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Translation, Adaptation, Validation of Player Experience of Need Satisfaction Scale (PENS) Modified Version in Malaysian Multiplayer Online Battle Arena (MOBA) Players

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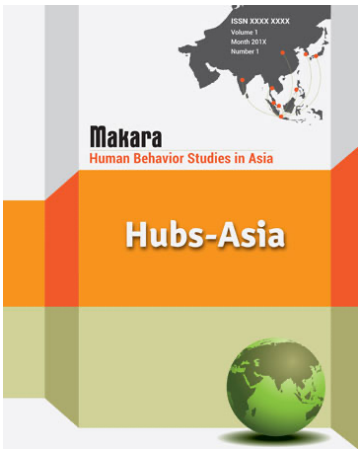

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Translation, Adaptation, Validation of Player Experience of Need Satisfaction Scale (PENS) Modified Version in Malaysian Multiplayer Online Battle Arena (MOBA) Players

Translasi, Adaptasi, Validasi Skala Pengalaman Pemain pada Kebutuhan Kepuasan (PENS) Versi Termodifikasi pada Pemain Malaysia *Multiplayer Online Battle Arena* (MOBA)

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ABSTRACT
This study aimed to translate, adapt, and validate the Player Experience of Need Satisfaction (PENS) – modified version for Malaysian Multiplayer Online Battle Arena (MOBA) players. The translation and adaptation process involved a rigorous procedure with nine experts from the mental health and linguistic fields. A non-probability sampling method was applied by recruiting 491 participants from MOBA Facebook groups. The parallel analysis indicated a two-factor structure (autonomy and competence as one factor and relatedness as another factor). Confirmatory factor analysis demonstrated a better model fit for the translated version compared to the original English version, with satisfactory psychometric properties. Future studies should address psychometric concerns and evaluate the scale across diverse populations and game genres. The study provides a foundation for understanding and enhancing the gaming experience in the dynamic and rapidly growing MOBA gaming market.

ABSTRAK
Studi ini bertujuan untuk menerjemahkan, mengadaptasi, dan memvalidasi Player Experience of Need Satisfaction (PENS) – versi modifikasi untuk pemain Multiplayer Online Battle Arena (MOBA) di Malaysia. Proses penerjemahan dan adaptasi melibatkan prosedur yang ketat dengan sembilan ahli dari bidang kesehatan mental dan linguistik. Metode sampling non-probabilitas diterapkan dengan merekrut 491 peserta dari grup Facebook MOBA. Analisis paralel menunjukkan struktur dua faktor (otonomi dan kompetensi sebagai satu faktor dan keterkaitan sebagai faktor lainnya). Analisis faktor konfirmatori menunjukkan model yang lebih baik untuk versi terjemahan dibandingkan dengan versi asli dalam bahasa Inggris, dengan properti psikometrik yang memuaskan. Studi di masa depan sebaiknya menangani masalah psikometrik dan mengevaluasi skala ini di berbagai populasi dan genre permainan. Studi ini memberikan dasar untuk memahami dan meningkatkan pengalaman bermain game di pasar MOBA yang dinamis dan berkembang pesat.

Original Article

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1. Introduction

Assessing players' experience during gameplay is crucial for enhancing the quality and success of video games, comprehending the overall impact of gaming, and applying effective game design principles in various domains (Johnson et al., 2018). Specifically, experienced players often demonstrate excellent problem-solving abilities, strong leadership skills, and perseverance, which typically aid in achieving better results in gameplay (Fen, 2024). There is a growing emphasis on examining player experience among both videogame researchers and developers (e.g., Bender & Gentile, 2020a; Cordeiro et al., 2016; Johnson et al., 2018; Mittman et al., 2023). Despite the ongoing progress in the field, significant challenges persist in achieving a standardised measure across various game genres and cultural contexts. A game that resonates

positively within one cultural context may not necessarily have the same impact. Therefore, to ensure a positive gaming experience, evaluating the acceptability, feasibility, and usability of games, specifically player experience becomes imperative for creating universally appealing games.

Questionnaires, known for their ability to gather experiences from diverse and anonymous participant pools are widely employed due to their cost-effective and high accessibility. To date, there is a lack of a validated Malaysian questionnaire covering the important factors of player experience specifically targeted multiplayer online battle arena (MOBA) players. Given the increasing popularity of this game genre, this study aims to translate, adapt, and validate a questionnaire tailored to the Malaysian sample. The chosen instrument is the Player Experience of Need Satisfaction (PENS) scale – a modified version developed by Bender and Gentile (2020b). The decision was based on its "best practice" development, ensuring a comprehensive tool covering all relevant player experience factors. The modified version with fewer items is suitable for the young population, making it an ideal instrument for use. Translating the scale into *Bahasa Malaysia* (the national language of Malaysia) considers language nuances and expressions specific to the target audience. This helps in maintaining clarity and ensures that the items are easily understood. Different gaming communities may have distinct preferences and expectations, scale adaptation allows considering the unique experiences and the impact of the game on the player's overall experience.

According to Newzoo (2023), the Asia-Pacific region accounts for nearly half of the players worldwide, approximately 84.1 billion out of 184 billion players. The gaming industry in Southeast Asia has successfully captured considerable public attention and has been acknowledged as the "world's fastest-growing mobile games region". Importantly, the gaming market in Malaysia is undergoing substantial expansion propelled by the increasing popularity of mobile gaming among the younger generation. The number of users in Malaysia's games segment within the media market is projected to rise consistently from 2024 to 2029. This marks the 12th consecutive year of growth, and it is forecasted that a new peak of 12.88 million by 2029. In general, the game segment has experienced continuous growth in user numbers during these recent years (Statista, 2024a). Mobile games stand out as the largest segment, particularly the user penetration rate at 18.2% in 2024 and is anticipated to rise to 20.0% by 2027 (Statista, 2024b). The expansion of the gaming sector is expected due to the implementation of the Malaysia Digital Content Ecosystem (DICE) policy as outlined by Malaysia Economy Corporation (2021). The policy encompasses financial schemes, training programs, incubation support, business connections, and opportunities for market access, all geared towards nurturing the expansion of the gaming sector.

MOBA games represent a subgenre within real-time strategy games. These games involve two teams, typically comprised of five players each, engaging in competitive play. Each player assumes control of a single character and collaborates to attain the shared goals. MOBA games offer collaborative (within the team) and competitive (between two teams) play experiences (Tyack et al., 2016). Several popular games (e.g., *Mobile Legends: Bang Bang; League of Legends, Honor of Kings, DOTA 2, Arena of Valor*, *Pokémon UNITE)* are categorised under the MOBA genre. Cultural influences significantly shape player experiences in MOBA games, as they dictate player expectations regarding gameplay mechanics, social interactions, and competitive dynamics. For instance, in cultures that emphasise collectivism, players may expect a stronger focus on teamwork and cooperative strategies, which can affect their gameplay approach and satisfaction levels. Conversely, in more individualistic cultures, players might primarily prioritise personal achievement and competition, leading to different expectations regarding match outcomes and player interactions (Bonny & Castaneda, 2022).

In Malaysia, the popularity of MOBA games reflects these cultural dynamics. Malaysian players often engage in these games not only for entertainment but also as a means of social interaction, aligning with the collectivist cultural values prevalent in the region. This cultural backdrop influences player expectations, where community support and teamwork are highly valued. For example, Malaysian players enjoy participating in team-based tournaments, which fosters a sense of community and shared goals, contrasting with the more individualistic approaches seen in other regions (Abbasi et al., 2021). The present study aims to fill a critical gap by providing a culturally validated measure for assessing the player experience. It also provides a valuable tool for future research endeavours in the dynamic and rapidly evolving gaming market.

PENS was originally developed by Ryan et al. (2006). The PENS draws its theoretical foundation from the extensively researched Self-Determination Theory (SDT) by Deci et al. (1991) and Ryan and Deci (2000). This theory outlines how experiences fulfill fundamental and universal psychological needs, namely (1) competence (wish to acquire new skills and achieve mastery over one's surroundings), (2) autonomy (inherent longing for a sense of freedom and make choices independently), and (3) relatedness (innate yearning to be loved, cared for, and to experience closeness and connections with others). Activities that

satisfy these needs are more likely to engender intrinsic motivation, motivating individuals to participate more frequently and leading to positive well-being outcomes. The PENS instrument was designed to measure these three fundamental needs, along with two additional factors: presence/immersion and intuition controls. However, these two additional factors were omitted in the modified version by Bender and Gentile (2020b). The primary aim of PENS scale is to evaluate the satisfaction of basic psychological needs as outlined by SDT. The reasoning was that presence/immersion and intuition controls are not fundamental psychological needs, but they are related to game mechanics, user interface design or other technical factors of the gaming environment. Specifically, presence/immersion captures the extent to which players feel absorbed and immersed in the games environment, transporting their experience as real. Intuition controls evaluate how natural and user-friendly the game's controls are. It assesses whether the game enables smooth and seamless player interaction. By removing presence/immersion and intuition controls, the modified version allows for a more streamlined assessment of psychological needs, which are central to understanding motivation and well-being, particularly in the gaming context.

The present study adopted PENS- modified version (focusing on three factors: competence, autonomy, and relatedness) by Bender and Gentile (2020b) over the full version by Ryan et al. (2006) due to several considerations: (1) the brief version is less burdensome for participants, increasing the likelihood of high response rates and minimising participant fatigue (Cook et al., 2018); (2) more accessible for participants with limited attention spans or in contexts where lengthy assessments are complex (Carlson & Donnellan, 2011); (3) can be completed within shorter duration, making more suitable for large-scale studies (Podsakoff et al., 2003). The PENS scale by Ryan et al. (2006) is one of the most frequently used tools for assessing need satisfaction in video games. However, the scale was identified as lacking in conceptualising the relatedness factor. For example, one of the three items, "I don't feel close to other players", is limited in assessing the richness of social experiences in multiplayer games. Therefore, the PENS-modified version has two additional items for the relatedness factor compared to the full version. The two additional items suggested by Bender and Gentile (2020b) are essential for measuring social engagement with other players in the games (i.e., " I care about other players in this game and enjoy playing with them") and parasocial relationships with the game characters (i.e., " I care about the game characters and enjoy being involved with them"). The relatedness factor from the original version by Ryan et al. (2006) places limited emphasis on the relatedness factor, making it less effective in assessing MOBA games, which offer rich sources of complex social interactions (Tyack et al., 2016). Including additional items can better ensure that the scale is aligned with the richness of these social environments, enabling a more comprehensive exploration of one's social satisfaction within the MOBA context.

An online survey conducted by Statista (2021) found that 42% of Malaysian youth engage in mobile gaming daily. Similarly, Chen et al. (2020) highlighted that Malaysian youth dedicate more time to mobile gaming applications. The rise of esports and gaming as a recognised form of competition has transformed the landscape for youth gamers. Wang and Cheng (2023) indicated that the growing popularity of online games has created new opportunities for youth to experience social presence. Social presence plays a crucial role in shaping online interaction and collaboration during competitive gameplay. There is no denying that the appealing social features in the MOBA genre have successfully attracted youth to play games excessively. The present study defines youth as individuals aged 18 to 35, according to the age definition by the Malaysian Youth Council (2019). The definition of youth reflects the social, cultural, and economic realities of Malaysia. Other international or regional definitions (e.g., the United Nations, which defines youth as 15 to 24 years) might not capture the unique developmental periods experienced by Malaysian youth. The standardised age definition is also crucial for consistent understanding across the implementation of youth programs and policies in the local context.

The goals of the present study were: (1) to accurately translate and adapt the items from English into *Bahasa Malaysia* with the involvement of mental health and linguistic experts. This involves not only linguistic translation but also cultural adaptation to ensure that the items are understood in the same way. Other goals are (2) to determine if the factor structure of the translated version matches the original version and (3) to examine the psychometric properties (i.e., validity and reliability) of the translated scales.

2. Methods

Participants and Procedure

The present study applied a cross-sectional research design due to the absence of a sampling frame. Consequently, a non-probability judgmental sampling method was implemented. Given the potential dispersion of gamers in private residential areas, an online survey was considered more feasible for data collection. Prospective participants were invited to participate in a Qualtrics online survey. A total of 491 MOBA players from 28 randomly selected Malaysian MOBA Facebook groups were identified. The groups were identified through relevant keywords (e.g., *Mobile*

Legends Malaysia, DOTA 2 Malaysia, Leagues of Legends Malaysia, Honor of Kings Malaysia, and others).

Inclusion criteria were established to ensure that participants met specific characteristics: (1) being a MOBA player, (2) aged between 18 and 35, and (3) acquiring at least 12 months of MOBA gaming experience. Participants were provided with comprehensive information about the study, and online informed consents were obtained voluntarily. The data collection procedure adhered to the ethical standards outlined in the Helsinki Declaration of 1975, as revised in 2005. Ethical approval was granted by the Scientific and Ethical Review Committee (Ref No: U/SERC/263/2022). The detailed sample characteristics are outlined in Table 1.

Instrument

Player Experience of Need Satisfaction Scale (PENS) – Modified Version

This instrument was first introduced by Ryan et al. (2006) to measure need satisfaction in gaming. The original version consists of 21 items which are derived from five factors (i.e., competence, autonomy, relatedness, presence/immersion, and intuitive controls). However, the modified version by Bender and Gentile (2020b) has a total of 11 items with only three factors (i.e., competence, autonomy, and relatedness). This modified version is administered by a 7-point Likert scale (1 = "do not agree"; 7 = "strongly agree). There is one reversed item (i.e., I don't feel close to other players) from the relatedness factor (same as the original version). However, Bender and Gentile (2020b) developed two additional items for the relatedness factor. In general, six items (or three items respectively) from competence and autonomy factors (same as the original version), and another five items (three items are the same as the original version and two new items) are from the relatedness factor.

Translation and Adaption Process

Malaysia has a diverse culture, language, and racial groups. Given a paucity of culturally appropriate, valid, and reliable scales in Malaysia to measure the specific aspect, there is a strong need to have cross-cultural scales to address potential psychometric problems. As such, the current study applied translation and adaption procedures as suggested by Sousa and Rojjanasrirat (2011). The translation should be cross-cultural and conceptual equivalent but not merely focus on the linguistic or literal aspect. The suggested guidelines by Sousa and Rojjanasrirat (2011) incorporated the highly recommended methodological approaches in a clear and user-friendly manner. The guideline provides a detailed framework for the translation and adaptation process, emphasising the importance of preserving the conceptual equivalence of the original content across different languages and cultures. This translation and adaptation model typically involves several key steps, including forward translation, back-translation, reviewing various versions of translated instruments, pre-testing, and preliminary and full psychometric testings. The guideline emphasises that the translated material must be linguistically accurate and culturally appropriate. This meticulous process helps maintain the integrity of the original content while adapting it to diverse linguistic and cultural contexts.

A specific example illustrating the consideration of cultural nuances can be provided. For instance, the item "I find the relationships I form in this game fulfilling" can be translated in *Bahasa Malaysia* as "*Saya dapati hubungan yang saya bina dalam permainan adalah memuaskan*". While the original English version uses the plural form "relationships," *Bahasa Malaysia* typically does not modify nouns to indicate plural forms. Thus, *"hubungan"* which translates to "relationship," remains the same, whether it is applied as singular or plural. Generally, choosing suitable translators and committee members are the key elements to enhance the quality of the translation, back-translation, and cross-validation of an instrument. The entire translation and adaption process can be summarised as follows:

Step 1: Forward Translation

This step involves the translation of the original instrument into the target language (i.e., from English to *Bahasa Malaysia*). The translators must be bilingual (being fluent in the source and target languages) and preferably bicultural. The first translator must be knowledgeable about the terminology and the content area in the desired target language. The second translator must be familiar with the colloquial phases, slang, jargon, idiomatic expressions, and emotional terms commonly used in the target language. In the present study, two translators were invited. The first translator is a native Malay, being a psychologist, with six years of working experience. The second translator is also a native Malay, linguist, with eight years of working experience, currently teaching undergraduate English program. These two translators created *Bahasa Malaysia* versions of the questionnaire independently.

Step 2: Comparison of Two Forward-Translated Versions of the Instrument

In this step, the two translated versions were required to be synthesised into one version. Three experts from the mental health field were invited. The first expert is a psychologist, with ten years of working experience, and graduated with Ph.D. in Psychology. The second expert is a registered counsellor, with ten years of working experience, who graduated with a Ph.D. in Guidance and Counselling. The third expert is a registered counsellor, with twenty years of working experience,

who graduated with Ph.D. in Guidance and Counselling. These experts are fluent in both languages, they were required to compare between English and translated versions, particularly on the comprehensibility, culture, grammar, and terminology. Further discussion about the translated item was conducted when an expert provided 3 out of 5 (or below) ratings and commented for further improvement. As a result, a consensus was made for synthesising a translated version for the subsequent step.

[Table 1 about here]

Step 3: Blind Back-Translation

Two backward translators are required at this step. The two bilingual translators must show good proficiency in both the source language and the target language. One translator must be knowledgeable about the terminology and the content area of the instrument in the source language. Another translator must be knowledgeable about the cultural and linguistic nuances of the source language. In the present study, both translators received the synthesised translated version of the questionnaire and completed backward translation (from *Bahasa Malaysia* to English) independently. The first translator is a psychologist, with six years of working experience in the mental health field. The second translator is a linguist, with six years of working experience in teaching the English language undergraduate students.

Step 4: Comparison of Two Backward-Translated Versions of the Instrument

A multidisciplinary committee is recommended to be set up with members of the research team, field experts, and bilingual translators from the earlier steps. Any items that do not retain the original meaning are re-translated and back-translated until the discrepancies and ambiguities are resolved. Despite these members, an additional two experts from the mental health field (who were not involved in the earlier steps) were invited for improvement purposes. The first expert is a psychiatrist, with ten years of working experience. The second expert is a registered counsellor, with five years of working experience. Consensus was made and the present study continued to the following step with the translated instrument.

Step 5: Pilot Testing and Step 6: Preliminary Psychometric Testing

A pilot test is required to be conducted for individuals whose language is the target language of the instrument. An evaluation of the instructions, items, and response format clarity is also required. In the present study, a total of 80 participants (who were Malaysian MOBA players) were invited for this pilot study. The PENS-modified version exhibited satisfactory reliability with Cronbach's alpha = .838. Twelve participants (7 males and 5 females) were randomly selected to check the clarity of the entire questionnaire, they responded the translated items displayed good clarity. However, item 9 (which is derived from the relatedness factor) is a reversed item, participants commented that they easily overlooked the negative word "I *don't* feel close with other players" (*Saya tidak rasa akrab dengan pemain lain*). The present study decided to continue with this reversed item in the actual data collection for detecting measurement precision and inattentive responding.

Step 7: Full Psychometric Testing

This last step is used to establish the initial full psychometric properties of the newly translated, adapted instrument within a sample of the target population of interest. The validation of the translated instrument was conducted by comparing the results between the English and translated versions.

Statistical Analyses

The univariate normality was assessed using the rule-of-thumb criteria introduced by Kim (2013). Cases with skewness absolute values exceeding two and kurtosis absolute values more than seven will be identified as univariate outliers. An evaluation of skewness and kurtosis values for each item demonstrated no violations. To screen for univariate outliers, a standardised composite score (summing up the scores of all items) was computed for the eleven items, and cases were designated as outliers if the standard deviation fell beyond the ±3.29 range. This criterion was selected to encompass approximately 99.9% of normally distributed scores in a dataset (Field, 2017). The use of composite scores in screening for univariate outliers has been shown to be more effective than relying on single item measures. Composite scores aggregate multiple indicators (or items), which can provide a more nuanced understanding of the underlying data structure and reduce the likelihood of misclassifying outliers. Single-item measures can be easily influenced by random noise or measurement error. This is also supported by Liu and Jurich (2022) emphasised that multiple data points or composite score can mitigate the impact of individual outlier observations, thereby enhancing the robustness of the analysis. At this stage, no cases were excluded after the examination of univariate outliers.

As for validation of the translated scales, the statistical analyses consisted of the following: (1) exploratory factor analysis, (2) confirmatory factor analysis, and (3) psychometric properties of the translated scale. The exploratory factor analysis was conducted specifically with parallel analysis (PA) and factor analysis with the use of SPSS version 26. PA was conducted to identify significant eigenvalues and determine the number of factors or components of the selected scale. It is recommended by Horn (1965) as a modification of Cattell's scree diagram to deal with the issue of

component indeterminacy. O'Connor (2000) stated that PA is a powerful tool for factor retention, as it compares the eigenvalues derived from the actual data with those from randomly generated datasets. This comparison helps to identify factors that are statistically significant, thereby reducing the risk of over-extraction of factors, which is a common pitfall in EFA. In the present study, the rawpar.sps script developed by O'Connor (2000) and five thousand datasets through permutations of raw data using the common factor analysis approach suggested by Hayton et al. (2004) were performed. This method provides eigenvalues from the raw data, along with mean, and 95th percentile (random data) eigenvalues based on Monte Carlo simulation. Therefore, the decision to retain a specific number of factors or components was determined by comparing the eigenvalues of the raw data to the 95th percentile (random data) eigenvalues. Cross-validation is crucial for independent replication, improving the confidence of the replicability of the study, and preventing overfitting models (Yarkoni & Westfall, 2017). Therefore, the present study compared the results between English sample and *Bahasa Malaysia* sample. After identifying the number of factors with PA, the present study continued to apply factor analysis with the Promax rotation method to identify the pattern of item loadings on specific factors. Items with higher loadings on a specific factor are considered good indicators of the underlying construct. Factor analysis is crucial in refining and finalising the items of the scale.

Subsequently, confirmatory factor analysis was carried out using AMOS version 26 to compare the model fit indices between the English sample (N = 248) and the *Bahasa Malaysia* sample (N = 243). The assessment included chi-square (χ^2) value, chi-square/degree of freedom ratio (CMIN/df), comparative-of-fit index (CFI), root mean square error of approximation (RMSEA), and standardised root mean square residuals (SRMR) to evaluate the model fit. Importantly, χ^2 value with $p > .05$ is considered a good fit, however, this can be sensitive to large sample sizes regardless of the model fit quality. The suggested cut-off values for other fit indices are as follows: CMIN/df within the range of two to five (Arbuckle & Wothke, 2006), CFI is at least .90 (Bentler & Bonett, 1980), RMSEA below .08 indicating a reasonable fit (Knight et al., 2004), and SRMR below .08 (Hu & Bentler, 1999). These criteria provided a comprehensive assessment of the model fit and assessed the appropriateness of the proposed factor structure.

Lastly, an examination of the psychometric properties of the translated scale was conducted, specifically focusing on validity (i.e., concurrent, convergent, and discriminant validities) and reliability (i.e., Cronbach's alpha and composite reliability). Convergent validity is established if AVE is above .5 and factor loadings are at least .50 (Cheung & Wang, 2017). Discriminant validity was tested with heterotrait-monotrait (HTMT) ratio of correlations, the suggested cut-off value can be either .85 or .90 (Henseler et al., 2015). It is important to take note that Cronbach's alpha may under or over-estimate the true reliability. Therefore, composite reliability as recommended by Peterson and Kim (2013) was also applied, which is particularly suitable for unit-weighted scales where the total score is the sum of equally weighted items (Geldhof et al., 2014). Hair et al. (2022) suggested that composite reliability should be at least .70. All statistical tests were performed at a significance level of .05, ensuring a rigorous evaluation of the psychometric properties of the translated scale.

3. Results

Exploratory Factor Analysis (EFA)

Parallel analysis (PA) was conducted to determine the number of factors or components of the scale. In Table 2, the results show that two factors or components should be retained given that the eigenvalues of raw data are greater than the eigenvalues of random data. The results are consistently presented across both English and *Bahasa Malaysia* samples. Given it is a multidimensional scale, the factor analysis (with Promax rotation) was conducted to identify the pattern of item loadings on the particular factor. In Table 3, comparing the item loadings across both samples, a total of six items are from the first component and another five items from the second component. The first six items represent autonomy and competence factors, whereas the other five items represent relatedness factor.

[Table 2 about here]

[Table 3 about here]

Confirmatory Factor Analysis (CFA)

CFA with the maximum likelihood method was conducted with the use of two factors. In Table 4, both models display poor fit indices with the inclusion of all items. The reversed item (item 9) is found with low loading across both models (ranging from .29 to .40). Therefore, this item was removed and continued for subsequent analyses. Upon removing the reversed item, the model fit indices of both models were improved, but not at satisfactory levels. Hence, modification indices were applied to improve the model fit. Error covariances are allowed if it is presented in a positive direction and theoretically supported (Holmes-Smith, 2012). After adding error covariances according to the suggestion in modification indices, the model fit indices of both models improved. However, model 1 (from the English sample) shows a poorer fit, and more error covariances are required as compared to model 2 (from

the *Bahasa Malaysia* sample). The poorer fit of model 1 signified that the participants who selected the original English language questionnaire showed more discrepancies between the proposed model and the actual data. However, no violation of model fit indices in model 2, reflecting that the data fit well into the proposed model and the translated scale performed better than the original version.

[Table 4 about here]

Validities and Reliability

Spearman rho correlation revealed positive and significant correlations (ranging from .178 to .352) between each PENS factor, overall scale, and three gaming-related variables (i.e., gaming frequency, gaming duration, and gaming experience). The results provide evidence for concurrent validity that the three highly gaming-related variables are consistent with the translated scale intended to measure. Additionally, for construct validity, the average variance extracted (AVE) value for autonomy and competence factor is .613, and composite reliability is .903. However, AVE for the relatedness factor is slightly below the .50 cut-off value (.468) but all of the factor loadings are above .50 and composite reliability is at a satisfactory level of .769. HTMT was applied to assess discriminant validity and the results show that all HTMT value between factors (.66) is below the cut-off value of .85.

4. Discussion

The present study aimed to translate the PENS-modified version into the Malaysian context. The entire translation and adaptation process involved nine experts from the mental health and linguistic fields. The present study supported only two factors (instead of three factors) of the scale. According to SDT by Deci et al. (1991) and Ryan and Deci (2000), posits that autonomy and competence are two of the three basic psychological needs that drive human motivation. Autonomy involves the need to experience volition and choice, while competence involves the need to feel effective in one's actions. To some extent, these needs often interact and influence each other. Combining both autonomy and competence can also simplify measurement and analysis. The results of parallel analysis also provide empirical evidence that a high interdependence between autonomy and competence. It is also believed that autonomy and competence are key factors influencing intrinsic motivation. MOBA gamers often provide a rich environment for players to autonomously explore their preferences (e.g., choosing their characters, items, and strategies). This autonomy is strongly tied to the pursuit of competence as players engage in continuous learning and skill development. It can be also the satisfaction derived from autonomy contributes to the player's overall sense of competence. The combination of these constructs may reflect the integrated nature of MOBA player's gaming experience.

The model fit indices suggested a good model fit of the translated version as compared to the original English version. It is important to take note that the reversed item was removed given with low loading across both English and *Bahasa Malaysia* models. Participants may not consistently interpret the reversed items in the same way. Additionally, reversed items can also impose a cognitive burden on participants. They need to allocate more cognitive resources to mentally reverse their usual response pattern. Carlson et al. (2011) found that reverse-scored items exhibited lower internal consistency compared to non-reversed items. This finding suggests that the inclusion of reversed items can create confusion among participants, leading to inconsistent responses that do not accurately reflect their true feelings or experiences. Moreover, Weijters et al. (2013) also argued that reversed items can introduce bias into the measurement process. They suggest that participants may overlook the variation in item polarity, leading to a misinterpretation of the scale. This may lead to reversed items to form a separate factors rather than aligning to the indended construct. Consequently, these outcomes can complicate the interpretation of results and undermine the validity of the scale. From the psychometric measurement perspective, the reversed item was excluded. The removal of the reversed item did not hamper the psychometric properties. Specifically, the concurrent validity was supported by the gaming-related variables. Convergent validity for autonomy and competence factor was established. However, the relatedness factor was slightly below the cut-off value, but it displayed satisfactory item loadings and reliability. Discriminant validity was also established given that the factors were not strongly correlated. In general, the psychometric properties of the translated scales were at a satisfactory level.

As for practical implications, the combination of autonomy and competence into a single factor in Malaysian gaming context may reflect unique player preferences and experiences. Malaysian gamers, particularly MOBA players exhibit greater social dynamics and in-game collaboration in shaping their gameplay experience. For instance, MOBA players often need to balance personal decision making (autonomy) with mastering roles or strategies (competence) to support the team success, which could explain that these two concepts appear to merge in this gaming environment. Players derive satisfaction not only from personal freedom but also from feeling effective within the context of a team. Importantly, understanding the player experience through this two-factor model provides a clearer picture for game developers on how to design a more appealing gaming

environment for MOBA players. Emphasising game features that foster both competence and autonomy can enhance gaming engagement in this community. Specifically, game designers may focus on features which allow players to cultivate stronger abilities in customising characters or skill systems for players to enjoy different strategies while feeling competence in their performance. Gaming events or competitions in Malaysia could also focus more on team dynamics and skill showcases, which highlight the importance of competence as an intergrated experience with personal decision-making. This fosters a gaming culture that reflects the core motivations of MOBA players in this region.

Several limitations are found in the present study. Firstly, the present study exclusively recruited MOBA players in Malaysia. However, it is crucial to achieve a more generalised outcome by selecting a sample that is more representative of the population. Therefore, the translated scales' psychometric properties may not be highly applicable to other game genres. Future studies are strongly recommended to re-evaluate the psychometric properties of this translated scale using more diverse populations. Secondly, the data were collected through a self-reporting measure on an online platform. This method may not accurately capture players' gaming experience. The reliance on an online sampling strategy may lead to a high margin of error and low statistical confidence, potentially leading to biased findings. Participants may also exhibit acquiescence bias in which they have a tendency to agree with statements regardless of their true feelings or opinions. This could lead to artificially high scores on positively worded items, skewing the factor structure and potentially masking true relationships among items or variables. Self-reporting relies on participants' accuracy in recalling and reflecting on their gaming experiences. In fast-paced environments like MOBA games, participants may struggle to accurately report their in-gaming experiences, resulting in incomplete or inaccurate reflections of their true experiences during gameplay. Using other methods in collecting data (i.e., interviews or randomised control trials) would be more appropriate. Thirdly, the relatedness factor displayed a lower cut-off value of AVE, posing a psychometric concern. Future studies are encouraged to replicate the present study across different populations.

Gaming research has traditionally centered on Western populations, which may not fully capture the experiences and motivational factors of players from non-Western or underrepresented backgrounds. Re-evaluating the scale with more diverse participants can help identify potential cultural or demographic nuances that affect how players perceive constructs like autonomy, competence, and relatedness in games. Including a broader range of participants, such as players from various age groups, ethnicities, socioeconomic backgrounds, and regions, also enhances the inclusivity of gaming research. Ensuring that the psychometric properties of scales (e.g., PENS-modified version) are valid across diverse populations will allow game designers and researchers to better understand and cater to the full spectrum of gaming experiences. Inclusivity in research is essential not only for developing fairer, more representative tools but also for creating gaming environments that resonate with the needs and preferences of all players, promoting a more equitable gaming culture globally.

5. Conclusion

In conclusion, the present study translated, adapted, and validated the PENS-modified version using Malaysian samples in the MOBA genre. The outcomes of this research lend support to the existence of a two-factor structure of the translated scale. The confirmation of a two-factor structure provides insights into the underlying dimensions that contribute to players' gaming experiences in the MOBA gaming context. The merging of these factors reflects how players in this environment experience freedom and mastery simultaneously, suggesting that the complementary roles of both competence and autonomy in the highly collaborative and strategic nature of MOBA games.This knowledge can aid future researchers in refining the existing theories or developing new frameworks to better understand the intricate dynamics of player engagement. By providing a validated translated scale tailored to the Malaysian context, the study contributes to the development of a more nuanced and culturally sensitive understanding of the factors shaping players' experiences. These findings can also guide game developers in designing MOBA games which are more effectively in addressing the integrated needs for skill mastery and player agency. Ultimately, the findings of the study also lay a foundation for future investigations and interventions aimed at enhancing the gaming experience.

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Table 1. Demographic Characteristics of Participants

	Sample 1 (English)	Sample 2 (*Bahasa Malaysia*)
N	248	243
Age_{mean}	24.89	26.72
Age_{SD}	3.92	4.18
Sex, *n* (%)		
Male	147 (59.3)	185 (76.1)
Female	101 (40.7)	58 (23.9)
Relationship, *n* (%)		
Single	163 (65.7)	144 (59.3)
Married	36 (14.5)	72 (29.6)
Separated/Divorced	-	1 (.4)
In-Relationship	49 (19.8)	26 (10.7)
Employment, *n* (%)		
Employed	113 (45.6)	144 (59.3)
Unemployed	18 (7.3)	28 (11.5)
Student	117 (47.2)	71 (29.2)
Educational Level, *n* (%)		
Secondary school/ Pre-U	25 (10.1)	43 (17.7)
Diploma	36 (14.5)	71 (29.2)
Bachelor's degree	171 (69.0)	123 (50.6)
Postgraduate Degree	16 (6.5)	6 (2.5)
Gaming Frequency (weekly, *n*, %)		
0 – 1 time	15 (6.0)	7(2.9)
2 – 4 times	86 (34.7)	67 (27.6)
5 – 8 times	72 (29.0)	79 (32.5)
9 times and above	75 (30.2)	90 (37.0)
Gaming Duration (weekly, *n*, %)		
1 hour and below	19 (7.7)	9 (3.7)
2 – 4 hours	112 (45.2)	94 (38.7)
5 – 7 hours	45 (18.1)	60 (24.7)
8 – 10 hours	35 (14.1)	31 (12.8)
11 hours and above	37 (14.9)	49 (20.2)
Gaming Experience		
<1 year	0 (0.0)	0 (0.0)
1– 3 years	47 (19.0)	38 (15.8)
4 – 6 years	62 (25.0)	50 (20.6)
7 –9 years	58 (23.4)	45 (18.5)
10 years and above	81 (32.7)	110 (45.3)

Table 2. Parallel Analysis Results of Both Samples

	No. of Factors	Raw Data Eigenvalues	Random Data Eigenvalues
English Sample	1	4.889	1.318
	2	1.519	1.228
	3	.942	1.164
	4	.786	1.114
Bahasa Malaysia Sample	1	5.339	1.459
	2	1.404	1.318
	3	.923	1.229
	4	.720	1.154

Table 3. Item Loadings Across Two Samples

	English Sample		*Bahasa Malaysia* Sample	
	Component			
	1	2	1	2
Item 1	**.864**	-.165	**.930**	-.235
Item 2	**.836**	-.025	**.882**	-.053
Item 3	**.755**	.055	**.824**	-.011
Item 4	**.733**	.021	**.724**	.064
Item 5	**.771**	-.025	**.585**	.237
Item 6	**.594**	.220	**.460**	.373
Item 7	.007	**.830**	.057	**.778**
Item 8	.006	**.821**	-.013	**.813**
Item 9	-.175	**.714**	-.198	**.698**
Item 10	.051	**.693**	-.006	**.699**
Item 11	.225	**.472**	.098	**.645**

Table 4 Model Fit Indices of Both Models

	χ^2	CMIN/df	CFI	RMSEA	SRMR
Inclusion of all items					
Model 1	240.548***	5.596	.831	.136	.090
Model 2	165.378***	3.846	.913	.108	.056
After the removal of item 9 (reversed item)					
Model 1	218.549***	6.428	.835	.148	.096
Model 2	147.999***	4.353	.917	.118	.057
With error covariances (according to suggestion in the modification indices)					
Model 1	81.859***	2.924	.952	.088	.054
With covariances:					
e1↔e2					
e2↔e5					
e5↔e6					
e7↔e8					
e10↔e11					
Model 2	79.036***	2.550	.965	.080	.049
With covariances:					
e4 ↔e5					
e5 ↔e6					
e10 ↔e11					

Note: Model 1 is derived from English sample; Model 2 is *Bahasa Malaysia* sample, *** is significant at $p < .001$