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Developing and Validating Critical-Heutagogy Learning (CHL) to Enhance Lifelong Learning: A Rasch Analysis Approach

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Abstract: This research is dedicated to the development and validation of Critical-Heutagogy Learning (CHL), an innovative pedagogical approach designed to foster lifelong learning among university students. In an era characterized by rapid changes, the imperative for lifelong learning is paramount, necessitating individuals to continually update their knowledge and skills to remain adaptable and successful in diverse environments. To evaluate the validity and reliability of CHL, this study employs Rasch analysis. The development phase of CHL encompassed an exhaustive review of relevant literature, consultations with subject matter experts, and an iterative design methodology. This process was critical to ensure that CHL adhered to established principles of lifelong learning while promoting critical thinking and heutagogical practices. For the validation phase, CHL tools were administered to a heterogeneous group of students across multiple educational contexts. The gathered data underwent rigorous Rasch analysis to ascertain the framework's reliability, evaluate item fit, and pinpoint areas necessitating enhancements. The findings indicate that CHL is both a valid and reliable approach, with a high percentage (89.5%) of student respondents affirming its effectiveness in fostering engagement in learning and enhancing autonomous learning competencies. Additionally, this study delves into the interactions between bias and differential item functioning. The outcomes of this research offer a valuable contribution to the field of education, presenting a rigorously validated framework that supports lifelong learning. This is achieved through the promotion of critical thinking and the facilitation of independent learning skills, thus aligning with contemporary educational objectives and needs.

INTRODUCTION

Learning plays a pivotal role in the development of students' potential and equips them to address future challenges (Yi et al., 2021). In the context of escalating globalization, the concept of lifelong learning becomes critical for individual adaptability and success across various life dimensions (Eynon & Malmberg, 2021). Lifelong Learning emphasizes the importance of continuous learning throughout one's life (Eynon & Malmberg, 2021; Mohd Salleh et al., 2019). Lifelong learning, a continuous process throughout an individual's life, transcends formal educational settings and encompasses diverse learning modalities, including digital and online platforms (Eynon & Malmberg, 2021; Wismaningrum et al., 2020). This approach is instrumental in fostering personal, social, and economic development (Eynon & Malmberg, 2021). Therefore, there is a pressing need for

learning approaches that align with the principles of lifelong learning, promoting greater independence and self-direction in learners. Such approaches, should facilitate reflective practices and metacognitive skills, enabling learners to autonomously navigate their educational pathways (Briška & Siliņa-Jasjukeviča, 2022; Kamenetz, 2010). Moreover, fostering such an environment is essential for continual skill development, preparing students to stay competitive in an increasingly challenging job market (Yi et al., 2021).

Despite advancements in educational methodologies, significant challenges persist in cultivating learning environments that effectively foster lifelong learning skills among students (Ashton & Newman, 2006; Ryan & Deci, 2000). Predominant traditional learning practices often remain teacher-centered, potentially diminishing student motivation and autonomy (Lu et al., 2022). Consequently, there is a growing recognition of the need for more autonomous and student-centered learning approaches. One such approach is heutagogy, which positions students as proactive agents in their learning process, responsible for guiding their educational journey (Gillaspy & Vasilica, 2021).

Heutagogy, as a pedagogical approach, emphasizes student responsibility and autonomy in learning (Agonács & Matos, 2019; M. Yunus Abu Bakar et al., 2022; Ryan & Deci, 2000). This approach empowers students to set their learning objectives, devise strategies for their learning process, and assess their own progress (Moore, 2020). Through heutagogy, students are encouraged to engage in self-determined learning, fostering skills that are essential for lifelong learning.

In Indonesia, the potential to explore and implement heutagogy-based learning approaches is significantly supported by the 'Freedom to Learn' (Merdeka Belajar-Kampus Merdeka) policy, initiated in medio 2020. As outlined by the Director General of Higher Education (2020), this policy represents a strategic effort to attain national educational objectives through the establishment of an autonomous and flexible learning framework in higher education institutions. The aim is to foster a learning culture that is innovative, non-restrictive, and tailored to student needs. Furthermore, the 'Freedom to Learn' initiative seeks to enhance integration and alignment with the business and industrial sectors, thereby equipping students for early engagement with the workforce. Central to this educational reform is the concept of liberating education, which emphasizes the creation of a learning process that resonates with contemporary societal dynamics and the evolving nature of the times.

The 'Freedom to Learn' initiative in Indonesia can be conceptualized as an educational approach that facilitates human liberation, addressing both external challenges such as poverty and intellectual limitations, and internal aspects like the freedom of thought, decision-making capabilities, personal dignity, and the development of a democratic mindset. This approach to learning independence kindles a philosophy of 'humanizing humans,' encapsulated in the Javanese pedagogical principles of “among, momong, ngemong,” which translate to nurturing, caring for, and fostering students in the educational journey. This philosophy underscores a paradigm shift in education, moving from merely transmitting knowledge to transforming values, thereby ensuring a more holistic and value-driven learning experience (Rahadian, 2018; Sugiarta et al., 2019).

The 'Freedom to Learn' initiative in Indonesia aligns closely with John Dewey’s principles of progressivism, as both advocate for the autonomy and independence of educational institutions in facilitating the exploration and development of students’ potential, tailored to their unique needs (Faiz &

Kurniawaty, 2020; Mustaghfiroh, 2020). Additionally, this concept resonates with the tenets of constructivism, emphasizing the freedom, independence, and flexibility of educational institutions in recognizing and nurturing student competencies (Yusuf & Arfiansyah, 2021).

Conversely, the 'Freedom to Learn' initiative is perceived as aligning with the principles of humanistic education (Fitra, 2022; Nasution, 2020); Furthermore, this approach bears a significant correlation with Paulo Freire's critical pedagogy, particularly in its aim to emancipate students from traditional "banking" models of education (Datungsolang, 2018; Siswadi, 2022), Additionally, its relevance to the 'Taman Siswa' movement's 'among system' (Ferary, 2021; Sesfao, 2020). Lastly, the concept of independent learning, as embraced by the "Freedom to Learn," is congruent with the ethos of humanistic education, which similarly focuses on humanizing learners through meaningful learning experiences that prioritize student needs (Herpanda & Neviyarni S, 2022; Mujahid & Aderus, 2022).

Critical pedagogy represents a reflective educational paradigm that aims to challenge and transform dominant ideological structures to facilitate social change (Giroux, 2020; Shor et al., 2017; Topatimasang et al., 2010). This approach encompasses the development and application of critical, creative, and active mindsets and dispositions within the learning process (Facione, 2011). Furthermore, it involves cultivating a culture of thinking, reading, writing, and speaking that transcends conventional, myth-based, doctrinal, and opinion-driven thought processes. Critical pedagogy encourages a deep understanding of the underlying meanings, root causes, social contexts, ideologies, and personal implications associated with every action, event, object, process, organization, experience, text, subject matter, etc. (Shor et al., 2017).

Heutagogy, as conceptualized by Hase Hase (2009) and Lock et al (2021), is recognized as an effective method for enhancing students' learning capabilities, fostering independence, and promoting lifelong learning. This learner-centered approach empowers students to develop a deeper comprehension of the learning process and enhance their self-directed learning skills (Bakar et al., 2022). Locket et al. (2021) further elucidate that heutagogy enables students to confidently employ various strategies and resources in support of their learning endeavors. This extends beyond merely accessing information; it involves identifying and utilizing diverse sources for experiential learning that contribute significantly to their educational growth (Blaschke, 2021; Shpeizer & Glassner, 2020).

Previous research has indicated that heutagogy holds considerable potential in cultivating key competencies such as problem-solving, critical thinking, and independent learning (Köseoğlu et al., 2023; Mohd Salleh et al., 2019). Despite these findings, there remains a gap in understanding how to effectively integrate heutagogy within formal educational settings and how to facilitate students' application of heutagogical practices in their daily learning activities, particularly in incorporating critical thinking aspects (Blaschke, 2021). Consequently, there is a need to develop the CHL approach, which synergizes heutagogical methods with critical thinking elements (Blaschke, 2021). The CHL approach is anticipated to provide more comprehensive operational guidelines, enabling students to develop lifelong learning skills with an emphasis on critical and reflective thinking.

The CHL approach will undergo validation through Rasch analysis. Rasch analysis represents a sophisticated statistical methodology employed to evaluate the quality of measurement instruments and to analyze item characteristics within a scale (Bond et al., 2020; Wind & Hua, 2022). The application

of Rasch analysis in this context is intended to rigorously assess the validity and reliability of the CHL approach, thereby establishing a more effective framework for promoting lifelong learning.

The primary objective of this research is to generate empirical evidence regarding the efficacy of the CHL approach in enhancing students' lifelong learning competencies. It is anticipated that the findings from this study will contribute significantly to the field of education by offering an innovative and adaptable learning model. Such a model is designed to equip students with the skills and confidence required for continuous learning and development throughout their lives, thereby addressing contemporary educational demands and challenges.

This research aims to address five key questions focused on the Comprehensive Health Literacy (CHL) approach and its development and implementation within educational settings. Firstly, the investigation explores the distinctive characteristics that emerge in the CHL approach when it is systematically developed through the application of the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) procedure. Secondly, the study seeks to understand how validators perceive the feasibility and applicability of the CHL approach within educational settings, considering their insights and perspectives. Thirdly, the research examines the potential influence of gender bias on assessment outcomes, particularly when evaluators are rating the efficacy of the CHL approach. The fourth question delves into the established validity and reliability criteria for the CHL approach, focusing on these criteria as determined by student responses. Lastly, the study investigates students' reactions and feedback following the implementation of the CHL approach in classroom settings, aiming to provide valuable insights into the practical implications and reception of this educational methodology. Through a comprehensive exploration of these research questions, this study aims to contribute to the refinement and understanding of the CHL approach in the context of educational practices.

METHOD

This study uses the R&D design with the ADDIE model. The ADDIE model, which stands for Analysis, Design, Development, Implementation, and Evaluation, can be used systematically to develop, and validate CHL to promote lifelong learning. This model provides a structured framework for instructional design and ensures that the CHL model is developed and validated effectively (Branch, 2009). The research and development procedure model was adapted (Branch, 2009; Dick et al., 2015; Dousay, 2017; Spatioti et al., 2022) as the ADDIE model.

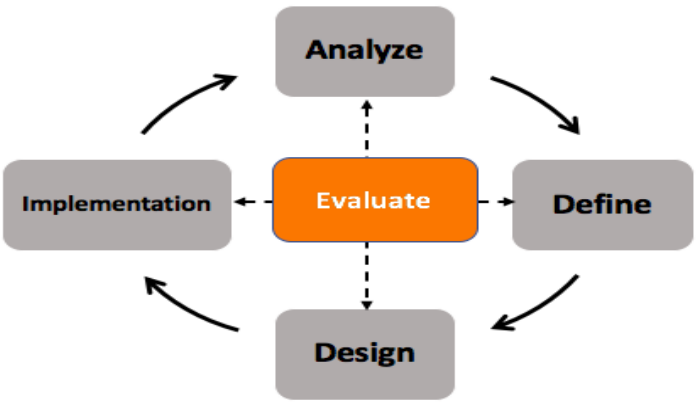

Figure 1. ADDIE Model Cycles.

Analysis

In this initial phase, an extensive review of the existing literature on critical learning, heutagogy, and lifelong learning was conducted. This review is instrumental in delineating the theoretical underpinnings and core components of the Critical-Heutagogy Learning (CHL) model. Additionally, this stage involves identifying the target audience and assessing their learning requirements (Branch, 2009). Complementing this, field studies were carried out to identify potential challenges and opportunities necessitating the development of the CHL model.

Design

The CHL model was formulated based on the insights gained during the analysis phase. This involved specifying learning objectives, strategies, and assessment techniques. The design phase ensures alignment with the principles of critical learning and heutagogy, while fostering lifelong learning. It encompasses the creation of a detailed blueprint for the CHL model, outlining the structure of instructional materials and learning activities.

Development

This stage entailed the creation of educational materials and resources essential for the implementation of CHL. It involved developing learning modules, designing interactive activities, and crafting assessment tools, all tailored to engage learners and support their lifelong learning journey.

Implementation

The developed CHL model was subsequently applied in real-world learning settings, such as classroom environments. This phase included the dissemination of teaching materials, facilitation of learning activities, and provision of support to students.

Evaluation

To evaluate the efficacy of the Critical-Heutagogy Learning (CHL) model, a multifaceted methodological approach was employed, encompassing surveys, interviews, and assessments. Data were gathered on students' knowledge, skills, and attitudes towards CHL, facilitating an assessment of the model's impact on lifelong learning and identifying potential areas for enhancement.

For the validation of the CHL model, the Rasch analysis method was utilized. Rasch analysis, a robust statistical technique, is employed to evaluate the psychometric properties of measurement instruments. In the context of CHL, Rasch analysis was applied to assess the model's validity and reliability by examining person-item fit, item difficulty, and individual capabilities. This analytical process is crucial to ascertain the model's robustness and its capacity to effectively promote lifelong learning.

Prior to testing with student respondents, the developed CHL model underwent a preliminary validation phase involving various experts, including educational theorists, media specialists, linguists, and evaluation professionals. A pilot study was then conducted with a sample comprising students from the Biology Study Program at UIN Raden Intan Lampung (n=80) and a small group of lecturers (n=4). The data derived from the questionnaire were subjected to Rasch analysis to determine the instrument's validity and reliability.

RESULT AND DISCUSSION

Analysis

The initial phase of the research involved a comprehensive analysis to identify the needs and challenges associated with enhancing lifelong learning among students and lecturers at UIN Raden Intan Lampung. This crucial step in developing innovative teaching methodologies is predicated on a thorough

understanding of the target audience's needs and challenges, forming the foundation for the creation of effective and pertinent learning strategies. The research incorporated an in-depth review of literature on lifelong learning and heutagogy, a pedagogical approach that emphasizes the development of self-determined learning capabilities. This literature review was instrumental in deepening the researcher's understanding of the context and fundamental concepts associated with lifelong learning and heutagogy.

Additionally, to supplement the literature review, interviews and surveys were conducted with students and lecturers at UIN Raden Intan Lampung. The objective of these empirical methods was to collate their views and perceptions on lifelong learning and the obstacles encountered in its implementation. The data garnered from these interviews and surveys offered invaluable insights into the experiences, expectations, and goals of both learners and educators in relation to lifelong learning.

After the analysis, key characteristics of the target audience, comprising students and lecturers at UIN Raden Intan Lampung, were delineated. These characteristics included educational backgrounds, learning interests, and prior educational experiences. Recognizing the specific attributes of the audience is critical, as it enables the researcher to develop pedagogical methods that are customized to align with the learners' needs, preferences, and comprehension levels.

Furthermore, the analysis underscored a pressing need for the development of teaching methodologies that are adaptive and responsive to the evolving educational landscape. Considering technological advancements and shifting learning requirements, there is a growing demand for innovative approaches that actively foster lifelong learning. The insights obtained from this analysis provided a robust foundation for the design and development of the Critical-Heutagogy Learning (CHL) approach, which emphasizes the cultivation of self-determined learners equipped to navigate future changes.

The findings of the analysis highlighted an imperative to devise educational methods that not only advocate lifelong learning but also enhance students' pedagogical skills. The identification of audience characteristics is instrumental in the creation of a CHL model that resonates with the needs and expectations of both students and lecturers. (see Figure 2).

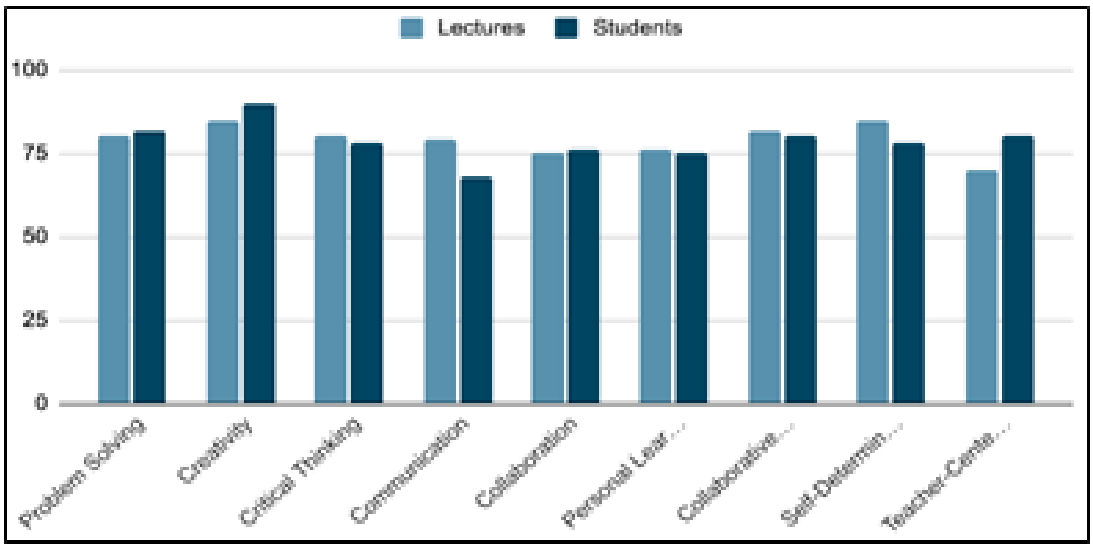

Figure 2. The Needs of Skills and Learning Based on Lecture and Students' Perspective.

Referencing Figure 2, it is evident that both lecturers and students prioritize the orientation of current educational practices towards the development of 21st-century skills. Consequently, there is a growing inclination to embrace collaborative, student-centered learning methodologies and to foster self-determined learning strategies. The data obtained from interviews with lecturers and students, coupled with classroom observations, underscore the significance of cultivating 21st-century competencies and implementing collaborative, student-centric pedagogical approaches.

Lecturers have emphasized the necessity for students to develop skills pertinent to the digital age and future job markets. Furthermore, they have underscored the advantages of collaborative and student-centered learning methods in fostering inclusive and supportive educational environments. From the student perspective, there is a marked enthusiasm for acquiring 21st-century skills, with a preference for collaborative learning models. Students also value the flexibility to select topics and learning approaches that resonate with their individual interests and professional aspirations. Classroom observations have additionally highlighted instances where lecturers have successfully implemented collaborative and student-centered techniques, thereby facilitating opportunities for student collaboration, discussion, and problem-solving.

21st-century learning is increasingly focused on fostering student autonomy to fully harness their potential (Blaschke, 2012; Gillaspy & Vasilica, 2021; Moore, 2020; Shpeizer & Glassner, 2020). Contemporary educational paradigms emphasize enhancing the learning experience, focusing on meta-learning strategies, double-loop learning, non-linear processes, universal learning methodologies, and learner-centric orientation (Glassner & Back, 2020; Hase, 2013; Starkey, 2012).

Consequently, the fundamental tenets of heutagogy are deemed pertinent in the design of learning systems. Heutagogy advocates for educational initiatives to be primarily driven by the learners themselves or their communities, granting them the autonomy to determine the content and methods of their learning journey. This approach is predicated on the understanding that individuals possess an inherent willingness to learn, a process that occurs naturally throughout life, thereby transcending the traditional debates surrounding andragogy and pedagogy (Canning & Callan, 2010; Gillaspy & Vasilica, 2021; Hase & Kenyon, 2007; Veletsianos, 2010).

Design

In the design stage of the study, findings from the preceding analysis were integrated to develop a Critical-Heutagogy Learning (CHL) model at UIN Raden Intan Lampung. The design of the CHL model was predicated on a comprehensive understanding of the specific needs and challenges encountered by students and lecturers in enhancing lifelong learning. The CHL model encompasses several critical components of lifelong learning: (1) Importance of Lifelong Learning: The CHL framework emphasizes the significance of lifelong learning, extending beyond the confines of formal education; (2) Self-Determined Learning Ability: It supports and guides students in becoming autonomous learners, taking responsibility for their educational journey; (3) Collaboration: The model fosters collaborative interactions between students and lecturers; (4) Experience-Based Learning Application: CHL encourages experiential learning, integrating knowledge and skills in real-life scenarios, thereby enhancing lesson relevance and applicability; (5) Focus on Critical Abilities: This approach cultivates

critical skills necessary for analyzing information, evaluating learning resources, and making informed decisions, essential in navigating today's complex world; (6) Motivation and Participation: The model aims to boost student motivation and engagement in the learning process.

The design process of the CHL model included several stages: (1) Determination of Media and Learning Resources: This involved selecting appropriate resources such as books, images, YouTube links, websites, podcasts, environmental observations, news, and articles, tailored to the specific tasks and concepts; (2) Determination of Format: Selection of formats for developed tools, including modules, Student Learning Plans (SLPs), enrichment materials, student worksheets, and assessment tools; (3) Preliminary Design/Prototype: Designing prototypes of the CHL tools.

Development

During the product development phase of the Critical-Heutagogy Learning (CHL) model, a range of educational materials was meticulously crafted. These materials encompassed adaptations to core and basic competencies, clearly defined objectives, user instructions, comprehensive material descriptions, projects encouraging critical thinking and independence, as well as an array of evaluative components including sample questions, discussion prompts, and practice exercises.

After their development, these CHL materials underwent a validation process utilizing a structured questionnaire. The primary objective of this validation was to assess the practicality and applicability of the developed products. This crucial step provided an opportunity to collate feedback and suggestions for the CHL materials, thereby refining them before proceeding to field testing.

Figure 3. Display Cover and Table of Contents.

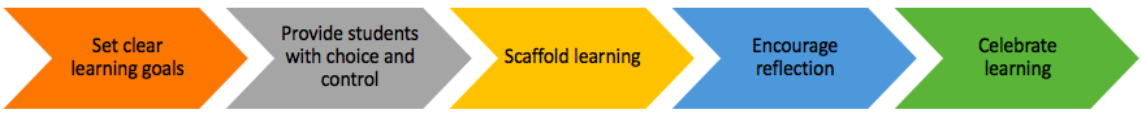

Figure 4. The Steps of CHL.

The learning process within the Critical-Heutagogy Learning (CHL) model is structured through the following sequential steps (see Figure 4.). The initial step in the Critical-Heutagogy Learning (CHL) model involves establishing clear learning objectives. This clarity is crucial as it delineates the expected learning outcomes for students, fostering motivation throughout their educational journey. Central to CHL is the principle of self-determination,

necessitating that students are afforded autonomy in selecting their learning goals, activities, and resources. Additionally, CHL incorporates a scaffolding approach, providing necessary support to facilitate student success. This support can manifest in various forms, including feedback, guidance, and resource provision.

Reflective practices are integral to CHL, aiding students in learning from their experiences and advancing their knowledge. Encouraging reflection can be achieved through questioning, opportunities for written reflection, and discussions. Furthermore, celebrating educational achievements is a pivotal aspect of CHL, serving to motivate and engage students. Recognition can be expressed through positive feedback, sharing of learning experiences, and acknowledgment of accomplishments.

Implementation

The implementation stage involves the practical application and execution of the developed CHL model. This stage encompasses product trials, conducted in two phases: a limited-scale trial with about 30 students and a larger-scale trial involving around 100 students. During this stage, student feedback on the developed learning tools is gathered through questionnaires.

Evaluation

The evaluation phase is an ongoing process that spans the analysis, design, development, and implementation stages. It encompasses both internal and external evaluations. The internal evaluation focuses on assessing the quality of the developed product.

1) Feasibility of CHL

The validation of the Critical-Heutagogy Learning (CHL) model's feasibility involved a panel of experts specializing in material content, learning methodologies, media, and language. The process resulted in the initial categorization of the developed module as 'highly feasible'. This categorization was reached after the researchers implemented revisions based on the feedback received during the first round of validation. Subsequently, the modified module underwent a second round of validation, where it attained a 'satisfactory' rating, allowing the researchers to progress to the subsequent phase of the study.

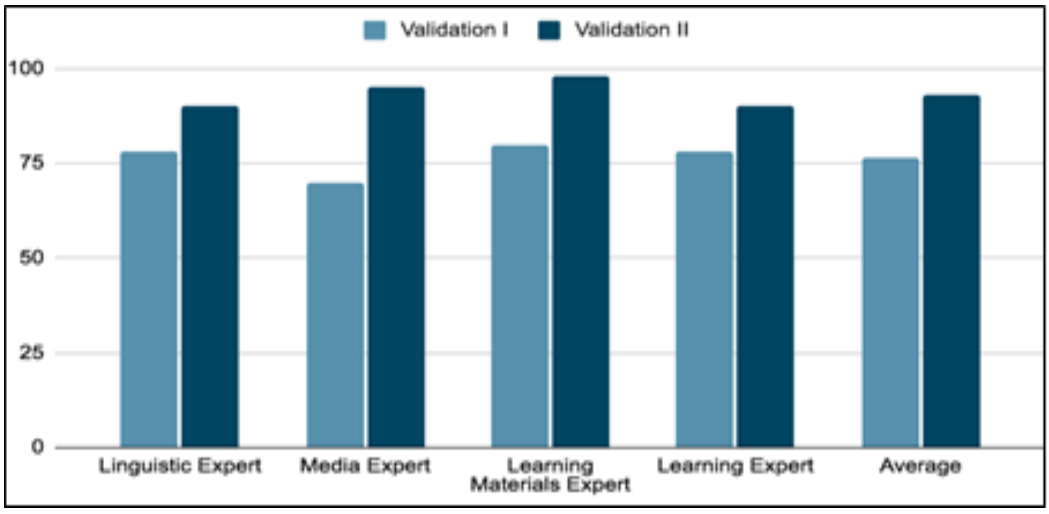

Figure 5. Validation Result.

2) Student Response to CHL

Initially, a limited-scale test was conducted with 20 students to evaluate the CHL model. The students engaged with the learning materials by reading, understanding, applying, and critically evaluating them. Key observations from this trial included: 1) the material was challenging yet stimulating, 2) students were initially unaccustomed to setting their own learning goals and methods, 3) the CHL approach was found to be straightforward to implement, and 4) the learning procedure facilitated the study process. Following this, a large-scale test was carried out with 100 students. Post-engagement with the module, these students completed a questionnaire to provide feedback. The results of this questionnaire, detailing student responses to the CHL module, are presented below.

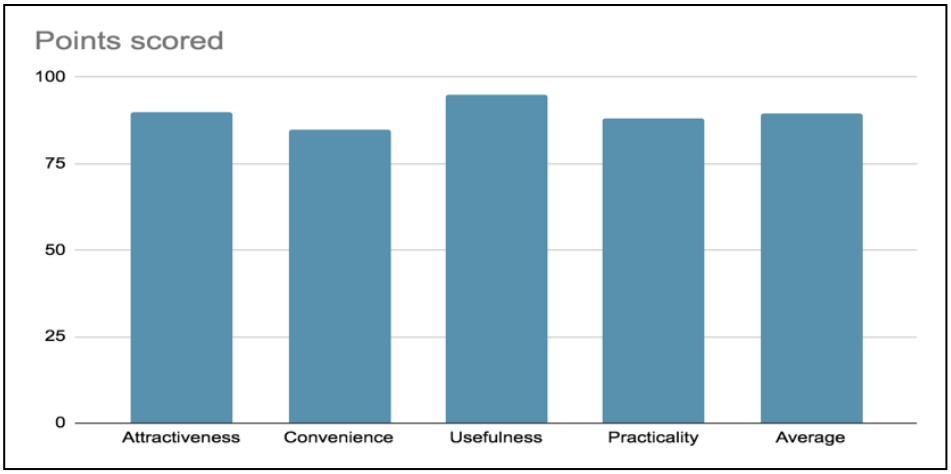

Figure 6. Student Responses to CHL.

Referring to the graph presented, it was observed that the average student response to the module was predominantly positive (89.5%). This feedback suggests that the module is perceived by students as appealing, user-friendly, beneficial, and pragmatic.

To gain deeper insights into the dynamics between the variables, student responses were subjected to a Rasch analysis. This analysis was conducted using WINSTEPS software, employing the Joint Maximum Likelihood Estimation (JMLE) method. The raw data were adjusted to examine specific interactions involving 100 students and ten questionnaire items, with response options ranging from strongly disagree (1) to strongly agree (4). As depicted in Table 1, both students and items demonstrated satisfactory fit validity and reliability, with mean infit and outfit Mean Square (MNSQ) values within the range of 0.99 to 1.01. Furthermore, the validity of the fit was corroborated by the mean infit and outfit Z-standard (ZSTD) values, which varied between -0.33 and 0.00 (Andrich, 2017; Bond et al., 2020). The reliability scores for both students and items met the acceptance criteria, attaining values of 0.82 and 0.93 respectively (Fisher, 2007; Taber, 2018). The chi-square scores were indicative of data conforming to a normal distribution and fitting the Rasch model globally (Engelhard, 2013; Linacre, 2020). The average scores for students and items were 3.83 and 0.00, respectively. This implies that students generally rated the module highly (3.83), and the item difficulty was centered around the mean logit size (0.00). Item difficulty values ranged from -1.23 to 1.0.

Table 1. The Summary of Rasch Parameters.

Psychometrics Attribute	Learning Experience
Number of Items	10
Mean	
Item outfit MNSQ	0.99
Item Infit MNSQ	1
Person oufit MNSQ	0.99
Item separation	1.01
Person separation	2.12
Item reliability	2.4
Cronbach's Alpha	0.82
Unidimensionality	0.88
Raw variance explained	
By measure	44.40%
Unexplained variance 1st	
Contrast	10.00%

Based on the data above, the mean measure of a person indicates that the tendency of the subject's ability is greater than the level of difficulty of the questions. This is because the mean measure is greater than 0.0. A mean measure of 2.10 indicates that the subject's ability is significantly greater than the questions' difficulty level. Alpha Cronbach value (KR-20) is a reliability coefficient calculated using the classical test theory approach. It is a measure of the internal consistency of a test. A high alpha value indicates that the items in the test are measuring the same construct. In this case, the alpha value of 0.88 indicates that the questionnaire's items measure the construct of student perception of the module very well. A scale category probability analysis was performed to understand whether students can differentiate the scale categories from strongly disagree (1) to strongly agree (4). The results show that all category probabilities have clear peaks (non-overlapping), with the mean size monotonically increasing from 0.92 to 3.85. This indicates that students can differentiate the scale categories very well.

Figure 7. Measure Relative to Item Difficulty Result.

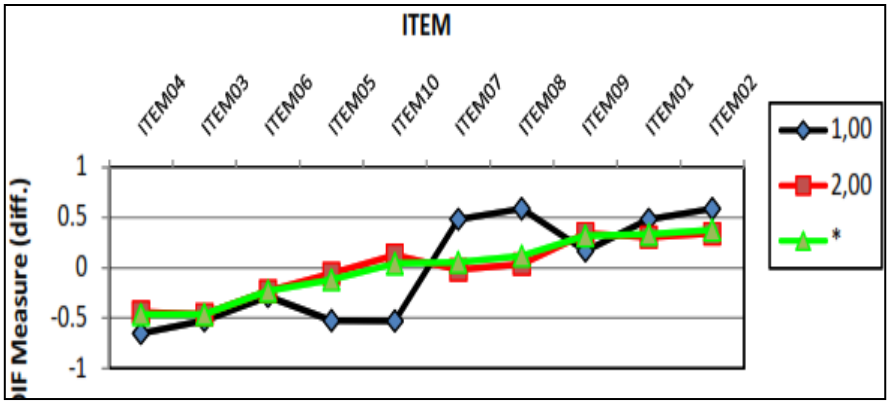

Figure 8. Item Category of DIF.

In this section, we focus on analyzing the person size estimates to examine the effects of module implementation. We confirmed that student and item criteria met the fit validity criteria, with mean MNSQ infit and outfit values ranging from 1.00 to 1.07 and mean ZSTD infit and outfit values ranging from 0.19 to 0.23. Figure 8 compares student responses and item sizes in the log. As can be seen, most students gave higher and more positive responses, with 55% (agreeing and 39% (strongly agreeing) on all the item criteria that represent whether the module can help encourage independent learning after class implementation. Individual student measures ranged from 0.68 (only five students) to 8.27, while item sizes ranged from 1.80 to 1.75. After applying CHL, an independent sample t-test was conducted to compare female and male students. No significant difference was found on the test ($p > 0.05$) ($t(172) = 1.18$, $p = 0.241$). The mean sizes of female and male students were 3.71 and 3.47, respectively, where female students had a higher positive response than male students. Differential Item Functioning (DIF) analysis was performed to examine biased items by sex. The results in Figure 8 show that no bias was detected for the ten criteria items ($p > 0.05$), indicating that the criteria items are free from the influence of gender bias.

CONCLUSION

Based on a series of research and development activities that have been carried out, the following conclusions can be drawn: 1) The development of CHL to enhance lifelong learning was carried out using the ADDIE approach. CHL is designed to be learner-centered, which means that it is tailored to the individual needs and interests of the learners. CHL gives learners the freedom to control their learning. Learners can choose the learning activities they want to complete and the pace at which they want to learn. CHL encourages learners to collaborate with the instructor. This helps learners to share their ideas and to learn from each other. CHL encourages learners to reflect on their learning. This helps learners make sense of what they have learned and apply it to their lives. CHL is designed to be challenging, but not too challenging. This helps learners stretch themselves and learn new things. 2) The learning modules developed were included in the very decent category (93.25%), 3) Students gave a very positive response to the learning presence that was developed (89.5%), and 4) There is no gender bias on the CHL module. Further research is highly recommended to test the effectiveness of this learning further through experimental research. This study will allow us to determine how far this learning can influence the success of student learning.

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