RESEARCH ARTICLE

Development of a Qualitative Assessment Instrument for Cognitive Processes in Gaming Decision

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Abstract

Indonesia ranks 6th with the highest number of online gamers in Asia and 12th in the world gaming market. When online gamers become addicted, they lose the ability to halt or control their gaming behavior, leading to problematic behavior. Decision-making processes at the cognitive level are considered relevant in various addictive behaviors, including inappropriate gaming behavior. Exploratory research can be conducted using a qualitative technique, with data collected through in-depth interviews, to acquire an in-depth understanding of the comparison of the interaction process of each cognitive component in decision-making to play online games. This research was conducted in Bandung from December 2021 to December 2022. Steps are needed to develop guidelines that explore the functioning of affective and cognitive responses (coping, cognitive and affective bias, and craving and urge) and executive and inhibitory control. The guideline used a cognitive theoretical framework in addictive behavior, namely the I-PACE model, with a multidimensional theoretical basis. Through theoretical deepening, it was derived as a guideline divided into three main aspects, four sub-aspects, 32 main questions, and 36 probing questions.

Keywords: Cognitive process, decision-making, depth-interview guideline, qualitative method

Introduction

Indonesia ranks 6th with the highest number of online gamers in Asia and 12th in the world gaming market.[1] A report from DFC Intelligence showed that nearly 3.1 billion people, or about 40% of the world's population, play online games.[2] In addition, data from the Indonesia E-Sport Premier League (IESPL),[1] Indonesia's active online game players in 2019 were 62.[1] million people. This fantastic number shows that online gaming behavior has evolved into a social phenomenon. Online games are modern game that provides limitless winning and losing experiences, sophisticated narratives and characters to investigate, enormous open worlds to explore, and possibilities to communicate with other players.[3] Online games are intended to be long-playing applications, with game creators creating extremely engaging features that encourage players to stay involved in the game and limit their likelihood of abandoning the field. According to Ng and Wiemer-Hastings,[4] online game players spend more time playing games than offline game players, with the majority of the underlying reasons being that the gameplay characteristics of online games are perceived as more fun and satisfying, and they sometimes prefer playing online games to doing other activities in real life. Nowadays, many new types of games have more immersive, socially integrated, and financially rewarding features than previous games. In psychologically vulnerable people, these features open up opportunities for problematic gaming behavior or even addiction.[5]

A variety of factors influence a person's decision to play online games. King and Delfabbro[5] stated that there are three main factors behind the emergence of gaming behavior in enthusiasts (non-problematic) and harmful (problematic) gamers. Individual differences, external influences, and gaming-related factors are the three categories. As the only internal factor, individual differences are essential in developing problematic online gaming behavior. These include gender, age, personality traits and personal characteristics, comorbidities, low self-regulation and decision-making deficits, low self-esteem and self-efficacy, low levels of education, and interest in other things. The psychological traits of a person underlie vulnerability and can develop problematic gaming behavior.

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However, not all people who play games are susceptible to becoming addicted to all games. Problematic gaming behavior will emerge due to the interaction between the characteristics of the vulnerable player and the characteristics of the game properties.[6] One of the perspectives considered capable of understanding this problematic behavior is the multidimensional theoretically grounded Interaction of Person-Affect-Cognition-Execution (I-PACE) model, a synthesis of a wide range of theoretical approaches and empirical research results and is considered the most comprehensive to explain the emergence of problematic online behavior.[5]

Because this paradigm explains the importance of psychological and social elements in addition to biological factors. Brand et al.[7] underline the importance of diverse cognitive and affective processes in influencing recurrent decisions to play games despite long-term detrimental repercussions. There are four main components in examining the emergence of problematic gaming behavior based on the I-PACE model, namely predisposition (P), affective and cognitive responses (A and C), executive function, inhibitory control, and decision-making to play games (E) and the consequences of playing games. Predisposition refers to an individual's core characteristics that remain relatively stable throughout life. This component includes biopsychological constitution, psychopathological features, personality, social-cognitive, and motives for using the internet. Affective and cognitive responses to internal and external stimuli refer to changes in mood and thinking that follow exposure to gaming stimuli. This section comprises coping, internet-related cognitive biases, cue-reactivity, craving, the urge to regulate mood, and attentional biases. Executive function, inhibitory control, and gaming decision-making refer to the executive function deficits and response control that determine an individual's decision to play. Finally, the consequences of gaming pertain to positive experiences, satisfaction, and compensation arising from playing online games. The core idea of this theoretical model is that individuals who have a predisposition for addiction (to gaming) will seek gratification from gaming, which causes significant changes in the individual's emotional and cognitive responses to gaming activities. This then leads to habitual gaming behavior to compensate for the changes (arising from regular gaming), resulting in negative consequences. Various results from literature studies show that multiple determinants make gamers maintain their behavior to play games despite knowing the harmful consequences, such as impulsivity, weak self-regulation, and differences in personality type.[8–10] However, research exploring the potential of cognitive mechanisms in problematic online gaming behavior has yet to be widely conducted for clinical application.[11] This is reinforced by Nuyenz et al,[12] who stated that it is necessary to study cognitive processes in two groups of online game players (problematic and non-problematic) as a suggestion for further research. Based on literature studies conducted by the author, cognitive processes are widely measured through cognitive tasks such as the Stroop task, go/no-go task, cue reactivity task, negative priming task, and game of dice task.[13–17] In the author's view, an in-depth explanation of how the process of individual cognition and affective mechanisms in the emergence of gamers' decisions to play games is essential data. King and Delfabbro,[5] stated that mixed observations with qualitative studies and clinical case studies are needed to develop online game addiction research, strengthening the author's consideration of this study.

A qualitative approach will be used to gain an in-depth understanding of comparing the interaction process of affective and cognitive response (A and C) and executive and inhibitory control (E) on decision-making to play online games in problematic and non-problematic online game players. The purpose of the qualitative approach was to obtain a thorough and complete understanding of the phenomenon under study.[18] Of the many data collection techniques in the qualitative approach, interviews are the most frequently used technique for primary data collection because they provide a natural and comfortable atmosphere for participants.[19] Interviews in a qualitative approach are used to obtain in-depth information about participants' perceptions, thoughts, and meanings, where participants can express their points of view personally and freely. In this case, the interviewer must encourage participants to be fully involved through an interpersonal approach. However, if well prepared, the content of the interview can be on-topic and efficient. Qualitative researchers need to identify an appropriate line of questioning to stay on track and get to the main object of a research study.[20] To get in-depth, meaningful

data, the researcher chose a semi-structured interview format. Through this format, interviews will be conducted based on predetermined questions (guidelines). However, the interviewer can also ask more questions to clarify information. Thus, a master guide is required, which contains the questions to be asked. The interviewer can modify the questions' wording and order of questions and explore new avenues to obtain data according to the research objectives. In line with Taherdoost's[19] statement, this interview format allows rich data collection and new concepts to emerge. This means that the in-depth interview data collection method will provide a greater opportunity for researchers to explore the experience of playing online games. Identify the flow of questions, starting with designing a guide that meets the research objectives. There are three types of interview questions: main questions, planned follow-up questions (probes), and follow-up questions. Main questions focus on the main objective of the research and are usually the first question after the interviewer opens the interview. Planned follow-up questions, or probes or probing, are used to get more specific and detailed answers. These questions can also lead to important research concerns. Finally, follow-up questions are questions that the interviewer asks after hearing the participants' initial responses. This is also done to gain validity by encouraging participants to prepare more clarification on what the question/issue means to them.[20] Specifically, six points serve as guidelines in designing the interview guide conducted by the researcher, namely: 1) relevance, that the researcher should dedicate sufficient time to analyze the required questions that are appropriate to answer the research objectives accurately; 2) phrasing the questions in simple and short sentences; that the researcher should phrase the questions in simple and short sentences to avoid any misunderstanding from the participants, for example by considering the participants' education level. Therefore, jargon and technical language are not recommended; 3) use language that is easy to understand; the use of language that is easy to understand can avoid the emergence of questions and bias; 4) use questions that are prompts and probes; these questions encourage participants to elaborate or provide further explanation. Probing questions can be applied with follow-up questions to get more details and clarifications, 5) writing final

questions; these can be designed like "Is there anything else you want to say?" which can help add final details or forgotten points to the answer. These answers can be very open-ended, and adding these questions is very important. 6) starting with easy questions placing more challenging questions that may discourage participants from continuing at the end of the interview.[19–22]

Thus, based on the explanation above, it can be said that an instrument in the form of a guideline containing a list of open-ended questions is required to gather the information needed by the researcher so as not to get out of the original purpose of conducting the interview. This study compiled an interview guideline for qualitative assessment of the cognitive process in making online games to get an in-depth description of the decision-making process for playing games.

Methods

The qualitative research was conducted in Bandung from December 2021 to December 2022. It was approved by the Committee on Research Ethics at the Faculty of Psychology, Universitas Indonesia, with a Research Ethics Approval number 069/FPsi.Komite Etik/PDP.04.00/2021.

The preparation of this in-depth interview guideline used the theoretical framework of the I-PACE model by Brand et al.,[7] and the characteristics of problematic online gaming behavior using the internet gaming disorder criteria based on the American Psychiatric Association,[23] as the primary reference to be derived into several question items.

The components of the I-PACE model are 1) predisposing, 2) affective and cognitive response, 3) executive and inhibitory control, and 4) consequences of gaming behavior or other internet activities. The characteristics of internet gaming disorder include 1) preoccupation, 2) withdrawal, 3) tolerance, 4) loss of control, 5) loss of non-gaming interest, 6) gaming despite harm, 7) deception of others about gaming, 8) gaming for escape or mood relief, and 9) conflict/interference due to gaming.[5,23]

After compiling the question items, a content validity test was conducted to ensure researchers' accuracy in reducing related theoretical concepts into question items. This test was conducted by consulting and discussing with two experts. One

expert has experience in clinical psychology and qualitative research, while the other has cognitive process expertise. The input provided was in the form of assessment and feedback regarding the relevance of the theory to the items, word selection, and sentence construction. Researchers used this input data to refine the instrument.

The subsequent step was to conduct a pilot study with a small group of participants with similar characteristics to the research participants, specifically five individuals who enjoy playing online games. The comments and feedback obtained by the researcher from the small group helped the researcher develop the interview guidelines. In line with Doody and Noonan,[21] Bolderston,[20] and Turner III,[22] comments from the pilot group can be utilized, such as the researcher's accuracy in sentence construction or confusing question wording. The researcher then examined the questions by question, considering these comments, and made modifications (if necessary).[20–22]

To determine whether the questions covered the aspects of the theoretical construct, the researcher followed and answered the following points of the pretesting protocol: 1) whether the questions can provide the data needed to answer the research questions, 2) whether the questions are easy enough to understand, 3) whether the flow of questions within the same topic or from one topic to another is appropriate, 4) whether the language used is appropriate for the educational level of the participants, 5) whether the set of questions is comprehensive, or whether any topics are missing.[20]

Results

Researchers carried out several stages in developing this qualitative assessment instrument. First, the researchers employed the internet gaming disorder classification concept to generate an interview guide comprising eight primary questions. Next, utilized the I-PACE framework to construct the question items, with the measured components including 1) predisposition, 2) affective and cognitive responses, 3) executive function, and 4) consequences of playing games. Overall, we developed 32 main question items and 38 probing questions in this qualitative assessment design.

Specifically, the theoretical framework of question item references, aspects, sub-aspects, and question items are presented in Table.

Discussion

The interview guide, as an instrument for qualitative assessment of cognitive processes in decision-making to play online games, was divided into two main aspects, namely 1) information related to gaming behavior, 2) information related to aspects of the I-PACE model, and was prepared using the principles of interview guide preparation from Taherdoost[19] and pretesting protocol from Bolderston.[20]

In the first aspect, information related to online gaming behavior, was derived from the classification of internet gaming disorder; namely 1) preoccupation: constantly thinking about gaming activities and internet gaming becomes a dominating activity every day, 2) withdrawal: feeling angry, anxious or sad when unable to play games, 3) tolerance: increased need to play games, 4) loss of control: failure to control oneself not to play games, 5) loss of non-gaming interest: loss of interest in hobbies or other pastimes due to gaming, 6) gaming despite harms: continuing to play online games despite knowing the risk of problems that will arise, 7) deception of others about gaming: lying to family, therapists and others about the amount of time used to play games, 8) gaming for escape or mood relief: using online games to avoid or reduce negative moods/feelings, 9) conflict/interference due to gaming: losing meaningful relationships, work, education or career opportunities due to playing online games.

Furthermore, various research results related to risk factors for problematic gaming behavior were used, namely individual differences and gaming-related factors. As the only internal factor, individual differences are essential in developing problematic gaming behavior. These include gender, age, personality traits and personal characteristics, comorbidities, low self-regulation and decision-making deficits, low self-esteem and self-efficacy, low levels of education, and interest in other things. The external factors explain how social and environmental factors can lead a person to display problematic online gaming behavior. These include peer influence, accessibility to online games, family influence, and traumatic events, on factors directly related to the online game itself (gaming-related factors), including the type of game and game features. Based on these classifications and theories, eight main questions and 18 probing questions were derived.

Table Depth Interview Guideline Cognitive Processes in Decision-Making to Play Online Games

Aspect	Sub-aspect	Main and Probing Question	Theoretical Framework Reference

Information related to gaming behavior		1. How did you get to know and start playing online games?
		2. How long have you been playing?
		3. What games (type and name) have you played?
		  • From these games, what do you like the most?
		  • What are the reasons for this?
		4. What is the average length of time spent gaming in a session?
		5. How often do you play games?
		  • In one day?
		  • Do you log in every day?
		  • In a week?
		6. What time of day do you usually choose to play games?
		  • Is it morning/afternoon/evening?
		  • What is the reason?
		7. What feelings do you experience when playing online games?
		8. Has playing online games affected your life positively or negatively in this aspect?
		  • Self-care: bathing, eating
		  • Social relations:
		  • Do you have a new circle of friends in online games?
		  • How do you perceive the difference between making friends in the game and the real world?
		  • Purpose of life
		  • Has it changed your goals?
		  • How does it affect focus in life?
		  • Productivity
		  • Is it as a student?
		  • Is it as a worker?
			1. Classification of Internet Gaming Disorders from DSM-5[23]
			  • Preoccupation
			  • Withdrawal
			  • Tolerance
			  • Loss of Control
			  • Loss of non-gaming interests
			  • Gaming despite harms
			  • Deceptions of others about gaming
			  • Gaming for escape or mood relief
			  • Conflict/interference due to gaming
			2. Problematic gamers
			Theories related to risk factors of problematic gamers:
			Individual differences
			  • Peer influences: Kowert et al.[24]
			  • Personal characteristics: Billieux et al.,[8] Lee and Chao,[25] Rho et al.[26]
			  • Self-regulation in managing both timing and amount of play: Seay and Kraut[27]
			Gaming related factors
			  • Types of games: Eichenbaum et al.[28]
			  • Game features: Wood and Griffiths[29]

I-PACE	Affective and cognitive bias	1. What comes to your mind when you hear about online gaming?
		2. When you are enjoying playing a game, what do you feel?
		3. Can you tell me how gaming affects your mood or feelings?
		4. Do you have other hobbies/favorite activities besides gaming?
		  • How do you balance playing online games with these other activities?
		5. How do you deal with/counter other people's judgments about your gaming habits?
		6. Do you accept them, or do you counter them? What are the reasons for this?
			The main framework used is the Interaction of Person-Affect-Cognition-Execution (I-PACE) model of internet use disorders developed by Brand et al.[7]
			To deepen these aspects, the researcher used the following literature:
			Cognitive processes, in general
			  • Cognitive and behavioral model in problematic internet use: Davis[30]
			  • Cognitive approach to gaming: King and Delfabbro[31]
			  • Cognitive psychology in internet gaming addiction: King and Delfabbro[31]
			  • Irrational thinking regular gamblers: Delfabbro and Winefield[32]
			  • Cognition: Kahnemann[33]
			  • Cognitions in problematic game behavior: Haagsma et al.[34]
			  • Mind at play: Loftus and Loftus[35]
			  • Dysfunctional cognition in online gaming: Marino et al.[36]
			Cognitive bias
			  • Cognitive bias pada gamers: Decker and Gay[37]
			  • Role of cognitive bias in gamblers: Griffiths[38]
			  • Cognitive distortion: Huanhuan and Su[39]
			  • Attentional bias and disinhibition: Van Holst et al.[40]
			Decision making
			  • Deficient decision making: Liu and Peng,[9] Schiebener and Brand[41]
			  • Poorer decisions under risky conditions: Yao et al.[42]
			  • Less able to delay gratification for a larger reward: Pawlikowski and Brand[17]
			  • Decision-making style in internet gaming disorder: Ko et al.[43]
			  • Impaired decision making in internet gaming addiction: Wang et al.[44]
			  • Decision making and related process: Schiebener and Brand[41]
			Coping strategy
			  • Kardefelt-Winther[45]
			  • Snodgrass et al.[46]
			  • Boyd[47]
			  • Blinka and Smahel[48]
			Inhibitory control
			  • Tiego[49]
			  • Wilcockson and Pothos[50]
			Craving and urge
			  • Abstinence-induce IGD symptoms: Kaptsis et al.[51]
			  • Craving for internet gaming: King and Delfabbro[31]
			  • Motivation for gaming: Yee[52]
			  • Cognitive-behavioral models: Dong and Potenza[53]

	Specific coping style	1. What do you usually do when you have a problem (stress, demands, or many tasks)?
		  • What is the reason?
		2. Is online gaming an option to do when you are experiencing uncomfortable feelings?
		  • What is the reason for this?
		  • Can you tell us when?
		3. When your game session happens, can you tell us how you feel?
		  • How did you overcome that feeling?
		4. Have you ever felt judged or stigmatized (negatively) as a gamer?
		  • How do you respond to that?	

	Craving and urge	1. When did you want to play a game?
		  • What made you want it so much?
		  • How did you respond to that?
		2. When you are in a situation where it is not possible to play games (e.g., traveling, exam week, sick)
		  • What comes to your mind?
		  • And then what happens?
		3. Have you ever had a situation where you felt like you could not stop gaming, even though you wanted to?
		  • What was going through your mind at that time?
		  • What did you feel at that time?
		4. Have you ever felt that gaming was taking up time in your life? Can you tell me?
		  • Can you tell me what happens to you and how you feel when you hear stories about other people's experiences playing games or advertisements for new games?	

Executive and inhibitory control	Executive function and response control	1. Does that prevent you from playing games?
		2. Has it ever crossed your mind to stop gaming?
		  • If Yes, when and why
		  • If No, why
		3. Did you take a break or even stop playing games?
		4. Have these things ever made you break or even quit? Such as feelings, situations, or other influences?
		5. How do you manage your time between gaming and other priorities like school or work?
		  • Have you ever had trouble managing that time? Can you tell me?
		6. Are there any ways that you monitor your gaming habits, such as keeping track of your playing time or setting a limit on the money you spend?
		  • If so, can you tell us about it?
		  • If not, what is the reason?	

	Decision to gaming	1. What usually makes you want to play games? Is it a feeling/situation/hearing a sound/seeing a picture? Are there any other influences? 2. What are some things that could cause you to decide to stop playing the game even though you could have continued playing it at that time? What were the influencing factors? 3. What are some of the things that could have caused you to decide to keep playing the game even though you could have kept playing the game at that time? What were the influencing factors? 4. What are some things that could cause you to decide to stop playing the game even though you could have continued playing it at that time? 5. How do you balance your desire/liking to play online games with the negative impacts you will face?	

In the second aspect, information related to aspects of the I-PACE model was derived from the I-PACE model framework.[7] The components of this model are 1) predisposition (P), which refers to the main characteristics (core) of individuals that are relatively stable throughout their lifespan. These include the biopsychological constitution, psychopathological features, personality, social-cognitive and internet use motives, and 2) affective and cognitive responses (A and C) to internal and external stimuli, which refers to changes in mood and thinking that follow exposure to gaming stimuli. This component includes coping, internet-related cognitive biases, cue-reactivity and craving, the urge to regulate mood, and attentional biases; 3) executive functioning, inhibitory control, and decision-making to game (E); refers to deficits in executive functioning and control over responses that determine an individual's decision to game, 4) consequences of gaming. Refers to positive experiences, satisfaction, and compensation arising from playing online games, which was divided into four sub-aspects, namely attentional and cognitive bias, specific coping style, craving and urge, executive function and inhibitory control, and decision to game. The predisposing component was assumed to be measurable from the first aspect (individual differences and gaming-related factors) described in the previous paragraph.

Attentional and cognitive bias is the behavioral tendency to more quickly, efficiently, or accurately remember, recognize, and respond to stimuli associated with a particular behavior; based on this definition, two main questions and two probing questions were derived.

Furthermore, specific coping styles are repeated cognitive and behavioral responses to manage stressful situations and related emotions; based on this definition, four primary and five probing questions were derived.

On craving and urge: craving refers to the affective experience of image and verbal thought accompanied by the sensation of urge; based on this definition, five primary and six probing questions were derived.

Then, in the sub-aspect of executive function and inhibitory control, executive function is defined as cognitive control over thoughts, actions, and emotions directed at a goal. At the same time, inhibitory control is the ability to inhibit responses to irrelevant stimuli while

cognitively pursuing a goal. Based on this definition, six main questions and five probing questions were derived.

The last sub-aspect, decision to game, is choosing whether to game or not; based on this definition, four primary and four probing questions were derived.

The researcher developed 32 main question items and 38 probing questions to qualitatively assess cognitive processes in gamers' decision-making to play online games. This guideline was developed as a guideline for conducting semi-structured interviews. Thus, the interviewer can modify the wording of questions and the order of questions and develop the interview until in-depth data is obtained and the initial objectives of the interview can be achieved. Prior research primarily relied on explicit measures, including various cognitive tasks, to gain insight into the cognitive processes involved in gamers' decision-making when choosing to play games.[13–17] However, qualitative research methods such as interviews are also essential to achieve a comprehensive understanding of these processes. By utilizing qualitative studies, a more profound comprehension of experiences in the context of real-life situations can be garnered.[54] This aligns with past research findings indicating that utilizing qualitative methods provides a more comprehensive understanding of gaming behavior.[34] Therefore, the guideline developed in this study offers an alternative approach to gathering qualitative research data on online gaming behavior.

Conclusions

The need for a thorough evaluation of the factors influencing an individual's decision to play games has become increasingly pressing, given the rise in the number of online gamers in Indonesia. Researchers have developed a qualitative assessment tool as an alternative method of measuring the cognitive processes of online gamers. The development process of this evaluation instrument involved several stages. First, researchers compiled eight main questions into an interview guide using the concept of internet gaming disorder classification. Next, the I-PACE framework was utilized to construct the question items, with the measured components including 1) predisposition, 2) affective and cognitive responses, 3) executive function, and 4)

consequences of playing games. This qualitative assessment design had 32 primary question items and 38 probing questions.

Conflict of Interest

There is no conflict of interest in this study.

Acknowledgments

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