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PROBLEMATIC USE OF MASSIVELY MULTIPLAYER ONLINE GAMES: SCALE DEVELOPMENT AND VALIDATION

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Abstract

With the rise of the Internet, the new phenomenon of problematic use of online games has emerged, particularly with the popular genre of massively multiplayer online games (MMOGs). Currently, there are a growing number of reported cases of problematic MMOGs use and related negative outcomes. Though the concept of problematic MMOGs use has received considerable attention in the psychology community, there is still a lack of general consensus regarding its dimensionality, operationalization, and development, as well as a paucity of theory-guided empirical research. Thus, this study attempts to bridge research gaps by operationalizing and empirically validating a scale to measure problematic MMOGs use. In this research-in-progress paper, we propose a rigorous approach in developing and validating a problematic MMOGs use scale. The authors believe that this research will contribute to an understanding of the phenomenon and development of problematic MMOGs use in IS research, and add to the repository of rigorous research instruments for researchers to use.

Keywords: Problematic MMOGs Use, Massively Multiplayer Online Games, Online Games, Scale Development, Internet Addiction

1 INTRODUCTION

Massively multiplayer online games (MMOGs) constitute the largest segment of the online gaming industry. The MMOGs business was valued at \$6.5 billion in 2009, and is expected to grow to \$11 billion by 2014 (Internap, 2012). Games are better than ever: they contain art at a world-class stage of design, and integrate social good and efforts to make the world a better place (ESA, 2012). Uncontrolled or problematic gaming, however, can result in negative consequences of different forms. Some recent examples: more parents have turned to court for help with their children's uncontrollable online gaming (Ng, 2012); there were descriptions of teenage gamers attacking others to cure online gaming addiction (Zhao, 2010); and even a rare reported case of death from playing online games excessively (Sun, 2011).

Problematic or addictive online gaming has now become a phenomenon of imperative importance today, and is receiving considerable attention from the public. However, research is hindered by the present relative lack of consensus on both definitions and validated measurement instruments of problematic MMOGs use. We conducted a comprehensive review of prior literature and revealed that prior definitions of problematic MMOGs use centered around several major components of behavioral addiction, including salience, tolerance, withdrawal, loss of control, relief, relapse and reinstatement, and negative outcomes (Brown, 1997; Griffiths, 2010). Though scholars have adopted various measurement instruments to study problematic MMOGs use, the instruments are basically derived from DSM-based (**D**iagnostics and **S**tatistical **M**anual of **M**ental **D**isorders) diagnostic criteria (e.g., substance dependency, and pathological gambling) which share great similarity with the above-mentioned components of behavioral addiction. Despite the widespread adoption of DSM-based diagnostic criteria in describing problematic MMOGs use, little theory-guided research has been undertaken to examine its nature and development. More importantly, the study of problematic MMOGs use has been hampered by a lack of validated and consistent scales. There have been very few prior studies developing scales to assess problematic MMOGs or online games use, and the existing scales were not subjected to vigorous scale development processes, validation with representative samples, and identification of major components (e.g., loss of control, and the various aspect of mood modification and negative outcomes) (Demetrovics et al., 2012; King et al., 2011). As a step towards bringing this gap, this study will explore the major components or dimensions of problematic MMOGs use, and propose a rigorous approach for the scale development and validation.

2 PROBLEMATIC MMOGS USE CONCEPTUALIZATION

Problematic MMOGs use is an emerging phenomenon; consequently, existing literature on the topic is still culturally diverse, and terminology has varied from online game addiction, to pathological online game use, excessive online gaming, and problematic online gaming (Kim & Kim, 2010). Most of the prior studies on problematic MMOGs use tended to concentrate on examining risk factors for excessive online gaming (e.g., Hsu et al., 2009), and on understanding diagnoses, symptom management and treatment strategies (e.g., Young, 2009). There are only a limited number of studies identifying dimensions and instruments (e.g., Charlton & Danforth, 2010; Demetrovics et al., 2012).

Assessing multiple dimensions concerning problematic MMOGs use is important in the sense that a definition or an instrument structure is a prerequisite to the subsequent instrument refinement, and failure in identifying the dimensionality of a scale may lead to inappropriate or inaccurate specifications of constructs or theories (Smith & McCarthy, 1995). Moreover, the dimension scores can provide information beyond a global score of a unidimensional scale can (Floyd & Widaman, 1995). Pioneers in the psychology or addiction disciplines (Brown, 1997; Griffiths, 2010) treated addictive (here, considered as problematic) behavior as a multidimensional construct that tapped the core components (e.g., salience, tolerance, withdrawal, loss of control, relief, relapse and conflict).

We conducted a comprehensive review on prior scales used to measure the phenomena, and found that a major of studies measured problematic or addictive MMOGs use as unidimensional construct (e.g., Billieux et al., 2013; Snodgrass et al., 2011). However, it is interesting to reveal that the predominant unidimensional scales used, such as Young's Internet Addiction Scale, are in fact tapping major dimensions of behavioral addictions. Prior study of online gaming indicated that the multidimensional view of problematic use best capture the breadth and complexity of the phenomenon than the unidimensional one (Charlton & Danforth, 2010). We thus argue here that problematic MMOGs use also features most or all the seven dimensions of behavioural addiction. Following the frameworks behavioural addictions (Brown, 1997; Griffiths, 2010), the seven major dimensions or components of problematic MMOGs use identified from prior literature are summarized as follows:

- **Salience:** The state when MMOGs use becomes the most important activity in the person's life and dominates gamers' thinking (*i.e., Cognitive Salience*) and behavior (*i.e., Behavioral Salience*).
- **Tolerance:** The state whereby increasing amounts of gaming are required to achieve the former experience, i.e., gamers gradually build up the amount of the time spent playing MMOGs.
- **Withdrawal:** The unpleasant feeling states, emotions, and/or physical effects (e.g., moodiness, irritability, and shakes) that occur when MMOGs use is discontinued or suddenly reduced.
- **Loss of Control:** The state featuring an inability to limit the time or resources given to MMOGs use, even when a decision appears to have previously been made to do so.
- **Relief:** Subjective experiences derived from playing MMOGs for mood modification, consisting of two components: to experience an arousing "buzz" or a "high" (*i.e., Mood Enhancement*); and to experience a tranquilizing feel of "escape" or "numbing" (*i.e., Emotional Relief*).
- **Relapse and Reinstatement:** The tendencies for repeated reversions of earlier patterns of (excessive) MMOGs use to recur after periods of abstinence or control.
- **Negative Outcomes:** Conflicts resulting from problematic (excessive) MMOGs use, such as missing real life social engagements (*i.e., Interpersonal Problems*), personal problems the gamer experiences within themselves even including physical illness (*i.e., Intrapersonal Problems*), and missing work or classes (*i.e., Professional & Academic Problems*).

3 SCALE DEVELOPMENT AND VALIDATION PROCESS

Constructs with a strong theoretical justification, and measures with strong reliability and validity, are the foundation to the accumulation of knowledge in social science research. IS scholars have been advocating a systematic and rigorous approach in developing scales (Boudreau et al., 2001; Moore & Benbasat, 1991; Segars, 1997). The primary objective of the current study is to systematically and rigorously develop and validate a scale for problematic MMOGs use. Following the robust paradigm for scale development and validation, we went through longitudinal processes starting with domain specification, followed by item creation, scale construction, and systematic assessments of the scale's reliability and validity (Moore & Benbasat, 1991; Segars, 1997). This approach has been widely adopted by IS scholars and has worked well in developing measures with desirable psychometric properties. Figure 1 summarizes the major steps in the scale development and validation process.

3.1 Specifying the Domain and Defining the Constructs

The first step in scale development is to delineate the domain of the related concepts. Here, we operationalize the problematic use of MMOGs as online game play that results in negative outcomes in different aspects of gamers' lives, and may also feature other major components of traditional problematic or addictive behaviors (e.g., salience, tolerance, withdrawal, loss of control, relief, and relapse and reinstatement). We believe that despite being developed particularly in the context of MMOGs, the final scale will provide references for future examination of other problematic technology use.

3.2 Scale Construction

Churchill (1979) recommended the use of extensive literature review and experts’ opinions to form the initial list of candidate scale items. The use of these methods is believed to generate a set of candidate scale items with a relatively high degree of content validity (Moore & Benbasat, 1991). We conducted a thorough literature review to survey the existing problematic MMOGs use scales, and generated an initial pool of 43 scale items intended to capture the seven dimensions of problematic MMOGs use.

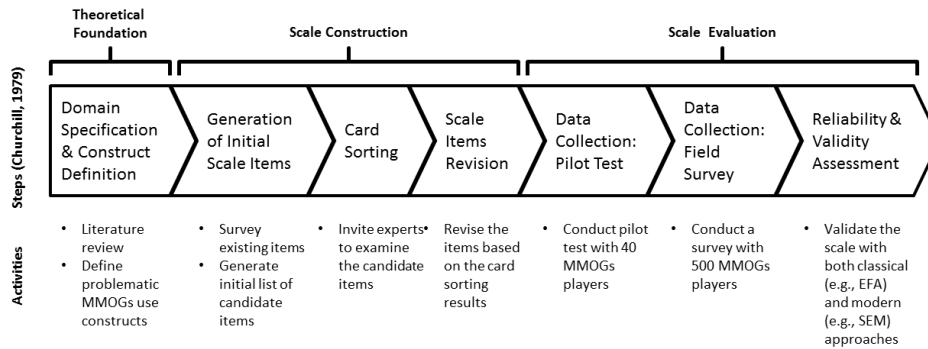


Figure 1. Overview of the Scale Development and Validation Process

Five experienced researchers, in each round of card sorting, were invited to evaluate the content validity of each item with respect to our definitions of the seven dimensions of the problematic MMOGs use. The judges were requested to carefully read each item and classify it to the corresponding dimension of problematic MMOGs use. We used two measurements, Cohen’s (1960) Kappa and item placement ratio to assess the reliability of the card sorting procedures and the content validity of the scale (Moore & Benbasat, 1991). The results for Cohen’s Kappa and item placement ratio are shown in Table 1 and Table 2 respectively. An acceptable score of Cohen’s Kappa should be greater than 0.65 (Todd & Benbasat, 1991; Vessey, 1984), and a higher item placement ratio is considered to demonstrate a higher degree of construct validity. The results suggested an adequate reliability and validity of our scale (see Table 1 and 2). Two items were dropped according to the results and judges’ evaluations, with a 41-item scale left for the subsequent pilot test.

Card Sorting 1	Judges	1	2	3	4	5	Card Sorting 2
	1			0.92	0.95	0.89	
2		0.72		0.95	0.87	0.89	
3		0.79	0.77		0.89	0.95	
4		0.82	0.74	0.85		0.87	
5		0.74	0.74	0.74	0.74		

Table 1. Results of Card Sorting – Cohen’s Kappa

		Actual Categories										Total Items	Hit Ratio%	
		CS	BS	LC	TO	NIE	NPA	NIA	WI	ER	ME			RR
Target Categories	CS	13(15)	1	1									15(15)	87(100)
	BS	(1)	24(9)	(2)	(2)		1	(6)					25(20)	96(45)
	LC			19(18)	1							(2)	20(20)	95(90)
	TO			2(5)	12(13)						1(2)		15(20)	80(65)
	NIE					20(20)							20(20)	100(100)
	NPA						15(15)						15(15)	100(100)
	NIA							15(15)					15(15)	100(100)
	WI					(5)	(1)	1(3)	18(16)				20(25)	90(64)
	ER		(1)		(1)					20(16)	(2)		20(20)	100(80)
	ME			(1)						(3)	20(16)		20(20)	100(80)
RR		(3)	4(2)	(1)								16(19)	20(25)	80(76)
Total Items Placement: 205 (215)		Hits: 192 (172)					Overall Hit Ratio: 93% (82%)							

Table 2. Results of Card Sorting – Item Placement Ratio

Note: Results inside bracket are from card sorting 1; others are from card sorting 2.

3.3 Scale Evaluation

We conducted a pilot test with 43 frequent MMOGs players for scale revision and refinement. A self-administered questionnaire containing 41 revised scale items and other relevant variables was distributed to MMOGs players. To increase the response rate, entry in a lottery for shopping vouchers was offered as an incentive for participation. Cronbach's alpha and item-total correlation were calculated to assess the scale reliability and validity (see Table 3). Scale reliability met the conventional standard of internal consistency (Hair et al., 1998), with Cronbach's alpha greater than 0.70. Based upon the results and participants' feedback of the pilot test, we have refined wordings of the scale items (see Table 3) and prepared a refined online questionnaire for full-scale field validation.

Constructs	Item-Total Correlation	Item
Cognitive Saliency (CS) $\alpha = 0.90$	0.85	I am preoccupied with playing MMOGs
	0.79	When I am offline, I wonder what is happening in the MMOGs' world
	0.77	I think about playing MMOGs all day long
Behavioral Saliency (BS) $\alpha = 0.93$	0.89	Playing MMOGs becomes one of the most important activities to me
	0.80	I give priority to playing MMOGs over other activities
	0.80	I play MMOGs much more than other activities, prior hobbies and/or interests
	0.82	I spend a good deal of time playing MMOGs
Tolerance (TO) $\alpha = 0.92$	0.77	I play MMOGs before something else I need to do
	0.88	There is a need to increase the amount of time playing MMOGs to achieve my former excitement
	0.88	I play MMOGs with a marked increase in duration to attain satisfaction
Withdrawal (WI) $\alpha = 0.94$	0.77	I play MMOGs more extensively than ever before
	0.87	I feel restless (nervous) when I attempt to cut down playing MMOGs
	0.86	I become irritable (angry) when others attempt to stop my online gaming
Loss of Control (LC) $\alpha = 0.93$	0.84	I feel bad when I am unable to play online games
	0.83	I feel bored when I am unable to play online games
	0.86	I have made unsuccessful attempts to control my online gaming
	0.90	I have difficulty controlling the amount of time I spend playing MMOGs
Relapse & Reinstatement (RR) $\alpha = 0.92$	0.88	I am not able to resist the impulse/urge to play MMOGs
	0.68	I play MMOGs longer than intended
	0.77	I have tried cutting back on MMOGs use but failed
	0.83	I tend to resume playing MMOGs after periods of abstinence
Negative Outcomes (NIE) $\alpha = 0.95$	0.83	I have a tendency to revert back to the previous pattern of online gaming after stopping
	0.80	I return to online gaming after I have cut back, and play more excessively
	0.89	I miss real life social engagements because of playing MMOGs
	0.87	I give up or reduce social activities because of playing MMOGs
Negative Outcomes (NIA) $\alpha = 0.90$	0.83	Others in my life complain about my MMOGs playing
	0.91	I neglect others (e.g., friends or family) because of playing MMOGs
	0.76	Playing MMOGs causes me sleep deprivation
Negative Outcomes (NPA) $\alpha = 0.91$	0.84	I experience physical problems (e.g., backache, fatigue, or headache) because of playing MMOGs
	0.84	My health gets worse because of playing MMOGs
	0.86	My work or studies suffered because I play MMOGs
Mood Enhancement (ME) $\alpha = 0.91$	0.83	Playing online games often interferes with my work or studies
	0.76	I am not able to fulfill my role obligations at my workplace or campus because of my MMOGs use
	0.78	I feel good while I play MMOGs
	0.86	Playing MMOGs is the moment when I most feel pleasure
Emotional Relief (ER) $\alpha = 0.90$	0.76	I experience a buzz of excitement while playing MMOGs
	0.83	I play MMOGs to make myself happy
	0.82	I play MMOGs to forget about/escape from real life (problems)
	0.88	I play MMOGs to relieve a dysphoric (stressed & nervous) feeling
	0.77	I play online games to release stress
	0.63	Playing MMOGs helps eliminate my bad feelings (e.g., sadness, nervousness, or anger)

Table 3. Results of Pilot Test

MMOGs players will be used in the current research project to empirically validate the measures. We will target a sample of 500 players who have actively participated in MMOGs. We will first ask them to provide details related the MMOGs they play, followed by obtaining gaming statistics such as the frequency and duration of the gaming. We will then ask them to recall their gaming experiences with the mentioned MMOGs, and answer the remaining questions accordingly. The online questionnaire will contain all problematic MMOGs use scale items, personality traits, and demographic variables (owing to the space limitation, we list only the items related to problematic MMOGs constructs). We will recruit active gamers from various popular online gaming forums in the region (e.g., <http://www.2000fun.com/portal.php> or <http://www.gamer.com.tw/>). This recruitment approach has been found to be effective in prior problematic MMOGs use research (Billieux et al., 2013; Hussain & Griffiths, 2009; Utz et al., 2012). Both classical approaches (e.g., item-to-total correlation, Cronbach's alpha, and exploratory factor analysis) and contemporary approaches (e.g., structural equation modeling) will be used to validate the scale in the current study (Bagozzi et al., 1991). The aim of using these approaches is to ensure the development of a rigor scale with method triangulation.

4 CONCLUSION AND EXPECTED CONTRIBUTIONS

The purpose of this study is to develop and validate a scale for measuring problematic use in massively multiplayer online games. Building upon prior literature, problematic MMOGs use is conceptualized as MMOGs use that has resulted in negative outcomes in different aspects of gamers' lives. The gaming may also characterized with the other dimensions of problematic use, including salience, tolerance, withdrawal, loss of control, relief, and relapse and reinstatement. A pool of 41 items of problematic MMOGs use tapping the major components was obtained. We will continue the scale development and validation process, finalize the scale, and propose a theoretical model explaining the mechanism of how problematic MMOGs use is developed. Numerous definitions of problematic MMOGs or Internet uses can be found from practice and research driven literature. There is, however, a lack of consensus regarding its dimensionality, operationalization, and development, particularly in the context of MMOGs use. We believe that the current work enriches the existing work on the problematic use of MMOGs. In addition, the validated scale will be added to the repository of rigorous research instruments for IS survey researchers' future applications, helping to develop a cumulative tradition for IS research in problematic MMOGs use discipline. The current study is timely, as it will enhance our understanding of a phenomenon that grows increasingly important. We believe that the findings of this study will also provide industry and practitioners with the knowledge of the importance of creating attractive, yet healthy and sustainable online gaming environments.

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