

A PERSONALITY-BASED DIGITAL APPLICATION INNOVATION FOR EDUCATIONAL HUMAN RESOURCE DEVELOPMENT USING THE TREE HR FRAMEWORK

UMA INOVAÇÃO EM APLICAÇÃO DIGITAL BASEADA NA PERSONALIDADE PARA O DESENVOLVIMENTO DE RECURSOS HUMANOS NA ÁREA EDUCACIONAL, UTILIZANDO O MODELO TREEHR

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Abstract

The development of human resources (HR) in education requires an innovative approach that integrates personality-based learning with modern technology. This study aims to develop a personality-based application for HR in education using the Tree HR Learning Model as a conceptual framework. Using a research and development (R&D) design, this study followed a series of stages including needs analysis, application design, development, expert validation, and limited trials with potential users. Data were collected through questionnaires, expert reviews, and user feedback, and analyzed using descriptive statistics and qualitative analysis. The results show that the developed application effectively integrates the Tree HR Model by mapping fundamental values (roots), core competencies (trunk), and practical skills (branches) into application features. Expert validation demonstrated a high level of feasibility in terms of content, usability, and design. The test results indicate that this application increases user engagement and supports HR development in education through

Resumo

O desenvolvimento de recursos humanos na educação demanda abordagens inovadoras que integrem a aprendizagem baseada na personalidade às tecnologias educacionais contemporâneas. Este estudo tem como objetivo desenvolver uma aplicação digital baseada em traços de personalidade para a formação e o desenvolvimento de profissionais da educação, utilizando o Modelo Tree HR de Aprendizagem como referencial conceitual. A pesquisa adotou a abordagem de Pesquisa e Desenvolvimento (P&D), contemplando as etapas de análise de necessidades, concepção do design da aplicação, desenvolvimento do sistema, validação por especialistas e aplicação piloto com usuários potenciais. Os dados foram coletados por meio de questionários, avaliação de especialistas e feedback dos usuários, sendo analisados com estatística descritiva e análise qualitativa. Os resultados indicam que a aplicação integra de forma eficaz o Modelo Tree HR ao operacionalizar valores fundamentais, competências profissionais centrais e habilidades práticas nas funcionalidades do



increased self-awareness, competency building, and reflective practice.

Keywords: Personality Applications. Educational Resources. Tree HR Model. Human Resource Development. Educational Technology.

systema. A validação por especialistas evidenciou alto nível de adequação quanto ao conteúdo, à usabilidade e ao design instrucional, além de maior engajamento e desenvolvimento profissional reflexivo.

Palavras-chave: Aplicações de Personalidade. Recursos Educacionais. Modelo Tree HR. Desenvolvimento de Recursos Humanos. Tecnologia Educacional.

1 INTRODUCTION

The quality of human resources (HR) in education plays a crucial role in determining the effectiveness and sustainability of the education system. Teachers, administrative staff, and other educational personnel are responsible not only for imparting knowledge but also for embodying the values, competencies, and professional attitudes that shape the learning environment. In the 21st century, the need for sustainable development of HR in education is increasing, particularly with the integration of personality-based approaches that emphasize character, motivation, and adaptability in various educational contexts (Parola et al., 2025; Villacís et al., 2023). One emerging framework in HR development is the Tree HR Learning Model, which conceptualizes growth through three key dimensions: roots (fundamental values and principles), trunk (core competencies and professional identity), and branches (practical skills and innovation). This model emphasizes the importance of aligning personal development with professional growth, thus ensuring that educational personnel are not only competent but also resilient and value-oriented (Abid et al., 2021; Villacís et al., 2023).

Human resources (HR) in education refer to teachers, administrative staff, and educational professionals who directly influence the quality of learning outcomes. HR development in education requires a systematic strategy that enhances not only technical skills but also professional values and adaptability (Abid et al., 2021; Etomes et al., 2025; Kim et al., 2024). Effective human resource development emphasizes lifelong learning, reflective practice, and alignment with institutional goals (Malakasioti & López, 2024; Melania et al., 2024; Owusu-Agyeman, 2024; Tsiboukli & Babalis, 2025). In the era of digital transformation, educational human resources are also required to master technology integration to remain relevant to contemporary educational practices (Ajani,

2024; Gangmei & Thomas, 2025; Ren & Wu, 2025; Siyam et al., 2025). Personality-based learning focuses on individual differences, values, and psychological characteristics that influence the learning process (Abid et al., 2021; Jach et al., 2023; Kara et al., 2024; Tian & Ou, 2023). This approach highlights the role of motivation, self-awareness, and emotional intelligence in professional growth (Tian & Ou, 2023; Villacís et al., 2023). Recent studies show that a personality-oriented approach can increase student engagement and improve long-term competency development (Azizah & Setiawati, 2023). For educational human resources, personality-based learning supports the development of soft skills such as empathy, communication, and resilience, which are increasingly recognized as essential qualities for educators.

The Tree HR Learning Model is a conceptual framework that visualizes HR development as the growth of a tree, with three main components: roots (fundamental values and ethical foundations), trunk (professional competencies and identity), and branches (practical skills, creativity, and innovation). This model emphasizes holistic growth, ensuring that professional development is rooted in strong values while adapting to the dynamic challenges of education (Silva, 2023). The systematic structure of this model allows for integration into both formal training and technology-based applications, making it relevant for contemporary HR development strategies. Furthermore, the rapid advancement of educational technology has provided new opportunities to support HR development through digital applications. Personality-based applications, in particular, have the potential to facilitate self-assessment, reflection, and skill building in a more engaging and personalized manner. However, the integration of structured learning models such as Tree HR into digital platforms remains rarely explored, particularly in the educational context. This research seeks to address this gap by developing a personality-based application specifically designed for HR in education, based on the principles of the Tree HR Learning Model.

The use of educational apps is growing rapidly, offering opportunities for personalized and flexible learning (Ellikkal & Rajamohan, 2025; Fromm et al., 2025; Garzón et al., 2025; Kerimbayev et al., 2025). Digital platforms are increasingly being used to support HR training, self-assessment, and reflective practice. Studies show that well-designed applications can increase user engagement and provide scalable solutions for professional development (Vekić-Kljaić & Mlinarević, 2022). However, successful implementation requires careful alignment between pedagogical models and

technological design (Børte & Lillejord, 2024). The integration of the Tree HR Learning Model into a personality-based application is a new approach that has the potential to improve the development of educational human resources. Thus, the purpose of this research is to develop a digital application that integrates personality development with the Tree HR Learning Model. This research is expected to provide theoretical contributions by bridging personality-based learning and HR development models, as well as practical contributions by offering innovative tools to improve the quality of educational personnel in schools and universities in improving the quality of education by understanding personal in the educational context to facilitate the achievement of learning outcomes and the quality of education.

2 THEORETICAL BACKGROUND AND LITERATURE REVIEW

Human resource development (HRD) constitutes a systematic and strategic process aimed at enhancing the competencies, capabilities, and professionalism of educational personnel through structured education and training initiatives. In contemporary educational contexts, HRD is increasingly required to address the complex challenges posed by rapid social change, technological advancement, and evolving institutional demands. Empirical evidence suggests that organizational education and training programs significantly contribute to the development of both technical and non-technical competencies, thereby improving overall organizational effectiveness and positioning human resources as strategic assets in achieving educational institutional goals (Rofik et al., 2025). This study draws upon the Big Five Personality Model as its primary theoretical foundation for understanding individual differences in educational human resource development. The Big Five framework conceptualizes personality across five broad dimensions: Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism (Kim et al., 2024). Extant research has consistently demonstrated that these personality traits are significant predictors of job performance, adaptability to change, and collaborative effectiveness in organizational settings, including education.

Digital transformation has emerged as a critical driver of innovation in HRD practices across sectors. In the field of education, digital technologies facilitate systematic competency assessment, continuous monitoring of professional development, and the

personalization of learning and training pathways through real-time and adaptive systems. Recent studies further indicate that the integration of digital technologies into HR practices enhances competency planning, training effectiveness, and performance evaluation within increasingly dynamic and complex work environments (Shiferaw & Birbirs, 2025).

The Tree HR Framework is proposed as an integrative conceptual model that conceptualizes human resource development through an organic growth metaphor. Within this framework, personality traits function as foundational elements (roots), core professional competencies constitute the trunk, professional roles and adaptive capacities form the branches, and performance outcomes and organizational impact represent the fruits. This conceptualization of personality positions is not as a peripheral variable but as a central foundation for competency development within digital HR systems. According to this study conceptualizes personality as a strategic resource that can be systematically mapped and operationalized through a personality-based digital application. The proposed conceptual sequence consists of three interrelated stages: (1) personality as predictors of adaptability and work-related behavior; (2) digital systems that map personality profiles and generate tailored development pathways; and (3) HRD outcomes are reflected in enhanced professional competence, effective work behaviors, and positive educational organizational outcomes. From this perspective, personality-based digital applications extend beyond administrative functionality by enabling adaptive modeling and personalized human resource development strategies

3 RESEARCH AND METHODOLOGY

This study uses a Research and Development (R&D) design to develop and validate a personality-based application for educational human resources (HR) using the Tree HR Learning Model. The R&D process follows a modified Borg & Gall (1983) model, including: needs analysis, application design, product development, expert validation, trials, and revisions (Jamaludin et al., 2024; Putri et al., 2023).

A needs analysis was conducted on 30 educators and students from various levels of education and students in Indonesia. The application design was carried out by compiling a validated instrument and adapting it to a website that can be operated via mobile devices or laptops. Product development is the next step after the application

design is compiled. Application development is carried out by validating the application both in terms of test instruments and also practicality in application use. This activity involved experts, namely material experts in psychology, human resource management, and information and technology. Data were analyzed using V-Aiken.

Table 1

Aiken's V Criteria

Range of V	Interpretation	Decision/Implication
$V \geq 0.80$	High content validity	Highly appropriate
0.6 - 0.79	Moderate content validity	Acceptable
0.4 - 0.59	Low content validity	Requires revision
$V < 0.39$	Very low / Not valid	Should be rejected

The application trial was conducted in several regions in Indonesia, involving teachers, lecturers, students, and university students totaling 582 respondents. Respondents were selected randomly purposively from several institutions. Revisions were made after conducting trials obtained from expert and respondent input. This revision became the basis for refining the Tree HR model-based personality application product. The revised data consisted of quantitative and qualitative records analyzed according to needs, namely descriptive for qualitative data and v-aiken analysis for expert assessment results and descriptive statistical analysis for respondent feedback data.

4 RESEARCH RESULTS

4.1 Needs analysis

HR practitioners emphasize the lack of self-assessment tools, structured development models, and technology integration in educational HR development.

Table 2

Needs Analysis

Indicator	Presentation
Personality Development Needs	95%
Digital Awareness and Readiness	80%
Interest in Personality Tree HR Model Application	80%
Expectations for the Application	95%

4.2 Application design

The application design process includes two major sections that are discussed: 1) the instrument items that measure personality and 2) the application used to carry out personality measurements.

The design of personality measurement items was developed by adapting previously conducted research, namely "Tree-HR Model: Key Enhancements for Talent Development in Academia".(Ramly, 2024), and "Tree human resources (HR) model of human resource development in higher education"(Ramly, Handrianto, & Syaiful, 2024) Personality development was developed based on input from psychology experts, who stated that the personality instrument being developed was part of the root of the HR Model tree. Meanwhile, the application design was developed in collaboration with Information and Technology experts, with attention to ease of use, security, and accessibility. Based on the design results, the next stage of development was carried out by conducting focus group discussions (FGDs) with psychology and IT experts.

4.3 Application development

The personality application was developed based on the Tree HR model, which includes roots, trunks, and branches. The roots contain values and ethics, the trunk represents competency development, and the branches relate to practical skills and activities.

Figure 1 shows the initial section of the personality app. This app describes a person's personality, measured by their energy, mindset, temperament, and teaching style if the respondent is a teacher. If the respondent is a student, the resulting learning style is displayed.

Figure 1*Tree HR personality application cover*

The developed personality application was presented to experts for assessment. The assessment used a questionnaire and a focus group discussion. The validation results from subject matter experts in psychology and HR yielded the following suitability index:

Table 3*Validation of material experts in the fields of psychology and HR*

Indicator	V-Aiken Index	Information
Suitability of Personality Psychology Concepts	0.88	Very Valid
Suitability of Test Item Construction	0.85	Very Valid
Eligibility for Use	0.9	Very Valid

Table 4*IT and Design Expert Validation*

Indicator	Conformity index
User Interface (UI) Design	1
Navigation and Interactivity	0.95
Media Compatibility with Application Functions	0.95

Table 5*Functionality Testing Checklist*

Tested Features	Functioning (✓/✗)
User login and logout form	✓
Input personality questionnaire answers	✓
Input validation (cannot send if incomplete)	✓
Automatic score calculation based on answers	✓
Visualization of results in the form of a personality tree	✓
Providing recommendations based on score results	✓
Storing user test result history	✓
Admin dashboard to view user data	✓
Export test results in PDF format	✓
Responsive display on desktop and mobile	✓
Data security (restricted access, encrypted passwords)	✓
Fast and stable loading time	✓

4.4 Trial results

The trial was conducted on 582 teachers/lecturers and students.

Table 6*Respondent Demographics*

Status	Amount	Man	Woman
Educator	281	75	206
Students	301	191	110
Amount	582	266	316

Respondents provided feedback through a questionnaire provided via Google Form. The results of the responses provided by educators and students are as follows:

Table 7*Application User Response*

Status	Convenience	Benefit	Accuracy
Educator	92%	91%	91%
Students	84%	86%	83%

These findings confirm that the Tree HR Learning Model provides a strong conceptual foundation for human resource development in the educational sector, in line with previous research on value-based and competency-based growth (Ramly, Handrianto, & Syaiful, 2024; Ramly, Handrianto, & Syaiful, 2024; Vargas et al., 2025;

Yan et al., 2025). Personality-based focus supports participant engagement and professional identity formation (Pi et al., 2024)

This application demonstrates that educational technology can effectively support human resource development when combined with a pedagogical framework (Esmat & Amasha, 2025; Osorio Vanegas et al., 2025) Unlike generic HR applications, this model ensures that professional growth remains holistic—rooted in values, developed through competencies, and applied in practical innovations. This research contributes to theory and practice by connecting personality-based learning with HR development. It produces a tool that educational institutions can use for structured HR capacity building. A challenge that arises is the limited technological infrastructure, which is an area for future improvement.

5 CONCLUSION

This research successfully developed a personality-based application for educational human resources using the Tree HR Learning Model. Validation and trial results demonstrated that this application is feasible, effective, and has the potential to improve self-awareness, competence, and professional practice. This research provides theoretical contributions by linking personality-based learning with HR development models, and practical contributions by presenting an innovative tool for use by educational institutions.

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Authors' Contribution

All authors contributed equally to the development of this article.

Data availability

All datasets relevant to this study's findings are fully available within the article.

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