INVESTIGATING THE PRACTICES OF SECONDARY STUDENTS ON COMPUTER GAMES: AN EXPLORATORY STUDY

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ABSTRACT

This study mainly investigated the practices of secondary students on computers games. An exploratory sequential approach was used to describe and interpret the data acquired, beginning with qualitative data collection and analysis and concluding with quantitative data gathering and analysis. Initially, an in-depth interview and a focus group discussion with 17 participants were conducted. Then, a survey questionnaire was developed based on the qualitative findings. Afterwards, 300 secondary students served as the respondents to gather data in the quantitative phase. Data revealed that there were three themes that emerged in the qualitative phase that put emphasis on prosocial practices, repulsive actions, and positive behaviors. The four underlying dimensions of elements in the computer game model based on exploratory factor analysis include behavioral changes, socio-emotional and cognitive impacts, positive behaviors, and repulsive actions. The questionnaire utilized in the quantitative stage exhibited a very high reliability. Nevertheless, the final output contains 28 items, with 14 items in the behavioral changes dimension, 6 items on the socio-emotional and cognitive impacts dimension, 5 items in positive behaviors, and 3 items in repulsive actions

Key words*: computer games, practices, secondary students, repulsive actions, exploratory sequential approach, Carmen District*

INTRODUCTION

Computer games are one of the most prevalent ways for people to spend their time. Some people say that playing computer games can be a stress reliever, challenge and competition, relaxation, fun, social interaction, and even a way to escape from the real world (Pew Research Center, 2018). Research shows that about one-third of gamers (29 percent) are under the age of 18, which means that a lot of kids and teens play games (Entertainment Software Association, 2017).

Yilmaz (2018) found out that one of the key worries of educators and parents about computer games is the possibility for poor academic achievement and social competence. In addition, avid gamers are more likely to exhibit negative

behaviors in the classroom, such as communication and behavioral issues. Furthermore, avid gamers prefer to remain at home and play video games rather than participate in school activities (Yilmaz, Yel and Griffiths, 2018). On the other hand, according to Dumrique and Castillo (2018), playing computer games does not negatively affect students' grades because they know how to set limits for themselves. They understand that they must control themselves in order to function well in class, which is why they only play games during vacations and weekends when they have a lot of free time, as opposed to when they have classes. Even if they play online games, they know how to interact and may achieve well academically.

Numerous studies have been conducted on the subject of computer games, with findings indicating a negative correlation between problematic video gaming and psychological functioning in terms of psychological symptoms, affectivity, coping, and self-esteem (von der Heiden, Braun, Müller, and Egloff, 2019). Increased exposure to both video game play and video game violence has also been linked to a reduction in antagonism (Jones, 2018). Furthermore, the extent of addictive computer game usage has been linked to clinical symptoms of depression and anxiety disorders, as well as stress and maladaptive coping methods (Wang et al., 2018; Milani et al., 2018). However, all of the present researches emploed on correlational and qualitative methods. None of these studies used an exploratory sequential research approach. The research was also limited to a small number of participants.

Thus, this study was conducted to promote new approach in conducting research and to probe deeper on what practices really do exist on playing computer games. Also, the findings are presented here using bigger samples from the schools in the Municipality of Carmen, Cotabato. The result of this study may be beneficial to the policy makers, administrators, and teachers for them to have a tool in assessing such impacts of students' engagement to computer games.

FRAMEWORK

This research is anchored on the Connectivism theory by George Siemens (2004). It is a learning model that recognizes major shifts in the way knowledge and information flows, grows, and changes because of vast data communications networks. In computer gaming, Internet technology has moved learning from internal, individualistic activities to group, community, and even crowd activities.

Further, this theory posits that learning occurs when the individual explores and integrates information from myriad of networks, environments with shifting core elements and even complexity of self-organization theories. Learning can reside outside of ourselves and is focused on connecting specialized information sets, and the connections that enable us to learn more and are more important than our current state of knowing.

In connection, learning through computer games is a process of making connections on the sources of information found in the Internet wherein they link these concepts from their background knowledge. Nurturing and maintaining connections is needed to facilitate continual learning amidst these difficult times. Most importantly, this theory acknowledges the decision making itself as a learning process. Choosing what to learn and the meaning of incoming information is seen through the lens of a shifting reality.

METHODS

Research design

This study utilized exploratory-sequential methodology. It is an approach that is utilized when a researcher wishes to combine qualitative and quantitative analyses. This two-stage approach is very beneficial for researchers who want to develop a new instrument, taxonomy, or treatment process (Creswell & Plano Clark, 2011). The researcher applies the qualitative (exploratory) findings from the first phase to the construction of the instrument or intervention, which is then tested in the second stage (quantitative).

Respondents

For the preliminary (qualitative) phase of the study, a total of 17 students who are fond of computer games were invited for in-depth interview. The results of which were used to identify the emerging themes and as well as the items to generate the questionnaire.

For the succeeding quantitative phase, the constructed survey questionnaires from the qualitative interviews were disseminated to 200 students of secondary schools in Carmen, Cotabato.

Instruments

In the qualitative phase, the researcher formulated an interview guide that asked questions about their practices on computer games. The interview provided an insight into how a group of students thinks about computer games, about the range of opinion and ideas, and the similarities and variation that exists in their beliefs, their experiences, and practices at school and at home.

Meanwhile, the items of the questionnaire were constructed based from the frequency of occurrence as results of focus group discussions. The construction of the tool from qualitative phase revealed the computer games practices scale. This tool was subjected to dimension reduction to look for the factors that constitute the students' practices on computer games.

Further, five experts were invited to perform content validity of the interview questions and check the suitability of the items that captured the underlying dimensions on computer games practices. The purpose was to ensure the readability and comprehensibility of the questionnaire.

Statistical Tools

In the qualitative data, thematic analysis was used to analyze the data. This approach places a premium on identifying, evaluating, and documenting patterns (or "themes") within the data. Themes are patterns found in data sets that are important for the explanation of a phenomena and are associated with certain study areas (Boyatzis, 1998).

In quantitative data, the Exploratory Factor Analysis is used in the study. It determines empirically how many constructs, or latent variables, or factors underlie a set of items. Factor analysis is a type of multivariate analysis that seeks to explain the relationship between a large number of variables (items) in terms of a set of independent underlying factors. This statistical method can serve as an important tool for validating the structure of instruments (Nunnally, 1978; Carpenter, 2007) pointed out that factor analysis is not a simply defined statistical method, but a broad category of methods for conceptualizing groupings of variables that includes mathematical procedures for assigning variables to certain groups.

Additionally, the questionnaire was tested to Cronbach's Alpha to determine its reliability. This intended to offer a measure of a test's or scale's internal consistency. Internal consistency refers to the amount to which all items in a test assess the same notion or construct, and is therefore linked to the interrelatedness of the test items. Internal consistency should be established prior to using a test in study or examination to verify its validity (Cronbach, 1951).

RESULTS AND DISCUSSION

Emerging Themes of Secondary Students towards Computer Games Practices

There are three themes that emerged from in-depth interview and focus group discussion with public secondary students that put emphasis on prosocial practices, repulsive actions, and positive behaviors.

Towards Prosocial Practices. *The majority of participants reported that their computer game practices have something to do with empathy and care for others, both of which are associated with prosocial behavior. Prosocial conduct encompasses a broad variety of behaviors such as assisting, sharing, consoling, and collaborating with others. These are presented in the narratives of the participants below*:

> *"Friendship and cooperation are two things I learnt from playing online games, and I can apply these lessons to my everyday life by being nice and cooperative." (IDI_P3)*

> *"I feel empathetic whenever my friends lose the game. I told him that it's just okay to lose sometimes. I learned to comfort them." (FGD_P6)*

> *"I learned to cooperate while playing computer games, especially when a team of five people is required. Every time I play, I put forth my best effort to win the game by employing various strategies." (IDI_P8)*

The theme that emerged is consistent with the findings of Dumrique and Castillo (2018), who asserted that playing computer games had a beneficial influence on respondents' social conduct. Even if respondents engage in online gaming, their interpersonal interactions with others remain unaffected. Additionally, they formed personal connections and were able to interact successfully via video games.

Towards Repulsive Actions. Most of the participants narrated that they developed various repulsive or unpleasant behaviors in playing computer games. This is manifested when students supplied responses that centered on game addiction, aggressiveness, laziness, and the like. They developed these poor behaviors by spending too much time and not having control in playing. The students further explain these ideas as follows:

> *"I became too busy with my games in a way that even going to church, I am lazy. I also tend to forget*

accomplishing my household chores because my attention is consumed by playing computer games." (IDI_P2)

"I am of fond playing computer games that is why I have poor academic performance in school. I can't control myself with it. Another is I am risking my health because I skip my meals sometimes." (FGD_P2)

"My behavior in playing computer games I that I became short-tempered and easily get irritated. This occurs especially when I lose the game." (FGD_P3)

The participants' responses suggest that playing computer games has a negative impact on their conduct. The revealed result on the participants' poor behaviors is consistent with Yilmaz, Yel, and Griffiths (2018) findings that some students, particularly girls, have begun to develop negative reactions to heavy gamers as a result of their assertive and reckless behaviors; these students do not want to deal with them if they do not have to.

Towards Positive Behaviors. The last theme that emerged is opposite to the second theme which is repulsive actions. Some of the participants may claim that their practices in computer games are negative but some also argued that they developed positive behaviors in playing computer games. They believed that engaging the said activity present opportunities for vocabulary development, critical thinking, and other mental rotation abilities. Responses of the student participants are indicated below:

"My learning in playing computer games has taught me that it is okay to play, but in moderation. I became critical thinker because of the strategies I learned in playing computer games. I also tend to learn new terminologies such as legendary." (IDI_P6)

"The effect of these experiences/practices is that I became more energetic and my mind works well especially by solving math problems and analysis in my modules. I tend to become more profound in analyzing concepts by the help of computer games such as looking for clues and solving puzzles." (IDI_P4)

"My practices/experiences as a student who enjoys playing computer games are enjoyable and exciting

since it relieves the tension and boredom caused by the pandemic." (FGD_8)

The above statements demonstrate that computer gaming activities have a positive impact on people's mental and emotional well-being. The revealed theme from the participants' responses relates to Catle's (2018) conclusion that computer games boost students' motivation and academic success in Science.

Construction of Practices on Computer Games Scale

Based on the narratives of the participants, Table 1 presents the practices on computer games scale items, which are selected based on their frequency of occurrence from responses in qualitative interviews. The 33-item questionnaire was subjective to a data reduction technique using Exploratory Factor Analysis (EFA). Hence, the number of factors was fixed at three based on the priori qualitative analysis dimensions.

Table 1
Practices on Computer Games Scale Items

ITEMS	
1	I earn more friends by playing computer games.
2	I help my friend or partner in playing computer games to win the game or challenge.
3	I develop cooperation especially when the game requires 5 members.
4	I feel empathetic whenever my friends lose the game.
5	I share my rewards in playing computer games with my friends.
6	I share ideas with my virtual friends on how to win the game.
7	I love to connect my strategies with my co-players.
8	I learn to work as a team.
9	I become friendly.
10	I become too busy playing computer games.
11	I forget to accomplish my household chores.
12	I can't accomplish my modules right away.
13	I easily do trash talk when the game becomes intense.
14	I show violence and aggressiveness whenever I lose the game.
15	I easily get irritated whenever I play computer games.
16	I spend too much time in my gadgets and became short-tempered whenever someone distracts me.
17	I become addicted to computer games like Mobile Legend.
18	I easily shout bad words that leads to being disrespectful.
19	I become stubborn and become disobedient to my parents.
20	I cannot control my temper because of the disappointment I got from losing the game.
21	I don't skip meals just to finish the game.
22	I don't easily give up just to win the game or surpass the challenge.
23	I became a leader in playing computer games.
24	I improve my motor skills especially fine motor skills.
25	I enhance my cognitive abilities like solving math problems.

26	I become critical thinker because of the strategies I learned in playing computer games.
27	I learn moral lessons.
28	I play in moderation.
29	I feel excited whenever I play online games.
30	I am relieved by the boredom caused by the pandemic.
31	I become persistent in winning the game.
32	I become confident whenever I win computer game.
33	I learn new terminologies that are helpful to widen my vocabulary.

Dimension of Practices on Computer Games Scale

Testing of the 33-Item Practices on Computer Games Scale. To ensure that the construct can be tested for factor analysis, the Kaiser Meyer-Olkin Measure (KMO) of Sampling Adequacy and Bartlett's Test of Sphericity were performed. It can be gleaned from Table 2 that the KMO value is .709, which is above the recommended value of.5, which indicates that the sample is meritorious and adequate for factor analysis. Kaiser (1974) recommends accepting values greater than.5 as acceptable. Furthermore, values.5 to.7 are mediocre, values between.7 and.8 are good, values between.8 and.9 are great, and values above.9 are superb. (Kaiser, 1974).

Meanwhile, the Barlett's test was performed to check if there is a certain redundancy between the variables that we can summarize with a few numbers of factors. The results revealed that the p-value is significant (p-value = .05), which indicates that the data has pattered relationships and factorability is assumed. It is emphasized by Tabachnick and Fidell (2007) that the Bartlett's Test of Sphericity should be significant for factor analysis to be suitable.

Table 2
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.709
Bartlett's Test of Sphericity	Approx. Chi-Square	5437.696
	Df	528
	Sig.	.000

As shown in the preliminary analysis, it can be generalized that the 33-item practices on the computer games scale are suitable and adequate for the extraction of factors and thus ready for factor analysis.

The Derivation of the Number of Factor Structures. The derivation of the factor was determined through a priori results of qualitative data analysis wherein there are four dimensions of elements in the practice of computer games. Hence, the four-factor model exhibits clean patterns, as shown in Table 3.

After that, the 33-item construct is then subjected to rotation. The Promax rotation was used since the factor seems to be correlated with a coefficient above 0.50, which reflects that the data is not assumed to be orthogonal.

Table 3 shows the pattern matrix using principal axis factoring with a rotation method of Promax with Kaiser Normalization. It can be observed in the results that the loading of items in the tree factors above can be seen. 4. It can be supported by Field (2005) that.4 is recommended and necessary to obtain the desired factors. Furthermore, it can be observed that there is no item cross-loading or no loading at all, which means that the items best represent their factors. It is emphasized by Hair et al. (1998) that loadings indicate the degree of

correspondence between the variables and the factor, with higher loadings making the variable representative of the factor.

Table 3
Pattern Matrix[a]

	Factor			
	1	2	3	4
I earn more friends by playing computer games.	.432			
I help my friend or partner in playing computer games to win the game or challenge.	.604			
I develop cooperation especially when the game requires 5 members.	.651			
I feel empathetic whenever my friends lose the game.		.628		
I share my rewards in playing computer games with my friends.		.603		
I love to connect my strategies with my co-players.	.631			
I learn to work as a team.	.662			
I become friendly.	.548			
I become too busy playing computer games.	.586			
I forget to accomplish my household chores.	.639			
I can't accomplish my modules right away.	.460			
I show violence and aggressiveness whenever I lose the game.				.723
I easily get irritated whenever I play computer games.				-.515
I spend too much time in my gadgets and became short-tempered whenever someone distracts me.	.408			
I become addicted to computer games like Mobile Legend.	.583			
I easily shout bad words that leads to being disrespectful.				.424
I become stubborn and become disobedient to my parents.		.656		
I cannot control my temper because of the disappointment I got from losing the game.		-.426		
I don't skip meals just to finish the game.			.446	
I became a leader in playing computer games.	.744			
I improve my motor skills especially fine motor skills.	.425			
I become critical thinker because of the strategies I learned in playing computer games.			.523	
I learn moral lessons.			.412	
I play in moderation.			.864	
I feel excited whenever I play online games.	.562			
I am relieved by the boredom caused by the pandemic.			-.411	
I become confident whenever I win computer game.		.598		
I learn new terminologies that are helpful to widen my vocabulary.		.826		

Extraction Method: Principal Axis Factoring.
Rotation Method: Promax with Kaiser Normalization.
a. Rotation converged in 7 iterations.

The item loadings of each item indicate sufficient correlation between factors and variables and can thus be considered as a component of the factor. By using the EFA, the Four-Factor Model of Practices of Computer Games with 29 items was developed as shown in Table 4, namely behavioral changes, socio-emotional and cognitive impacts, positive behaviors, and repulsive actions.

Table 4

28-item Practices on Computer Games

ITEMS	Behavioral Changes
1	I earn more friends by playing computer games.
2	I help my friend or partner in playing computer games to win the game or challenge.
3	I develop cooperation especially when the game requires 5 members.
4	I love to connect my strategies with my co-players.
5	I learn to work as a team.
6	I become friendly.
7	I become too busy playing computer games.
8	I forget to accomplish my household chores.
9	I can't accomplish my modules right away.
10	I spend too much time in my gadgets and became short-tempered whenever someone distracts me.
11	I become addicted to computer games like Mobile Legend.
12	I became a leader in playing computer games.
13	I improve my motor skills especially fine motor skills.
14	I feel excited whenever I play online games.
	Socio-emotional and cognitive impacts
15	I feel empathetic whenever my friends lose the game.
16	I share my rewards in playing computer games with my friends.
17	I become stubborn and become disobedient to my parents.
18	I cannot control my temper because of the disappointment I got from losing the game.
19	I become confident whenever I win computer game.
20	I learn new terminologies that are helpful to widen my vocabulary.
	Positive Behaviors
21	I don't skip meals just to finish the game.
22	I become critical thinker because of the strategies I learned in playing computer games.
23	I learn moral lessons.
24	I play in moderation.
25	I am relieved by the boredom caused by the pandemic.
	Repulsive Actions
26	I show violence and aggressiveness whenever I lose the game.
27	I easily get irritated whenever I play computer games.
28	I easily shout bad words that leads to being disrespectful.

Reliability Test of the Scale

The instrument was evaluated for reliability to determine the internal consistency of items. It can be observed in the Table 5 that the overall reliability is high with a Cronbach's alpha value of .934. The subscale or dimension also is above the criteria of reliability above .70 alpha, namely prosocial practices (α=.938), repulsive actions (α=.995), and positive behaviors (α=.987). This indicates that the tool is very reliable as reflected by the excellent internal

consistency. This is supported by Nunnally (1978) that instruments used in basic research should have reliability of .70 or better.

Table 5

Reliability Analysis on Practices towards Computer Games Scale

Scale	Cronbach's alpha
Prosocial Practices	.938
Repulsive Actions	.995
Positive Behaviors	.987
OVERALL	.934

Final Version of Practices towards Computer Games

The final version of the instrument, which is the output of this study, is presented in the form provided in Table 6. This scale consists of 28 items. Specifically, a total of 14 items in the behavioral changes dimension, 6 items in the socio-emotional and cognitive impacts dimension, 5 items in positive behaviors, and 3 items in the repulsive actions dimension were collected. The 5-point Likert-scale from "strongly agree" to "strongly disagree" is shown below.

TABLE 6

28-item Practices on Computer Games

ITEMS	Behavioral Changes
1	I earn more friends by playing computer games.
2	I help my friend or partner in playing computer games to win the game or challenge.
3	I develop cooperation especially when the game requires 5 members.
4	I love to connect my strategies with my co-players.
5	I learn to work as a team.
6	I become friendly.
7	I become too busy playing computer games.
8	I forget to accomplish my household chores.
9	I can't accomplish my modules right away.
10	I spend too much time in my gadgets and became short-tempered whenever someone distracts me.
11	I become addicted to computer games like Mobile Legend.
12	I became a leader in playing computer games.
13	I improve my motor skills especially fine motor skills.
14	I feel excited whenever I play online games.
	Socio-emotional and cognitive impacts
15	I feel empathetic whenever my friends lose the game.
16	I share my rewards in playing computer games with my friends.
17	I become stubborn and become disobedient to my parents.
18	I cannot control my temper because of the disappointment I got from losing the game.
19	I become confident whenever I win computer game.
20	I learn new terminologies that are helpful to widen my vocabulary.
	Positive Behaviors
21	I don't skip meals just to finish the game.

22	I become critical thinker because of the strategies I learned in playing computer games.
23	I learn moral lessons.
24	I play in moderation.
25	I am relieved by the boredom caused by the pandemic.
	Repulsive Actions
26	I show violence and aggressiveness whenever I lose the game.
27	I easily get irritated whenever I play computer games.
28	I easily shout bad words that leads to being disrespectful.

Legend:
5- Strongly Agree
4 – Agree
3 – Moderately Agree
2 – Disagree
1 – Strongly Disagree

CONCLUSIONS

The themes in qualitative phase highlighted secondary students' practices towards computer games, with an emphasis on prosocial practices, repulsive actions, and positive behaviors. The results derived from factor analysis indicate that practices have four underlying factors that include behavioral changes, socio-emotional and cognitive impacts, positive behaviors, and repulsive actions. Moreover, the reliability of the dimensions on computer games practices scale is high which provides evidences that the items being measured are consistent in measuring the underlying factors. It also indicates that as a tool for measuring practices towards computer games, it captured the characteristics based on the nature and norms of the respondents. Most importantly, students' practices on computer games, with 28 items and four dimensions, was developed to measure the extent of practice on computer games among public secondary students.

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