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Validity and Reliability of the Malay Version of the Planned Happenstance Career Inventory for Malaysian University Students

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ABSTRACT: This study aimed to translate and validate the Planned Happenstance Career Inventory (PHCI) for use in a Malaysian context. A total of 500 final-year undergraduate students from four public Malaysian universities participated (100 for Exploratory Factor Analysis, EFA), 400 for Confirmatory Factor Analysis, CFA). Expert review (n=5) established strong face and content validity (0.95). EFA yielded a five-factor structure consistent with the original PHCI: curiosity, risk-taking, persistence, optimism, and flexibility, with all factors demonstrating strong factor loadings (>.6) and explaining 80.276% of the total variance. CFA confirmed the model's goodness-of-fit (RMSEA = 0.070, CFI = 0.943, TLI = 0.935, Chisq/df = 2.950) and demonstrated strong convergent validity and composite reliability. Internal consistency was also excellent, with Cronbach's alpha values ranging from .82 to .90 for the subscales and the total scale. These findings indicate that the Malay version of the PHCI is a valid and reliable instrument for measuring planned happenstance skills among Malaysian university students, offering a valuable tool for researchers and practitioners in this cultural context.

Keywords: Planned Happenstance Career Inventory, Planned Happenstance Skills, career, graduate employability, validity and reliability.

I. INTRODUCTION

The transition from adolescence to adulthood is a crucial phase marked by personal growth and self-discovery, with the university playing a vital role in this journey [1]. As students grapple with the demanding nature of higher education, they develop essential adaptive strategies and self-management skills that are critical for shouldering new responsibilities [2]. Beyond academia, university acts as a gateway to society, where students confront the pressures of both academic education and future employment prospects. It is not only important for them to find a fulfilling career path but also to strategically seek opportunities that align with their goals aspirations [1].The significance of opportunity in shaping the career paths of university students is particularly striking [3].

Traditional career theories, such as Holland's person-environment–fit theory, often provide a structured and reasonably predictable approach to career planning. These theories encourage individuals to consider their personality traits, interests, and abilities while carefully researching and evaluating potential career paths to find an ideal match. While this rational and self-directed approach can be valuable, it overlooks the significant influence of unplanned events on career progression. The reality is that career paths are rarely linear or completely predictable. Numerous researchers, including [1, 4, 5], have emphasized the non-linear nature of

careers and the significant influence of unforeseen circumstances. For instance, unexpected opportunities like a chance encounter at economic shifts such as a recession, technological advances like the rise of AI, and personal life changes such as starting a family can significantly alter an individual's career path, often leading them in directions they had not originally anticipated. To better reflect the dynamic and evolving nature of work and careers, it is important to recognize the role of chance and adaptability in career development.

Mitchell et al. [6] introduced the planned happenstance theory, suggesting individuals can actively leverage unexpected events for career growth. Planned Happenstance Theory (PHT) offers a powerful framework for navigating the increasingly unpredictable landscape of modern careers. For instance, a professional who unexpectedly loses their job could use this as an opportunity to explore a new industry or start their own business. Rather than simply reacting to unforeseen circumstances, PHT encourages individuals to actively cultivate a mindset and skillset that transforms unexpected events into opportunities for growth and development.

Five core components, identified through extensive research, form the foundation of PHT [7-9]: 1) Curiosity: Serving as the cornerstone of PHT, curiosity fuels exploration and a desire to learn from unexpected situations. It propels individuals beyond their comfort zones, opening doors to new possibilities. 2) Optimism: A positive outlook allows individuals to view unexpected events not as setbacks but as potential turning points. This optimistic lens reframes challenges as opportunities for growth and innovation. 3) Flexibility: In today's rapidly evolving job market, the ability to adapt quickly is essential. Flexibility enables individuals to adjust their sails, embracing new directions and capitalizing on unforeseen opportunities. 4) Risk-Taking: Calculated risk-taking is essential for stepping outside of one's comfort zone and exploring uncharted territory. PHT encourages individuals to weigh potential rewards against risks, fostering a spirit of informed experimentation. 5) Persistence: Setbacks and obstacles are inevitable in any career journey. Persistence provides the resilience needed to navigate challenges, learn from failures, and ultimately achieve long-term goals.

By embracing the principles of PHT, individuals can cultivate the metacognitive skills needed to thrive in today's dynamic work environment. PHT empowers individuals to become active architects of their careers, prepared to leverage both planned and unplanned events as steppingstones toward professional fulfillment. This emphasis on adaptability instills a sense of preparedness and confidence in the student, equipping them to face the uncertainties of modern careers.

The Planned Happenstance Career Inventory (PHCI) is an instrument that can be used to assess a person's ability and willingness to manage uncertain career situations effectively. It focuses on examining an individual's ability to adapt and take advantage of unexpected opportunities in their career development [10, 11] Unlike traditional career assessment tools that primarily emphasize structured career planning, the PHCI recognizes the importance of embracing unplanned events and using them for personal and professional growth. The PHCI measures an individual's ability to make decisions in ambiguous situations proactively and encourages an attitude that welcomes random events as valuable learning experiences for shaping one's career [12]. The PHCI is characterized by its emphasis on adaptability, resilience, and the ability to turn unforeseen events into beneficial career moves, distinguishing it from more deterministic career assessment approaches [13] . By using the PHCI, individuals can feel optimistic and hopeful about their career prospects, knowing that they have the tools to navigate uncertain situations and turn them into opportunities.

In the field of career counseling, PHCI provides a framework for career counsellors to help individuals embrace and capitalize on chance events in their career development [14]. By utilizing the PHCI, career counsellors can assist students in developing the skills and mindset necessary to navigate through uncertain career paths and take advantage of unexpected opportunities that arise along the way [15]. Overall, the PHCI is a valuable tool for career counsellors to help individuals navigate uncertain career paths and capitalize on chance events.

II. LITERATURE REVIEW

The Planned Happenstance Career Inventory is a valuable tool used in various cultural contexts to assess individuals' career planning skills and readiness for uncertain circumstances. It evaluates five key skills: curiosity (exploring new learning opportunities and interests), persistence (overcoming challenges and setbacks in pursuit of goals), flexibility (adapting to change and considering different paths), optimism (maintaining a positive outlook and believing in one's ability to succeed), and risk-taking (taking calculated

risks to pursue opportunities). These skills are deemed crucial for navigating unpredictable career paths and seizing opportunities [12].

Numerous studies have sought to validate and adapt the PHCI for use in diverse linguistic contexts. For instance, researchers have successfully translated and validated the PHCI in Urdu [10], Italian [16], and Chinese [1]. These adaptations involved a meticulous process of translation, back-translation, and psychometric testing to ensure the instrument's reliability and validity within the target cultures. Notably, these cross-cultural validation studies have consistently demonstrated the PHCI's robustness and applicability across different populations, providing strong evidence of its effectiveness. The findings suggest that the five planned happenstance skills are universally relevant and contribute to individuals' career adaptability and success in uncertain environments.

Research has shown that planned happenstance skills, when harnessed effectively, can empower individuals in their career progression. These skills influence various factors such as employability, career decision-making, career preparation, self-efficacy, and career adaptability and progression [13, 17-19]. By developing these planned happenstance skills, individuals can take charge of their employability prospects, increase their career decision-making self-efficacy, and enhance their adaptability to changing circumstances, ultimately leading to positive career outcomes. The finding also suggested that career counselors can leverage these findings to design programs that empower individuals, including students and unemployed married women, to cultivate these skills and proactively shape their career development and job preparation strategies, fostering a more resilient and adaptable workforce.

Besides that, studies have explored how planned happenstance skills can lead to personal and professional growth, significantly contributing to psychological well-being and academic adjustment, making them essential for successful adaptation to professional environments and personal career management [14]. Furthermore, a mixed methods study highlighted the importance of curiosity, optimism, flexibility, risk-taking, and persistence in cultivating planned happenstance skills, with social networking emerging as a key component not previously described in the literature [7]. By addressing uncertainty and developing these skills, individuals can navigate unpredictable events and create opportunities for personal and professional growth, instilling hope and optimism about their future career prospects.

The translation of psychological tests is a meticulous process crucial for cross-cultural research and clinical practice to ensure that translated instruments maintain the authenticity and credibility of the original versions, as highlighted by several studies [20, 21]. This process involves adapting language to be suitable for the target audience, considering their cultural background, age, and education level, to ensure the validity and reliability of the translated tests [22, 23]. To address these complexities, a collaborative effort between language and content experts is essential, ensuring linguistic accuracy and conceptual equivalence [24]. The World Health Organization (2019) recommends a four-stage process: forward translation, expert panel back-translation, pre-testing and cognitive interviewing, and finalization to achieve a linguistically accurate, culturally appropriate, and conceptually equivalent translated instrument.

In the pursuit of robust and reliable scientific findings, the quality of research instruments used to collect data is paramount. Establishing the validity and reliability of these instruments is not merely a procedural necessity but a fundamental step in ensuring the trustworthiness and integrity of research outcomes [26]. Two statistical techniques, Confirmatory Factor Analysis (CFA), and Exploratory Factor Analysis (EFA), emerge as powerful tools for researchers engaged in the critical task of instrument validation, offering practical benefits such as improved data quality and more accurate research outcomes [27].

CFA and EFA offer a comprehensive approach to evaluating instrument validity, encompassing various facets such as content validity, construct validity, and criterion-related validity [26] Content validity, focusing on how well the instrument's items represent the intended construct, benefits from both rational analysis and the application of EFA . EFA plays a crucial role in uncovering the underlying factor structure of the instrument, ensuring that items are aligned and contribute meaningfully to the measurement of the intended construct [28] .

Construct validity, arguably the most crucial aspect of instrument validation, delves into the degree to which an instrument genuinely measures the theoretical construct it purports to measure. Both CFA and EFA play distinct but complementary roles in assessing construct validity. CFA, utilizing a deductive approach, tests a predefined factor structure based on prior research and hypotheses. In contrast, EFA employs an inductive approach, exploring the data to identify latent factors and their relationships. This

combined approach, with its focus on construct validity, provides a more robust understanding of the underlying constructs being measured, ensuring the instrument measures what it is intended to measure [29].

Furthermore, criterion-related validity, which examines the relationship between instrument scores and external criteria, can be effectively investigated using both CFA and EFA. By analyzing the relationships between the identified factors and external measures, researchers can gain insights into how well the instrument predicts or correlates with relevant real-world outcomes [29, 30]. The combined use of CFA and EFA plays a pivotal role in equipping researchers with a powerful toolkit for establishing the validity and reliability of research instruments. This comprehensive approach ensures that instruments accurately measure the intended constructs, relate appropriately to relevant criteria, and ultimately contribute to the production of credible and trustworthy scientific findings [26].

In conclusion, the widespread use and validation of the PHCI in various cultural contexts underscore its significance as a tool for career counseling and development. By assessing individuals' strengths and areas for growth in planned happenstance skills, career counselors can provide tailored guidance and support to enhance their clients' career readiness and adaptability in today's dynamic work landscape. Therefore, considering that there are no more studies related to planned happening skill in Malaysia and there is still no Malay version of PHCI, this reinforces the need for this study to be carried out, and indirectly, the new Malay version of PHCI can minimize any issues related to culture and bias in research. The aims of this study are as follows:

i. To translate the PHCI into the Malay version of the scale.
ii. To assess the content validity of the PHCI among Malaysian university students.
iii. To examine the construct validation and reliability of the PHCI among Malaysian university students.

III. MATERIAL AND METHOD

This study aimed to translate the PHCI into a Malay version and evaluate its validity and reliability among Malaysian public university students. A sample of 500 final-year undergraduate students from four universities was selected using cluster and stratified random sampling to ensure representativeness. Data were collected via an online self-administered questionnaire, with 400 responses used for CFA and 100 EFA. Data analysis was conducted using IBM SPSS 25.0 and AMOS 24.0, and strict confidentiality of participant data was maintained throughout the study.

1. RESPONDENT BACKGROUND

This study focuses on final-year undergraduate students at public universities in Malaysia. To ensure a representative sample, the study involved two phases. The pilot study was conducted at a research university. In contrast, the main study expanded data collection to four universities, each representing one of the four public university classifications in Malaysia: research, focused, comprehensive, and technical.

1.1 Pilot Test

The purpose of this pilot study is to gather some preliminary data before the main study. It shows where the research instrument is deficient, ensures the research sample is representative of the population, and offers preliminary results regarding the validity of the research hypothesis. A pilot study is crucial for ensuring the smooth execution of the actual study by identifying and rectifying any deficiencies or faults that may arise from the pilot study's findings. Validation of the modified instrument necessitates the implementation of pretests and pilot studies [31, 32]. It would be of utmost importance, mainly if the initial tool were designed for a distinct cultural and demographic other than that of this study [33].

Subsequently, the researcher administers the questionnaire to participants to acquire data from a minimum of 100 respondents for the EFA, following any appropriate revisions based on the pretest findings [34, 35].

In this pilot study, the researcher has chosen a university under the research university cluster to be used as a sample of respondents. The following are the demographic characteristics of the pilot study respondents based on gender, and study program flow. Descriptive findings show that 60 (60.00%) are female respondents,

and 40 (40.00%) are male respondents. Based on the respondents, the stream of study shows that 74 (74.00%) respondents are students in the science stream, and 26 (26.00%) are students in the art stream.

1.2 Field Test

The population in this study is the final year students of the first degree, which is expected to be 75,000 students. Based on the minimum sample size presented by Hair et al. (2019) [36], Zainudin et al. (2018) [37], Cohen et al. (2018) [38], Krejcie and Morgan (1970) [39], and the G*Power Software analysis, the researcher set the number of samples in this study to be 400 respondents. In this study, the researcher will use two methods of sampling techniques, namely i) cluster sampling technique and ii) stratified random sampling technique according to proportion, in the selection of study respondents. In the first stage, the researcher will use the cluster sampling technique in selecting the study location. The researcher has selected four universities from four types of university clusters to be used as study locations through the method of drawing votes.

The next step is to use a stratified sampling technique. At this stage the researcher will select the number of respondents based on the ratio according to the university and the field of study. In this study, the researcher proposes that the field of study be divided into two, namely i) the science stream and ii) the art stream.

Descriptive findings show that 307 (76.75%) are female respondents and 93 (23.25%) are male respondents. Descriptive findings based on university clusters, findings show that the frequency of respondents from Research Universities is as much as 100 (25%), Focused Universities as much as 100 (25%), Comprehensive Universities as much as 100 (25%), and Technical Universities as much as 100 (25%) While based on respondents. The flow of the study field shows that 200 (50%) respondents consist of students in the science stream and 200 (50%) students in the art stream.

2. RESEARCH INSTRUMENT

This study utilizes a 25-item questionnaire adapted from the PHCI developed by Boram Kim et al. [12] to measure an individual's ability to leverage chance events for career advancement. The PHCI comprises 25 items organized into five subscales: persistence, optimism, curiosity, risk-taking, and flexibility, each assessing a distinct aspect of planned happenstance.

Departing from the original 5-point Likert scale, this study employs a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree), to capture participant responses. This decision is grounded in research suggesting that 7-point scales offer greater reliability compared to their 5-point counterparts, allowing for a more nuanced understanding of respondent perceptions. The expanded scale provides a wider range of choices, enabling participants to express their level of agreement or disagreement with greater precision. This enhanced sensitivity not only facilitates the collection of more comprehensive data but also increases the likelihood of aligning participant choices with objective reality. Furthermore, the 7-point scale encourages greater respondent engagement and focus, leading to more deliberate and informed decision-making during the survey process [40-42].

3. TRANSLATION PROCESS

To proceed, there are only a few steps that must be taken. Translators must then locate a language and content expert [24]. After that, the translator renders the instrument into the language of the target group. Next, engage other specialists to translate the tool without relying on the original instrument. Adhering to the correct processes would enhance the face and content validity of the instruments [43]. The translation procedure of PHCI into the Malay form is categorized into four distinct phases, as outlined by World Health Organization [25]. During the initial phase, two experts were tasked with translating the instrument into a Malay version. In the subsequent phase, two expert panels, consisting of individuals with expertise in counselling, language, and assessment, were selected to thoroughly evaluate and provide feedback on the language, word usage, and format. Every suggestion and feedback were considered to enhance the instrument's translation process. During the third phase, two additional translators are enlisted to render the Malay version of PHCI into the English language. The blind translation procedure involved translating the Malay version into English without consulting the original instrument.

4. EXPERT CONTENT VALIDATION

Prior to carrying out a field study, it is recommended that a pre-test method be carried out by experts in order to assess the validity of the instrument in terms of both its content and its face validity. The content validity study of the PHCI was conducted by experts and focused on its face validity and content validity. In accordance with the recommendations of Polit et al. [44], five experts were appointed for the counselling background, i.e. three to 10 persons [44]. The experts reviewed the instruments and agreed that the format of the instrument is appropriate, the items measure the domain, the language is understandable, the font size is legible, the meaning of each item, the objectives, the instructions are clear, and the spellings are correct. In this study, the formula used to determine content validity is that the total score (x) given by an expert is divided by the total score (y) and multiplied by one hundred. A measurement instrument is considered to have high validity if it achieves a score of more than 70 percent [45] The value for the content validity of the instrument is 95% or 0.95.

5. EXPLORATORY FACTOR ANALYSIS (EFA)

EFA is a powerful statistical technique employed to uncover the latent structure within a set of measured variables or items, revealing the underlying factors or constructs that drive observed response patterns. This method offers several key advantages for enhancing the validity and reliability of measurement instruments [46]. Firstly, EFA assists researchers in determining the optimal number of factors or dimensions to include in an instrument. By identifying distinct constructs, researchers can ensure that the instrument comprehensively captures the intended concept without unnecessary redundancy. Secondly, EFA helps identify and eliminate irrelevant or redundant items, leading to a more efficient and precise instrument. This refinement process strengthens the instrument's ability to measure the targeted construct accurately. Thirdly, EFA sheds light on the interrelationships between items, revealing how they contribute to the overall construct being measured [47-49]. This understanding of item relationships is crucial for interpreting the instrument's results and drawing meaningful conclusions.

In research, EFA with Varimax rotation is frequently employed to evaluate instrument and construct validity. This approach is particularly valuable when the number of potential factors within a set of variables is unclear [31,37,50]. By identifying these unobservable constructs, which cannot be directly assessed but are represented by a collection of measurable entities, researchers gain a deeper understanding of the relationships between variables. Critically, conducting EFA for each construct is essential to determine if the components of the items in the current study deviate from those found in previous research, especially considering potential variations related to population characteristics [37]. This step ensures that the instrument remains valid and reliable across different contexts and populations. For instance, researchers often utilize data from pilot studies to confirm whether all items load onto their expected factors.

In conclusion, EFA is a valuable tool for researchers seeking to develop and validate measurement instruments. By uncovering the underlying structure of data and refining instrument content, EFA contributes significantly to the creation of robust and reliable research tools.

6. CONFIRMATORY FACTOR ANALYSIS (CFA)

CFA is a statistical technique used to assess the validity and reliability of measuring instruments, particularly in the field of social sciences [51]. Some advantages of CFA include: 1. Confirmation of theoretical model: CFA allows researchers to test the hypothesized factor structure of a measuring instrument based on prior theoretical knowledge [52]. ; 2.Identification of measurement errors: CFA helps identify measurement errors or items that are not consistent with the underlying constructs [53]; 3. Assessment of construct validity: CFA provides a formal statistical test to assess the validity of the constructs being measured by the instrument [54]; 4. Identification of convergent and divergent validity: CFA helps determine if the items intended to measure the same construct (convergent validity) are positively correlated, while items intended to measure different constructs (divergent validity) are not strongly correlated [55]; 5. Assessment of discriminant validity: CFA allows researchers to assess if the items measuring different constructs are distinct from each other and do not strongly correlate [52]; 6. Establishment of reliability: CFA helps establish the reliability of a measuring instrument by examining the consistency and stability of the factors over time and across different samples [49]; and 7. Evaluation of

model fit: CFA provides statistical measures of model fit, such as chi-square, comparative fit index, root-mean square error of approximation, and standardized root-mean-square residual, which help researchers determine how well the measured data fit the hypothesized factor structure [56]. Overall, CFA provides researchers with a systematic and objective method to assess the validity and reliability of measuring instruments, allowing for more accurate and robust data analysis and interpretation in social science research.

This research aimed to rigorously evaluate the hypothesized relationships between observed variables and their underlying latent constructs by employing CFA. The primary goal was to establish the measurement model's validity, specifically focusing on convergent validity, construct validity, and composite reliability. Data collected from the field study were utilized for the CFA procedure. This approach aligns with recommendations by [31, 37] to conduct CFA with the main study data after an initial exploration of the factor structure using EFA during the pilot study phase.

IV. DATA ANALYSIS

1. EXPLORATORY FACTOR ANALYSIS (EFA)

A total of 25 items on the questionnaire numbered C1 through C25, are used to measure the PHCI construct. To analyze the EFA process, the five components that comprise the PHCI construct from the earlier research were utilized during the process. Each element of the PHCI, which is curiosity, risk taking, persistence, optimism, flexibility, was analyzed concurrently. The exploratory factor analysis (EFA) was employed. As a result, 25 items were divided into five distinct components and all 25 items were kept because their factor loadings exceeded 0.6 in the analysis. The items are displayed in the rotated component matrix according to their respective categories.

1.1 Kaiser-Meyer-Olkin (KMO)

The KMO test is a crucial statistical measure used to determine the suitability of a dataset for factor analysis or principal component analysis. Accurately reporting and interpreting the KMO test result is essential, as it directly impacts the validity and reliability of findings derived from these multivariate techniques [57]. In this study, the KMO measure, a key indicator of sampling adequacy, was found to be .864, exceeding the recommended threshold of 0.6 [42, 58]. Furthermore, Bartlett's Test of Sphericity yielded a statistically significant result ($p = .000$, $p < .05$), indicating the presence of correlations among the variables and supporting the suitability of factor analysis [42, 58]. These findings, with a KMO value above 0.6 and a statistically significant Bartlett's test, provide strong evidence that the data are appropriate for factor analysis and subsequent data reduction techniques [58, 59]. Specifically, the results suggest that the 25 items designed to measure the PHCI construct are suitable for analysis using EFA.

Table 1. KMO and Bartlett's for PHCI

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.864
Bartlett's Test of Sphericity	Approx. Chi-Square	1108.737
	df	120
	Sig.	.000

1.2 Components and Total Variance

In EFA, the percentage of total variance explained by the extracted factors is a key indicator of the adequacy of the factor solution. This percentage reflects how much of the variability in the observed variables can be attributed to the underlying latent factors. A higher percentage suggests a better fit, indicating that the extracted factors effectively capture the essential information within the data. As shown in Table 2, the EFA yielded five components or dimensions, each with eigenvalues greater than 1.0, a commonly used criterion for factor extraction. These components, along with their respective variance explained percentages, are Component 1

(Curiosity, 37.82%), Component 2 (Risk Taking, 14.30%), Component 3 (Persistence, 13.68%), Component 4 (Optimism, 7.71%), and Component 5 (Flexibility, 4.76%). Importantly, the cumulative variance explained by these five components reached 80.28%, exceeding the widely accepted threshold of 60% [58-60]. This finding suggests that the five-component solution effectively captures the underlying structure of the data and provides a strong indication that the number of components and the items within each component are appropriate for evaluating the PHCI construct [61]. The 60% threshold is a crucial benchmark as it sets a standard for the minimum level of variance explained, guiding the reader's understanding of the results. Achieving a cumulative variance explained of over 60% is crucial for several reasons. First, it enhances confidence that the extracted factors represent the most meaningful information within the data, leading to more robust and reliable interpretations of the underlying constructs [59]. Conversely, a low percentage of variance explained may indicate that important factors need to be noticed, potentially resulting in an incomplete or misleading understanding of the data [62].

Table 2. Components and total variance explained for the PHCI constructs

	Initial eigenvalues			Extraction sums of squared loadings		
Components	**Total**	**Variance (%)**	**Cumulative**	**Total**	**Variance (%)**	**Cumulative**
Curiosity	9.955	39.821	39.821	9.955	39.821	39.821
Risk Taking	3.576	14.303	54.125	3.576	14.303	54.125
Persistence	3.420	13.680	67.805	3.420	13.680	67.805
Optimism	1.927	7.707	75.512	1.927	7.707	75.512
Flexibility	1.191	4.764	80.276	1.191	4.764	80.276

The scree plot provides a visual representation of the eigenvalues associated with each component in the factor analysis. As shown in Figure 1, the scree plot for the PHCI construct clearly indicates a break after the fifth component, supporting the extraction of five components. This finding is consistent with the eigenvalues exceeding 1.0 and the cumulative variance explained exceeding 60%, further strengthening the validity of a five-component solution. EFA was employed to group the 25 items into these five distinct components. Each component in the rotated component matrix represents a specific latent trait and comprises a set of items that load highly onto that component, as detailed by [63, 64]. In conclusion, the scree plot, eigenvalue criterion, and cumulative variance explained converge to indicate that five distinct components can effectively represent the PHCI construct.

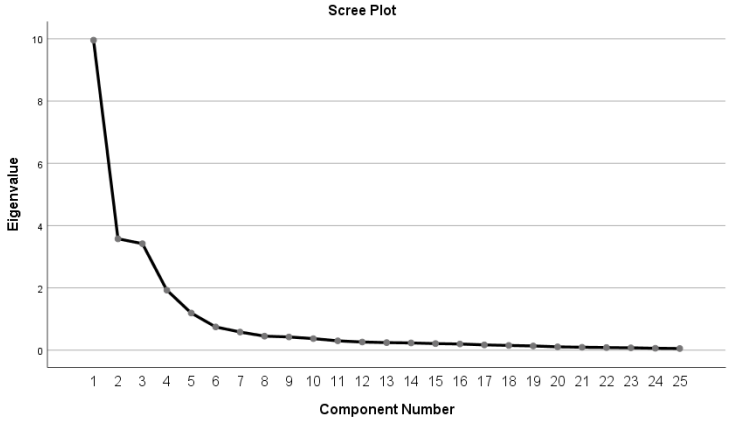

FIGURE 1. Screen plot of the PHCI construct

1.3 Rotation Component Matrix

Following the identification of five distinct dimensions through EFA on the 25 items, the next step involved examining the allocation of items to their respective factors. This process ensures that each factor is represented by items that strongly reflect the underlying construct [65]. Table 3 presents the rotated factor loading matrix, which reveals the strength of the relationship between each item and its corresponding factor. Notably, all items exhibit strong factor loadings, ranging from 0.747 to 0.881. These loadings exceed the recommended threshold of 0.6 [31, 37], indicating a substantial shared variance between each item and its latent factor. This finding signifies a strong relationship between the observed variables and the underlying constructs. Established guidelines recommend considering items with factor loadings below 0.6 for removal due to their weak association with the latent factor [65-66]. However, in this analysis, all items surpassed this threshold, indicating their strong contribution to their respective factors. Consequently, all 25 items and the five identified components were retained for subsequent analysis.

Table 3. EFA and each item in the components

Item	1	2	3	4	5
PHCI 1 (C1)				.813	
PHCI 2 (C2)				.801	
PHCI 3 (C3)				.741	
PHCI 4 (C4)				.814	
PHCI 5 (C5)				.807	
PHCI 6 (C6)					.785
PHCI 7 (C7)					.860
PHCI 8 (C8)					.863
PHCI 9 (C9)					.806
PHCI 10 (C10)					.818
PHCI 11 (C11)			.747		
PHCI 12 (C12)			.789		
PHCI 13 (C13)			.819		
PHCI 14 (C14)			.853		
PHCI 15 (C15)			.854		
PHCI 16 (C16)	.858				
PHCI 17 (C17)	.849				
PHCI 18 (C18)	.875				
PHCI 19 (C19)	.875				
PHCI 20 (C20)	.847				
PHCI 21 (C21)		.854			
PHCI 22 (C22)		.811			
PHCI 23 (C23)		.881			
PHCI 24 (C24)		.823			
PHCI 25 (C25)		.826			

2. CONFIRMATORY FACTOR ANALYSIS (CFA)

CFA was employed to evaluate the hypothesized second-order factor structure of the PHCI, as illustrated in Figure 2. The initial measurement model comprised five factors, each representing a distinct PHCI component: curiosity, risk-taking, persistence, optimism, and flexibility. Each component was measured by five corresponding items in the questionnaire.

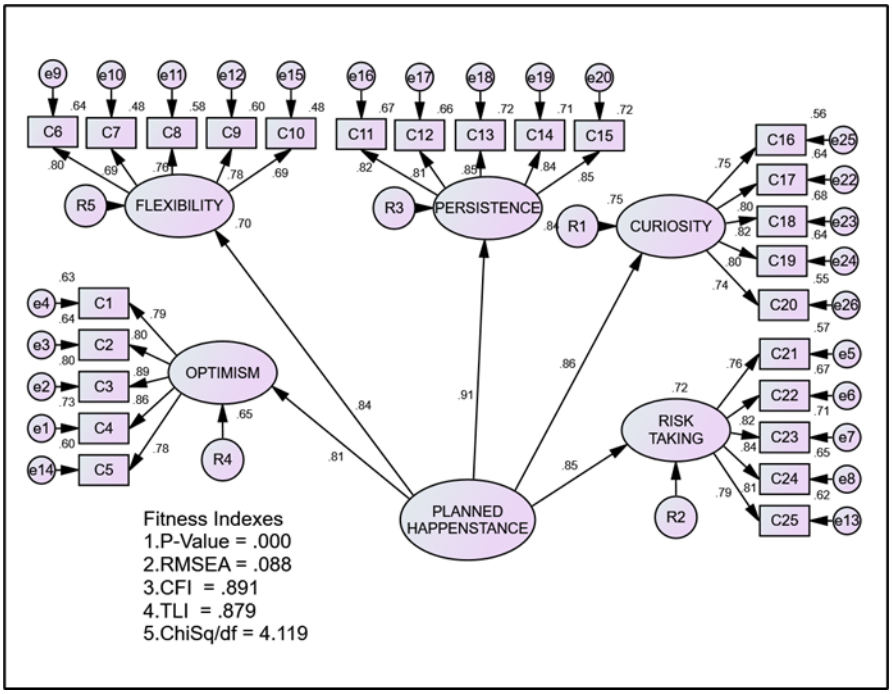

FIGURE 2. Initial measurement model for PHCI construct.

The initial CFA model, however, needed to fit the data adequately. As shown in Figure 2, the fitness indices fell short of the recommended levels established by [31, 37]: *Absolute Fit:* While the RMSEA value of 0.088 falls below the acceptable threshold of 1, indicating an acceptable fit, it is important to consider other fit indices in conjunction with RMSEA for a comprehensive assessment. *Incremental Fit:* Both the CFI and TLI values were below the recommended 0.90 threshold, with values of 0.891 and 0.879, respectively. This suggests that the model does not demonstrate a significant improvement in fit compared to a baseline model. *Parsimonious Fit:* The Chisq/df ratio of 4.191 exceeds the recommended limit of 3.0, indicating that the model's complexity outweighs its fit to the data. In other words, the model is not parsimonious and may be overfitting the data. These findings collectively underscore the importance of further refining the initial CFA model to achieve an acceptable and parsimonious representation of the PHCI structure, which is our goal.

To address this misfit, modifications based on high Modification Indices were explored. This systematic approach, guided by the insights of Awang et al. [31, 37] holds the potential to significantly improve the model fit by iteratively removing items exhibiting high MI values. The following items were identified for removal, along with their respective MI values: e9 (C6): MI = 83.25, e17 (C12): MI = 61.89, e3 (C2): MI = 33.99, e10 (C7): MI = 27.78, e6 (C22): MI = 15.86. This iterative process aims to achieve acceptable values for the Absolute Fit Index, Incremental Fit Indices, and Parsimonious Fit (Chisq/df), as recommended by [31, 37], ultimately leading to a well-fitting and parsimonious measurement model of the PHCI construct.

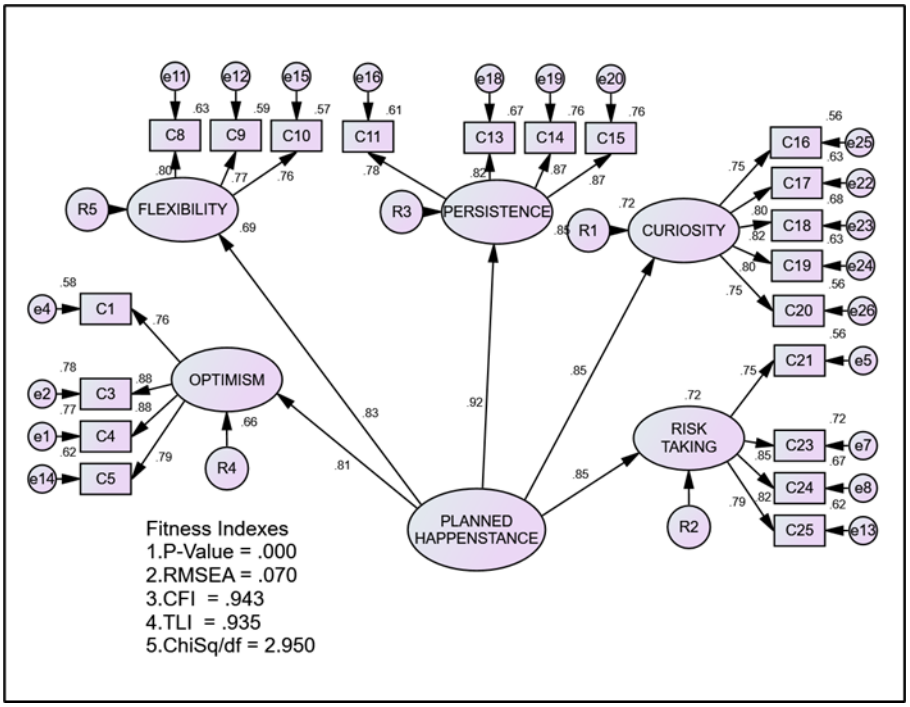

FIGURE 3. The final measurement model for PHCI construct.

Figure 3 presents the final measurement model for the PHCI, refined through an iterative process of model modification and analysis of fit indices. This final model demonstrates good fit to the data and meets the established criteria for construct validity as recommended by [31], [37]: This conclusion is supported by the following: *Excellent Absolute Fit:* The RMSEA value of 0.070 falls well below the acceptable threshold of 1, indicating a good fit of the model to the data. *Strong Incremental Fit:* Both the CFI and TLI values exceed the recommended 0.90 threshold, with values of 0.943 and 0.935, respectively. This signifies a substantial improvement in fit compared to a baseline model. *Good Parsimonious Fit:* The Chisq/df ratio of 2.950 falls below the recommended limit of 3.0, demonstrating a good balance between model complexity and fit. These findings provide compelling evidence that the final measurement model of the PHCI achieves construct validity, indicating that the model effectively measures the intended construct. This, in turn, strengthens the reliability and trustworthiness of the research findings derived from this model.

2.1 Convergent Validity and Composite Reliability

Convergent validity, a crucial aspect of construct validity, examines the degree to which a measure demonstrates adequate convergence with other measures designed to assess the same underlying construct. In the context of this study, assessing the convergent validity of the PHCI construct is paramount to ensuring that the instrument effectively measures the intended concept. To rigorously evaluate convergent validity, this study employs the average variance extracted (AVE) as a key indicator. AVE quantifies the shared variance among items within a construct relative to the variance due to measurement error. As recommended by [31, 37], an AVE value exceeding 0.5 is indicative of adequate convergent validity. In addition to convergent validity, this study also emphasizes the importance of composite reliability (CR) for the PHCI meaningfulness construct and its sub-constructs. Composite reliability serves as a measure of internal consistency, reflecting the extent to which the items within a scale consistently measure the same latent construct. A higher CR value signifies greater internal consistency and, consequently, enhanced reliability. Following the guidelines established by [31, 37] this study aims for CR values exceeding 0.6 to ensure the desired level of reliability for the PHCI instrument.

Table 6 presents the calculated AVE and CR values for the PHCI constructs. Notably, the results indicate that all AVE values surpass the threshold of 0.5, providing compelling evidence for the convergent validity of

the PHCI constructs. Furthermore, all CR values exceed the recommended 0.6 threshold, confirming the strong internal consistency and reliability of the PHCI measure. Therefore, based on the observed AVE and CR values, it can be confidently inferred that the PHCI constructs exhibit satisfactory convergent validity and composite reliability, underscoring the psychometric soundness of the instrument.

Table 6. AVE and CR for PHCI constructs.

Construct	Sub-Construct	Factor Loading	CR (>0.6)	AVE (>0.5)
Planned Happenstance	Curiosity	0.85	0.930	0.727
	Risk Taking	0.85		
	Persistence	0.92		
	Optimism	0.81		
	Flexibility	0.83		
Curiosity	C16	0.75	0.889	0.615
	C17	0.80		
	C18	0.82		
	C19	0.80		
	C20	0.75		
Risk Taking	C21	0.75	0.879	0.645
	C23	0.85		
	C24	0.82		
	C25	0.79		
Persistence	C11	0.78	0.902	0.699
	C13	0.82		
	C14	0.87		
	C15	0.87		
Optimism	C1	0.76	0.898	0.688
	C3	0.88		
	C4	0.88		
	C5	0.79		
Flexibility	C8	0.80	0.820	0.604
	C9	0.77		
	C10	0.76		

3. RELIABILITY

The analysis of Cronbach's alpha value was used to determine the reliability or internal consistency of the PHCI. The result of the internal consistency coefficients for the scale in this study was curiosity α =.88, risk taking α =.87, persistence α =.90, optimism α =.89, flexibility α =.88, total PHCI α =.82, indicating an ideal Cronbach's alpha coefficient of 0.7 (29,31–33).

Internal consistency, a critical aspect of an instrument's reliability, refers to the degree to which the items within a scale consistently measure the same underlying construct. To assess the internal consistency of the PHCI, this study employed Cronbach's alpha, a widely used statistical measure of internal consistency. Cronbach's alpha quantifies the intercorrelation among items within a scale, with higher values indicating greater internal consistency. A commonly accepted benchmark for an acceptable Cronbach's alpha coefficient is 0.7, as suggested by numerous researchers and guidelines [36, 58, 64, 67]. In this study, the analysis of Cronbach's alpha yielded promising results, demonstrating strong internal consistency for the PHCI and its subscales. Specifically, the following Cronbach's alpha coefficients were obtained: Curiosity: α = .88, Risk Taking: α = .87, Persistence: α = .90, Optimism: α = .89, Flexibility: α = .88 and Total PHCI: α = .82. These findings

clearly indicate that the PHCI exhibits excellent internal consistency, with all alpha coefficients surpassing the recommended threshold of 0.7. This high level of internal consistency provides compelling evidence that the items within the PHCI and its subscales are strongly interrelated and effectively measure the intended constructs. The robust internal consistency of the PHCI further strengthens the instrument's reliability and supports its use in measuring planned happenstance skills.

V. DISCUSSION

Planned happenstance skills have a positive effect on graduate employability. These skills, such as curiosity, optimism, flexibility, risk-taking, and persistence, play a significant role in shaping career paths and improving employment potential [7, 16, 19]. Planned happenstance skills are associated with increased career decision-making self-efficacy and career adaptability, which in turn positively impact employability [17]. Planned happenstance skills are particularly important for college students, as they enhance career adaptability and can help students successfully navigate the transition from academia to the labor market [14]. These skills also predict psychological well-being and academic adjustment, making them crucial for personal career management and academic success [14]. Because of this, it is abundantly evident that students need to acquire the skill of planned happenstance while they are enrolled in university to adequately prepare themselves to deal with the unpredictability of the issues they would experience in the workforce.

The PHCI is a tool that aims to assess skills in using chance events to develop career opportunities. It has been translated and adapted into different languages, including Urdu [10], Italian [16], and Chinese [1]. However, there currently needs to be a Malay version of this measuring tool that aligns with Malaysian culture. Considering the constraints that have been encountered, one of the potential solutions to the challenges encountered is to modify the current instruments that have been established to make it possible to carry out this study, particularly within the cultural framework of Malaysia. To satisfy the requirements for instruments in the counseling field in Malaysia, translating and adapting instruments from other languages could be possible [68].

Creating psychometric features appropriate for Malaysian culture and translating and adapting the PHCI into Malay with established validity and reliability results was the overall objective of this study, and it was accomplished. By doing a statistical analysis on a sample of final-year students at a public institution in Malaysia, it can be inferred that the results of this study align with those reported by [12]. An analysis of the psychometric features and factor structure of the PHCI, when compared to samples from recent years globally, showed a significant level of similarity [1, 2, 12, 69, 70, 71]. Regarding data specification, Cronbach's alpha coefficient indicated that the coefficient value for each subscale exceeded 0.87, while the overall coefficient reached 0.82. Both the principal component analysis of EFA and the confirmatory analysis of CFA provide support for the five-factor dimensional structure of the PHCI. Additionally, these results are consistent with the dimensional structure of the PHCI. Hence, our study affirms the usability and validity of the questionnaire among students studying at public universities in Malaysia.

The PHCI can be instrumental in helping career counselors guide individuals towards a more flexible and adaptable approach to career development. Instead of focusing solely on a predetermined career path, the PHCI encourages both counselors and individuals to acknowledge and leverage the role of chance in shaping career trajectories. Here's a more elaborate breakdown of how the PHCI can be utilized:

- *Identifying Strengths and Areas for Growth:* The PHCI can help counselors assess an individual's existing planned happenstance skills. This assessment can highlight individual strengths while pinpointing areas where further development is needed. For instance, an individual might demonstrate high levels of risk-taking, suggesting a willingness to embrace new opportunities and step outside their comfort zone. However, a lower score on flexibility could indicate a potential area for growth, highlighting the need to enhance adaptability and navigate unexpected career changes effectively. By identifying these specific strengths and weaknesses, counselors can tailor their guidance and interventions to address individual needs, fostering well-rounded planned happenstance skills and empowering individuals to navigate their career journeys with greater confidence and resilience.
- *Facilitating Personalized Strategies:* The PHCI doesn't offer a one-size-fits-all solution. Rather, it provides a framework for counselors to work collaboratively with individuals and develop personalized

strategies. These strategies might involve workshops on networking, brainstorming ways to step outside one's comfort zone, or practicing self-reflection to recognize potential opportunities.

- *Shifting Perspectives on Uncertainty: The* PHCI helps individuals move away from viewing uncertainty as a threat and instead see it as a potential source of opportunity. Counselors can guide individuals to reframe setbacks as learning experiences and encourage them to embrace new possibilities that might emerge from unexpected situations.
- *Encouraging Proactive Exploration:* The PHCI emphasizes the importance of actively engaging with one's environment to increase the likelihood of encountering chance events. Counselors can encourage individuals to attend industry events, connect with professionals in their field of interest, or pursue internships or volunteer opportunities to broaden their experiences.

By integrating the PHCI into their practice, career counselors can empower individuals to become active agents in their career development. This approach not only enhances adaptability in navigating the ever-changing job market but also fosters a growth mindset that proves invaluable throughout one's professional life.

VI. CONCLUSION AND LIMITATION

This research makes two significant contributions to the field. Firstly, it represents the pioneering effort to translate the PCHI into the Malay language using a rigorous back-to-back translation process. This meticulous translation process ensures linguistic equivalence and cultural appropriateness, making the Malay Version-PHCI the first and only instrument available for measuring planned happenstance skills within the Malaysian context. This contribution is particularly valuable for researchers and practitioners working with Malaysian students, as it provides a culturally sensitive and psychometrically sound tool to assess and develop these critical career skills.

Secondly, the Malay Version-PHCI offers enhanced user-friendliness compared to the original English version. By adopting a wider score scale ranging from 1 to 7, the instrument allows for greater sensitivity and differentiation in measuring individual differences in planned happenstance skills. This expanded scale facilitates a more nuanced understanding of individuals' strengths and areas for growth, enabling more targeted interventions and support.

Given the significance of these contributions, future research should build upon this foundation by conducting more comprehensive studies using the Malay Version-PHCI. Exploring the instrument's applicability across diverse Malaysian populations, examining its predictive validity in relation to career outcomes, and further investigating its factor structure will provide a more robust and holistic understanding of its psychometric properties and contribute to its broader adoption and application within the Malaysian context.

While this study offers valuable psychometric evidence for the PHCI within the Malaysian context, several limitations highlight avenues for future research:

1. *Sampling and Generalizability:* The sample comprised public university students, potentially limiting the generalizability of findings to other populations. Future research should employ stratified sampling techniques to recruit more diverse participants from various public and private universities, ensuring greater representation. Additionally, examining the factor structure's invariance across demographic variables like gender, academic achievement, and socioeconomic background would strengthen the instrument's cross-cultural validity.
2. *Test-Retest Reliability:* This study did not assess test-retest reliability, which examines the instrument's consistency over time. Future studies should incorporate a test-retest design to establish the temporal stability of the Malay Version-PHCI scores.
3. *Exploration of Private University Students:* Future research should extend this study's focus to include students from private educational institutions. This inclusion would provide a more comprehensive understanding of planned happenstance skills across different educational settings in Malaysia.
4. *Longitudinal Studies:* Investigating the relationship between planned happenstance skills, career decision-making self-efficacy, and career adaptability in longitudinal studies would provide valuable insights into the long-term impact of these skills on career development.

By addressing these limitations, future research can further refine the Malay Version-PHCI and contribute to a more nuanced understanding of planned happenstance in diverse cultural contexts.

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Author Contributions

All authors contributed equally to the conception and design of this study.

Conflict of Intersest

The authors declare no potential conflicts of interest or competing interests related to this research study.

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