNM, Lau WM, Chui TK, *et al*. Relationships between Severity of Internet Gaming Disorder, Severity of Problematic Social Media Use, Sleep Quality and Psychological Distress. Int J Environ Res Public Health. 2020;17(6): 1879. doi: 10.3390/ijerph17061879

[8] Pallavicini F, Pepe A, Mantovani F. The Effects of Playing Video Games on Stress, Anxiety, Depression, Loneliness, and Gaming Disorder During the Early Stages of the COVID-19 Pandemic: PRISMA Systematic Review. Cyberpsychol Behav Soc Netw. 2022; 25(6): 334-54. doi: 10.1089/cyber.2021.0252

[9] Ngetich R, Burleigh TL, Czako A, Vekony T, Nemeth D, Demetrovics Z. Working memory performance in disordered gambling and gaming: A systematic review. Compr Psychiatry. 2023; 126: 152408. doi: 10.1016/j.comppsych.2023.152408

[10] Tiznado D, Clark JMR, McDowd J. Cognitive predictors of a performance-based measure of instrumental activities of daily living following stroke. Top Stroke Rehabil. 2021; 28(6): 401-9. doi: 10.1080/10749357.2020.1834269

[11] Goktas A, Varli M. Psychosocial health and activities during the COVID-19 pandemic. Work. 2023; 75(4): 1127-38. doi: 10.3233/WOR-220007

[12] Law M, Baptiste S, McColl M, Opzoomer A, Polatajko H, Pollock N. The Canadian occupational performance measure: an outcome measure for occupational therapy. Can J Occup Ther. 1990 ;57(2): 82-7. doi: 10.1177/000841749005700207

[13] Larsson-Lund M, Nyman A. Participation and occupation in occupational therapy models of practice: A discussion of possibilities and challenges. Scand J Occup Ther. 2017; 24(6): 393-7.

[14] Christiansen C. H. BCM, Bass J. D. Occupational therapy: Performance, participation and well-being. 3rd ed. ed: SLACK Inc.; 2005, p.372-92.

[15] Schmitt ZL, Livingston MG. Video game addiction and college performance among males: results from a 1 year longitudinal study. Cyberpsychol Behav Soc Netw. 2015; 18(1): 25-9. doi: 10.1089/cyber.2014.0403

[16] Chang E, Kim B. School and individual factors on game addiction: A multilevel analysis. Int J Psychol. 2020; 55(5): 822-31. doi: 10.1002/ijop.12645

[17] Abdullah EJ, Badr HE, Manee F. MS People's Performance and Satisfaction With Daily Occupations: Implications for Occupational Therapy. OTJR (Thorofare N J). 2018; 38(1): 28-37. doi: 10.1177/1539449217719867

[18] Bergstrom A, Guidetti S, Tham K, Eriksson G. Association between satisfaction and participation in everyday occupations after stroke. Scand J Occup Ther. 2017; 24(5): 339-48. doi: 10.1080/11038128.2016.1245782

[19] Occupational Therapy Practice Framework: Domain and Process-Fourth Edition. Am J Occup Ther. 2020; 74(Suppl2): 7412410010p1-p87. doi: 10.5014/ajot.2020.74S2001

[20] Boot WR, Kramer AF, Simons DJ, Fabiani M, Gratton G. The effects of video game playing on attention, memory, and executive control. Acta Psychol (Amst). 2008; 129(3): 387-98. doi: 10.1016/j.actpsy.2008.09.005

[21] Chan V, Moore J, Derenne J, Fuchs DC. Transitional Age Youth and College Mental Health. Child Adolesc Psychiatr Clin N Am. 2019; 28(3): 363-75. doi: 10.1016/j.chc.2019.02.008

[22] Sayeed MA, Rasel MSR, Habibullah AA, Hossain MM. Prevalence and underlying factors of mobile game addiction among university students in Bangladesh. Glob Ment Health (Camb). 2021; 8: e35. doi: 10.1017/gmh.2021.34

[23] van den Eijnden R, Koning I, Doornwaard S, van Gurp F, Ter Bogt T. The impact of heavy and disordered use of games and social media on adolescents' psychological, social, and school functioning. J Behav Addict. 2018; 7(3): 697-706. doi: 10.1556/2006.7.2018.65

[24] Pornnoppadol P. SB, Khamklieng K., Pattana-amorn S. , The Development of Game Addiction Screening Test (GAST). J Psychiatr Assoc Thailand. 2014; 59(1): 3-14.

[25] Bujang MA, Omar ED, Baharum NA. A Review on Sample Size Determination for Cronbach's Alpha Test: A Simple Guide for Researchers. Malays J Med Sci. 2018; 25(6): 85-99. doi: 10.21315/mjms2018.25.6.9

[26] van Stiphout L, Rolfes J, Waardenburg S, Kimman M, Guinand N, Perez Fornos A, *et al*. Construct validity and reliability of the Bilateral Vestibulopathy Questionnaire (BVQ). Front Neurol. 2023; 14: 1221037. doi: 10.3389/fneur.2023.1221037

[27] Green SB, Yang Y, Alt M, Brinkley S, Gray S, Hogan T, *et al*. Use of internal consistency coefficients for estimating reliability of experimental task scores. Psychon Bull Rev. 2016;23(3):750-63. doi: 10.3758/s13423-015-0968-3

[28] Mylona I, Deres ES, Dere GS, Tsinopoulos I, Glynatsis M. The Impact of Internet and Videogaming Addiction on Adolescent Vision: A Review of the Literature. Front Public Health. 2020; 8: 63. doi: 10.3389/fpubh.2020.00063

[29] Wang JL, Sheng JR, Wang HZ. The Association Between Mobile Game Addiction and Depression, Social Anxiety, and Loneliness. Front Public Health. 2019; 7: 247. doi: 10.3389/fpubh.2019.00247