

PPAVI CONFERENCE SYSTEM

The 1st PPAVI Student Research and Vocational Conference 2026

16 Oct 2026 – 31 Oct 2026 · Asynchronous

COMPLETE PROGRAM BOOK

Program book online:

https://ppavi.or.id/conferences/ppavi-student-research-vocational-conference-2026/program-book/

An asynchronous PPAVI student conference for oral and poster presentations, designed to showcase student research, applied inquiry, vocational projects, and early scholarly work across PPAVI member institutions.

Student researchers from PPAVI member and non-member institutions are welcome to register as oral or poster presenters. Researchers, educators, and members of the wider public may also register as attendees. Presentation submissions remain subject to the conference review and payment requirements.

Background: Students in vocational higher education need a structured academic space to present applied research, project-based learning outputs, community-oriented innovation, and discipline-specific ideas in formats that are accessible across institutions. An asynchronous conference model allows students from health and nursing, STEM and maritime technology, business, social sciences, humanities, and economics to participate without being limited by travel, synchronous scheduling, or institutional calendar differences. The conference also introduces students to scholarly communication, peer learning, presentation ethics, supervisor-guided refinement, and publication pathways.

Goals: provide an inclusive PPAVI student research forum; encourage oral and poster presentation practice; strengthen supervisor-supported student scholarship; promote cross-institutional exchange among PPAVI member institutions; document applied student innovation across symposium clusters; develop selected outputs toward full-paper submission; and build a recurring student conference series connected to PPAVI proceedings and member journals.

Expected outcomes: accepted student abstracts, asynchronous oral presentation videos, digital poster presentations, reviewer and audience engagement, best presentation recognition by symposium and presentation type, full-paper submissions for editorial review, selected publication in PPAVI Conference Proceedings Series or PPAVI member journals, and a sustainable model for future student research and vocational project dissemination.

Symposium on Health Futures, Nursing Innovation, and Community Wellbeing

Effect of 30° Leg Elevation on Lower-Extremity Edema in Patients with Congestive Heart Failure: A Case Study

Adila Aura Agustiani

Symposium on Health Futures, Nursing Innovation, and Community Wellbeing · Community Health, Nursing Practice, and Patient Safety · Patient safety and care quality

PPAVI-2026-CBF67590 · Oral

Abstract

Lower-extremity edema is a common manifestation of congestive heart failure (CHF). Leg elevation may help reduce edema by promoting venous return and limiting fluid accumulation in the lower limbs. This descriptive case study examined changes in edema among two patients with CHF who received a leg-elevation intervention. Each patient's legs were elevated to 30° once daily for three consecutive days, with each session lasting 20 minutes. Edema severity and limb circumference were assessed using an observation sheet and measuring instruments. The first patient's edema decreased from grade III to grade II in both legs, with mean circumference reductions of 0.66 cm in the right leg and 0.75 cm in the left. The second patient's edema decreased from grade III to grade II in the right leg and grade I in the left, with mean circumference reductions of 0.79 cm and 1.03 cm, respectively. These findings indicate that leg elevation may be a useful complementary nursing intervention for patients with CHF and lower-extremity edema. However, because this case study involved only two patients and did not include a comparison group, the observed changes should be interpreted cautiously and cannot establish the intervention's effectiveness.

Keywords: congestive heart failure, lower-extremity edema, leg elevation, nursing intervention, case study

Effects of Finger-Hold Relaxation and Deep-Breathing Exercises on Blood Pressure in Patients with Hypertension: A Case Study

Selvy Hertiana Thonak

Symposium on Health Futures, Nursing Innovation, and Community Wellbeing · Community Health, Nursing Practice, and Patient Safety · Patient safety and care quality

PPAVI-2026-654517FC · Oral

Abstract

Hypertension requires appropriate management to reduce the risk of serious complications. This case study describes changes in blood pressure following a combined finger-hold relaxation and deep-breathing intervention in two adult inpatients with stage 2 hypertension. The intervention was conducted once daily for three consecutive days, with each session lasting 30 minutes, alongside prescribed amlodipine therapy. Blood pressure was measured using an aneroid sphygmomanometer and a stethoscope, and observations were recorded on structured observation sheets. By the third day, one patient's blood pressure had decreased from 150/90 mmHg to 130/80 mmHg, while the other patient's blood pressure had decreased from 180/100 mmHg to 140/70 mmHg. These observations suggest that the combined intervention may be used as a complementary nursing measure alongside medical treatment. However, because this study involved only two patients and had no comparison group, the observed changes cannot be attributed to the intervention alone. Further studies with larger samples and appropriate comparison groups are needed to evaluate its effectiveness.

Keywords: blood pressure, deep-breathing exercises, finger-hold relaxation, hypertension, nursing intervention

K-Means Clustering of Anthropometric Z-Score Profiles among Children Under Five at Cilongok I Community Health Center, Banyumas, Indonesia

Siti Maskanah

Symposium on Health Futures, Nursing Innovation, and Community Wellbeing · Applied Wellbeing, Maternal Health, and Health Promotion · Maternal and child health

PPAVI-2026-AD69A545 · Poster

Abstract

Child malnutrition remains a major public health concern. Globally, an estimated 150.2 million children under five were stunted, 42.8 million were wasted, and 35.5 million were overweight in 2024. Indonesia's stunting prevalence was 19.8% in 2024, with a national target of 14.2% by 2029. This study used the K-Means algorithm to identify nutritional status profiles among children under five at Cilongok I Community Health Center in Banyumas, Indonesia. The dataset comprised 3,676 anthropometric measurement records collected in June 2026. After data cleaning and removal of eight outliers, 3,668 records were retained. Weight-for-age (WAZ), height-for-age (HAZ), and weight-for-height (WHZ) Z-scores were standardized before clustering. Values of K from 2 to 8 were evaluated using inertia, the silhouette score, the Davies–Bouldin index, and the Calinski–Harabasz index. Four clusters were selected based on the combined evaluation metrics and clinical interpretability. The resulting clusters had a silhouette score of 0.326, a Davies–Bouldin index of 0.936, and a Calinski–Harabasz index of 2,518.2. Cluster 0 comprised 943 records (25.7%) with underweight, stunting, and wasting profiles; Cluster 1 included 1,090 records (29.7%) with low height-for-age values near the stunting threshold; Cluster 2 contained 952 records (26.0%) with generally normal nutritional profiles but a tendency toward low body weight; and Cluster 3 comprised 683 records (18.6%) with excess body weight and a risk of overnutrition. Robustness testing showed an adjusted Rand index (ARI) of 0.978 across 20 random seeds, 0.801 when WAZ was excluded, and 0.956–0.995 under alternative outlier-handling procedures. These findings suggest that K-Means may support exploratory segmentation of nutritional profiles. However, the clusters represent divisions along a continuous nutritional spectrum and should not be interpreted as distinct natural groups or clinical diagnoses.

Keywords: child nutrition, children under five, anthropometric Z-scores, nutritional status, K-Means clustering, public health

Formulation of Lip Balm and Determination of SPF (Sun Protection Factor) of Curcuma mangga Val. & Zijp. Rhizome Extract

Aisyah Ardelia

Symposium on Health Futures, Nursing Innovation, and Community Wellbeing · General Health · General Health

PPAVI-2026-A48C5D7F · Oral

Abstract

Exposure to ultraviolet (UV) radiation can cause dry and damaged lips, highlighting the need for lip balm formulations that can moisturize and protect the lips from UV radiation. This study aimed to formulate mango ginger, Curcuma mangga, rhizome extract into a lip balm preparation, evaluate its physical quality, and determine its Sun Protection Factor (SPF) value. This study employed a laboratory experimental method using four formulations: F0 (0%), F1 (5%), F2 (10%), and F3 (15%) of mango ginger rhizome extract. The formulations were evaluated based on organoleptic properties, homogeneity, pH, spreadability, spreadability during application, irritation, and hedonic tests. The SPF values were determined using UV-Vis spectrophotometry. The results showed that all formulations met the requirements for physical quality, were homogeneous, demonstrated good application properties, and did not cause skin irritation. Formulation F2 was considered the most preferred formulation based on the hedonic test and exhibited the highest SPF value of 15.7126, indicating ultra protection against UV radiation exposure.

Keywords: lip balm, mango ginger rhizome, Curcuma mangga, SPF, physical quality

In Vitro Antibacterial Activity of an Ethanol Extract of Curcuma mangga Val. & Zijp Rhizomes against Staphylococcus aureus and Cutibacterium acnes

Santa Enjelita Sihombing

Symposium on Health Futures, Nursing Innovation, and Community Wellbeing · General Health · General Health

PPAVI-2026-5C3542B4 · Oral

Abstract

Acne-associated bacterial growth is an important consideration in skin health. This study evaluated the in vitro inhibitory activity of an ethanol extract of mango ginger, Curcuma mangga Val. & Zijp, rhizomes against Staphylococcus aureus and Cutibacterium acnes (formerly Propionibacterium acnes). Antibacterial activity was assessed using the agar well-diffusion method. Medi-Klin® 1% gel and distilled water were used as the positive and negative controls, respectively. The data were analyzed using analysis of variance (ANOVA), with a significance level of 0.05. The analysis indicated a statistically significant difference among the tested treatments (reported by SPSS as $p = 0.000$; this should be reported as $p < 0.001$). The extract inhibited both bacterial species, although its reported inhibitory activity was approximately half that of the positive control. These findings indicate in vitro antibacterial activity; further testing is needed to characterize its magnitude and establish its potential application.

Keywords: Curcuma mangga, ethanol extract, antibacterial activity, agar well-diffusion, Staphylococcus aureus, Cutibacterium acnes

Association Between Stress Levels and Readiness for Dormitory Life among First-Year Nursing Students

Berta Putri Iglesias Zebua, Dini Oktaviani Gultom, Gresya Theodora Tampubolon, Jesica Putri Lourdes, Viescha Leonysa Sianturi, Yemima Purba, Evrina Br Ginting, Yunita Gratia Simanjuntak

Symposium on Health Futures, Nursing Innovation, and Community Wellbeing · General Health · General Health

PPAVI-2026-A988D7BC · Poster

Abstract

Transitioning to dormitory life can expose first-year students to new routines, expectations, and social environments, potentially contributing to stress and challenges in adjustment. This study examined the association between stress levels and readiness for dormitory life among first-year nursing students at Institut Kesehatan Santa Elisabeth Medan in 2026. A quantitative, cross-sectional correlational design was used. The study included 64 first-year students residing in the dormitory, selected through total sampling. Data were collected using the stress subscale of the Depression Anxiety Stress Scales–21 (DASS-21) and a questionnaire measuring readiness for dormitory life. Descriptive statistics and the chi-square test were used for analysis, with statistical significance set at $p < 0.05$. Of the 64 participants, 52 (81.3%) had normal stress levels, 11 (17.2%) had mild stress, and one (1.6%) had moderate stress. Fifty participants (78.1%) were classified as ready for dormitory life, while 14 (21.9%) were classified as not ready. Stress level was significantly associated with readiness for dormitory life ($p = 0.035$). These findings support the importance of providing adjustment and stress-management support for students entering dormitory life. Because the study used a cross-sectional design at a single institution, the findings indicate an association and should not be interpreted as evidence of causation.

Keywords: stress, dormitory life, readiness, first-year nursing students, cross-sectional study

CALM-STUDENT: A Pilot Study of State Anxiety Before and After a Five-Minute Guided Breathing Exercise in Nursing Students

Oktaviana Alvionita Safitri

Symposium on Health Futures, Nursing Innovation, and Community Wellbeing · General Health · General Health

PPAVI-2026-0932AA2A · Poster

Abstract

Nursing skills examinations are evaluative situations that may elicit anxiety among students. A brief guided breathing exercise may offer an accessible strategy for managing pre-examination anxiety. This pilot study assessed changes in state anxiety among 20 nursing students before and after the CALM-STUDENT intervention using a single-group pretest–posttest design. Anxiety was measured using the Indonesian six-item State-Trait Anxiety Inventory (STAI-6), with summed raw scores ranging from 6 to 24, and pretest and posttest scores were compared using the Wilcoxon signed-rank test. The mean anxiety score decreased from 16.70 (SD = 2.41) before the intervention to 13.40 (SD = 1.47) afterward, a mean reduction of 3.30 points. Scores decreased for 18 students (90%), remained unchanged for one student, and increased for one student. The pre–post difference was statistically significant ($p < 0.001$). These results show a preliminary reduction in state

anxiety following the exercise. However, because the study had no comparison group, the change cannot be attributed to the intervention alone. Controlled studies are needed to assess its effectiveness.

Keywords: state anxiety, nursing students, nursing skills examination, guided breathing, pilot study

Factors Associated with Age Group among First-Year Dormitory Residents at Institut Kesehatan Santa Elisabeth Medan: A Cross-Sectional Study

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Symposium on Health Futures, Nursing Innovation, and Community Wellbeing · General Health · General Health

PPAVI-2026-B525ED17 · Poster

Abstract

Living in a university dormitory while pursuing higher education may be influenced by students' personal and educational characteristics. This study described first-year students residing in the dormitory at Institut Kesehatan Santa Elisabeth Medan in 2026 and examined associations between age group and selected characteristics. A quantitative, cross-sectional observational design was used. Although total sampling was applied to a population of 78 students, 71 provided valid data for analysis. Data were collected through questionnaires and analyzed using descriptive statistics and chi-square tests. Most respondents were aged 18–19 years (55/71, 77.5%), female (66/71, 93.0%), and from North Sumatra (57/71, 80.3%); 57 (80.3%) had a good level of knowledge about dormitory life. Age group was significantly associated with gender ($p = 0.038$), region of origin ($p = 0.024$), and knowledge level ($p = 0.024$), but not with field of study ($p = 0.101$). These findings describe the characteristics associated with age group among the participating dormitory residents. Because the study included only students already living in the dormitory and did not compare them with students who chose not to live there, it cannot establish which factors influenced the decision to reside in a dormitory.

Keywords: age group, gender, dormitory residence, university students, region of origin, knowledge level

Symposium on Applied STEM, Maritime Technology, and Sustainable Engineering

Design and Testing of an Autonomous Mobile Robot for Hospital Areas Using the VDI 2206 Method

Herdaru Purnawarman, Marcellus Satria

Symposium on Applied STEM, Maritime Technology, and Sustainable Engineering · Sustainable Engineering, Maritime Systems, and Applied Technology · Prototype testing

PPAVI-2026-CB2AC4FD · Oral

Abstract

The need for Automated Mobile Robots (AMRs) in hospitals continues to increase along with demands for efficient distribution of medicines, samples, and medical equipment. AMR design has often been carried out without a standardized methodological framework, so design decisions are poorly documented. The problem is that few studies have applied mechatronic design methodologies such as VDI 2206 to AMRs, making the design difficult to explain from a design perspective, especially when justifying architecture, trade-offs, and integration between subsystems. This study aims to design a hospital AMR based on differential drive, BLDC motors, and ROS 2 using the VDI 2206 approach. The design follows five VDI 2206 stages: task clarification, conceptual design, preliminary embodiment design, detail design, and verification and validation. The main components used include a 350W BLDC motor, ZS-X11H driver, Jetson Nano, and Arduino Mega, with RPLIDAR A1M8 and MPU6050 IMU as sensors and ROS 2 Foxy as the software. Testing includes LiDAR readings, motor performance under loads up to 110 kg, and manual and autonomous control. The resulting design forms a three-layer architecture: perception, cognition, and actuation. Preliminary tests show that the motor–driver configuration can withstand loads up to 110 kg with a peak current of about 16 A per motor, and this value remains within the short-term operating limit of the 400 W driver. The LiDAR successfully produced a point cloud and a 2D map via SLAM Toolbox, although the mapping quality is not yet fully stable. Manual control worked well, but autonomous navigation was still disturbed by pose jumping due to suboptimal synchronization between odometry and IMU. The application of VDI 2206 makes the AMR design process more structured and easier to explain from a design perspective, although autonomous navigation still requires improvements through sensor fusion with robot_localization, increased odometry frequency, and migration to Micro-ROS.

Keywords: Autonomous mobile robot, Hospital, VDI 2206, LiDAR, ROS

Forecasting Monthly Dengue Hemorrhagic Fever Cases in Banyumas Regency Using a Hybrid ARIMA-SVR Model with Hydrometeorological Predictors

Jevon Nataniel Putra

Symposium on Applied STEM, Maritime Technology, and Sustainable Engineering · Informatics, Data Systems, and Digital Innovation · Data dashboard

PPAVI-2026-3A6560DB · Oral

Abstract

Dengue hemorrhagic fever (DHF) is endemic in Banyumas Regency, where case patterns may reflect both temporal trends and climate variability. This study developed a hybrid forecasting model combining Autoregressive Integrated Moving Average (ARIMA) and Support Vector Regression (SVR), with rainfall, ambient temperature, and relative humidity as hydrometeorological predictors. The dataset comprised 36 monthly observations from January 2022 to December 2024, obtained from health surveillance records of the Banyumas Regency Health Office and climate data from BMKG and BPS Banyumas. Climate variables were incorporated with one- and two-month lags to account for potential delayed associations with case counts. Model performance was evaluated using out-of-sample data from May to December 2024. The hybrid ARIMA–SVR model achieved an RMSE of 17.11, an MAE of 11.67, and a MAPE of 50.94%. Its RMSE and MAE were lower than those of standalone ARIMA(1,0,1) (17.85 and 12.40, respectively) and standalone SVR (25.72 and 17.81, respectively). Although the hybrid model performed better than the individual models on these error measures, its MAPE indicates substantial relative prediction error. The

findings suggest that combining time-series and climate information may support dengue forecasting; further evaluation with longer time series and additional validation periods is needed before operational use as an early-warning tool.

Keywords: dengue hemorrhagic fever, Banyumas Regency, ARIMA, support vector regression, hybrid forecasting, hydrometeorological predictors

Integration of Monitoring and Automatic Control of Fish Pond Water Quality Based on the Internet of Things

Rufus Deska Setyawan

Symposium on Applied STEM, Maritime Technology, and Sustainable Engineering · Informatics, Data Systems, and Digital Innovation · IoT monitoring

PPAVI-2026-69814DBA · Oral

Abstract

Water quality plays a crucial role in the growth and survival of fish. In the Mina Gawosa fish farming group in Banjarnegara, water testing is still conducted manually, making it risky to detect changes in pH and temperature in a timely manner. This study aims to develop an Internet of Things (IoT)-based system that integrates pH and temperature monitoring with automatic water replacement control in fish ponds. The system uses Wemos D1 R1 as the main controller, a pH sensor 4502C with an ADC ADS1115 16-bit module, and a DS18B20 temperature sensor. Measurement results are displayed on a 16 × 2 LCD and sent to the Blynk application for remote monitoring. When parameter values exceed the established thresholds, the system activates LED indicators, relays, and two pumps to perform water replacement. Development follows the Research and Development method using the ADDIE model. Calibration using buffer solutions of pH 6.86 and 4.01 resulted in pH reading accuracies of 95.13% and 95.31%, respectively. In a 24-hour test in the pond, the pH reading accuracy reached 94.68%, while the temperature reading accuracy reached 97.98%; both exceeded the success criteria of 90%. Black-box testing showed that sensor readings, data display and transmission, and pump activation functioned as designed. This system enables remote monitoring of water conditions and automatic activation of water replacement when pH or temperature exceeds the established thresholds.

Keywords: Blynk, DS18B20, Internet of Things, fish pond water quality, automatic monitoring and control, pH sensor 4502C, Wemos D1 R1

Platrack: A Blockchain-Enabled IoT Supply Chain Traceability System Integrating OCR and Geolocation

Bernaditus Yordan Baraga, Angelica Lulu Setiani

Symposium on Applied STEM, Maritime Technology, and Sustainable Engineering · Informatics, Data Systems, and Digital Innovation · IoT monitoring

PPAVI-2026-F7ED35AC · Oral

Abstract

Supply chain operations require accurate, transparent, and traceable records as goods move between suppliers and warehouses. Conventional systems may not adequately verify operational data at the point of entry, creating risks of inaccurate or invalid records. This study presents Platrack, a mobile Internet of Things (IoT)-based application for logistics traceability that integrates blockchain, optical character recognition (OCR), and geolocation. The system uses OCR to recognize vehicle license plates at departure and OpenStreetMap-based geolocation to validate the route from supplier pickup to warehouse check-in. Validated vehicle, location, and transaction data are recorded on a blockchain ledger to support data integrity and traceability. The system's license plate recognition performance is evaluated using the detection rate (DR), false positive rate (FPR), and false negative rate (FNR). The implementation demonstrates how combining visual and location-based data validation with blockchain recording can support a tamper-evident audit trail for logistics transactions. Platrack offers an approach to improving the security and transparency of supply chain records.

Keywords: Blockchain, supply chain, geolocation, Internet of Things, optical character recognition

Computer Vision-Based Bolt Inspection and Counting on a Conveyor Belt

Felix Gerardo Yunanto Putro, Michael Wijaya, Julius Gilbert Pradipta

Symposium on Applied STEM, Maritime Technology, and Sustainable Engineering · Informatics, Data Systems, and Digital Innovation · IoT monitoring

PPAVI-2026-C283472C · Poster

Abstract

Artificial intelligence and computer vision offer opportunities to automate industrial inspection and quality control. This project develops a bolt inspection and counting system using a webcam and an image classification model trained with Google's Teachable Machine. As bolts move along a conveyor belt, the webcam captures images that the model classifies according to predefined bolt categories or condition labels. The system also counts bolts passing through the inspection area, integrating condition inspection and quantity monitoring in a single workflow. Its performance will depend on factors such as lighting, camera position, variations in bolt appearance, and the size and quality of the training dataset. The project aims to demonstrate the feasibility of using an accessible computer vision platform for real-time component inspection and counting, with the potential to reduce manual inspection effort and support more efficient production monitoring.

Keywords: computer vision, bolt inspection, object classification, component counting, Teachable Machine, conveyor belt

Computer Vision-Based Smart Inventory and Real-Time Power Monitoring Using Edge Computing

Daniswara Satya Pradipta, Muhammad Habib

Symposium on Applied STEM, Maritime Technology, and Sustainable Engineering · Informatics, Data Systems, and Digital Innovation · IoT monitoring

PPAVI-2026-2C1BBB79 · Poster

Abstract

Component inventory management in engineering laboratories and workshops can be hindered by inefficient manual record-keeping, human error, and the risk of misplacing or misidentifying items. This study presents a smart inventory and electrical power monitoring system implemented on a Raspberry Pi 3B+ with 1 GB of RAM. The image-processing pipeline combines YOLOv5n object detection, executed through the OpenCV DNN C++ engine, with an ensemble TensorFlow Lite classifier and HSV-based color feature extraction to recognize components such as Arduino UNO boards, ESP32 WROOM-32 modules, 16 × 2 LCDs, breadboards, and smartphones. A local Flask-based dashboard supports item storage, retrieval, and borrowing records through a pushbutton-triggered vision mechanism with a 2.5-second hysteresis interval. Electrical monitoring uses a PZCT-02 current sensor and an ADS1115 16-bit I²C analog-to-digital converter to measure AC current, active power, and cumulative energy consumption. The system stores data locally in an SQLite database configured with Write-Ahead Logging (WAL). Initial performance testing showed an operating rate of 15–30 frames per second and RAM usage below 100 MB. These results indicate that the prototype can perform inventory recognition and power monitoring locally without relying on cloud services. Further testing is needed to evaluate recognition accuracy, inventory-record reliability, and measurement accuracy under varied operating conditions.

Keywords: edge computing, smart inventory, computer vision, YOLOv5n, TensorFlow Lite, Raspberry Pi, electrical power monitoring

Smart Parking Management System Using Computer Vision and Automated Tariff Calculation

Fransiskus Xaverius Dennis Dwi Retmono, Laurensius Abdi Pramudya

Symposium on Applied STEM, Maritime Technology, and Sustainable Engineering · Informatics, Data Systems, and Digital Innovation · IoT monitoring

PPAVI-2026-4282B5C5 · Poster

Abstract

This study presents the development of a computer vision–based smart parking management system designed to detect vehicles and support automated tariff calculation. The system integrates a camera, an object detection model, and a web-based dashboard to process visual data, record parking events, display system status, and provide information for monitoring. Development is organized into two stages: camera integration, image acquisition, and object detection; followed by dashboard development, data management, and integration with the vision-processing module. The prototype will be developed and tested in a Windows environment. Its performance will be evaluated in terms of detection accuracy, processing speed, system stability, and the reliability of dashboard information. The project aims to demonstrate how computer vision can support real-time parking monitoring and automated tariff calculation through a modular system that can be extended to meet different operational requirements.

Keywords: smart parking, computer vision, object detection, automated tariff calculation, real-time monitoring, web-based dashboard

ASTAKANDA: A Gamified Sign Language Learning Platform Using K-Nearest Neighbors and Interactive Dataset Enrichment

Jonathan Briant Wijaya

Symposium on Applied STEM, Maritime Technology, and Sustainable Engineering · Informatics, Data Systems, and Digital Innovation · Educational technology

PPAVI-2026-2B7EC938 · Oral

Abstract

Sign language learning can support more inclusive communication, yet learning materials based primarily on books or videos may offer limited interaction and immediate feedback. This study presents ASTAKANDA, a gamified web platform developed using Laravel 13 that combines interactive learning activities with real-time hand landmark detection using MediaPipe and K-Nearest Neighbors (KNN) classification based on landmark vectors. The platform also supports the contribution of additional user samples to enrich its dataset. The recognition model was evaluated using 1,201 test samples and achieved 100% accuracy, with precision, recall, and F1 scores ranging from 0.98 to 1.00. Performance testing recorded an average frame rate of 28.2 frames per second (FPS) and GPU memory usage of 1.7 MB. All nine core scenarios in black-box testing passed. These results demonstrate the technical feasibility of integrating real-time sign recognition with gamified learning activities and user-contributed data. However, the findings do not establish the system's generalizability across users or signing conditions, or its effectiveness in improving learning outcomes. Further testing with independent participants and measures of learning performance is needed.

Keywords: Sign Language, Gamification, Real-Time Feedback, K-Nearest Neighbors, Interactive Learning, Dataset Enrichment.

EduVenture: Design and Usability Evaluation of an Octalysis-Based Gamified Android Learning Application for History and Culture

Gregorius Pandu Tri Winata

Symposium on Applied STEM, Maritime Technology, and Sustainable Engineering · Informatics, Data Systems, and Digital Innovation · Educational technology

PPAVI-2026-6A15622F · Oral

Abstract

History and culture content can be perceived as unengaging, potentially limiting student participation in learning activities. This study presents EduVenture, an Android learning application designed to support engagement through an adventure-themed role-playing game (RPG) quiz. Its design is guided by the Octalysis framework and incorporates game elements such as coins, levels and experience points, badges, a leaderboard, daily missions, mini-games, time limits, hints, collectible characters, and a national-hero storyline. The application uses a client–server architecture, with Retrofit, a REST API, and a MySQL database to synchronize user progress. The login feature was evaluated using white-box and black-box functional testing. Flowgraph analysis produced a cyclomatic complexity value of 5, identifying five independent paths; all five black-box test cases produced the expected outputs. Usability was assessed with the System Usability Scale (SUS) among 20 respondents. The mean SUS score was 91.38 (Grade A; "Excellent"), with scores ranging from 62.5 to 97.5; 18

respondents scored above 80.3. These results indicate that the tested login feature functioned as expected and that respondents rated the prototype's usability highly. However, the study did not assess the application's effects on learning or knowledge retention. Further testing of other features and evaluation of learning outcomes using school students are therefore needed.

Keywords: gamification, Octalysis framework, Android learning application, educational technology, role-playing game, usability testing

Implementation of a Gamified Early Childhood Learning System

Fransiska Rambu Yowa

Symposium on Applied STEM, Maritime Technology, and Sustainable Engineering · Informatics, Data Systems, and Digital Innovation · Educational technology

PPAVI-2026-6B0A686F · Oral

Abstract

Early childhood education plays an important role in developing children's foundational knowledge and skills. At TK Diponegoro 95 Teluk, located in Bantarmangu, Teluk, South Purwokerto, Banyumas Regency, Central Java, Indonesia, limited interactive learning media and the absence of a digital progress monitoring system have constrained the use of technology in learning. This study developed a gamified learning system for recognizing letters, numbers, colors, and shapes. The system incorporates points, rewards, levels, and leaderboards, together with a dashboard through which teachers and parents can monitor children's progress. A research and development approach was used, comprising needs analysis, system design, implementation, and evaluation. Evaluation included black-box testing, verification of gamification features, and the System Usability Scale (SUS). Black-box testing yielded an 88.89% pass rate, all planned gamification features were implemented, and the system received an SUS score of 54.59. These findings indicate that the system provides the intended learning and monitoring features, although some functional issues remain and usability requires improvement, particularly in navigation and ease of use. The system offers a potential interactive learning medium for TK Diponegoro 95 Teluk; its effect on children's motivation and learning outcomes requires further evaluation.

Keywords: early childhood education, gamification, interactive learning, learning progress monitoring, System Usability Scale

Chemical and Sensory Characteristics of Sappanwood, Biancaea sappan (L.) Tod., Yoghurt Soft Candy with Different Formulations of Granulated Sugar and Arenga Palm Sugar

Lidya

Symposium on Applied STEM, Maritime Technology, and Sustainable Engineering · General STEM · General STEM

PPAVI-2026-052B11A3 · Oral

Abstract

Diversifying yoghurt into soft candy may improve product convenience, while the use of Arenga palm sugar can modify its chemical and sensory characteristics compared with granulated sugar. This study aimed to characterize sappanwood yoghurt soft candy prepared with different ratios of granulated sugar and Arenga palm sugar and to identify the most preferred formulation. Four treatments were evaluated: P0 (100% granulated sugar:0% palm sugar), P1 (75%:25%), P2 (50%:50%), and P3 (0%:100%). Yoghurt was prepared from full-cream UHT milk with 0.1% sappanwood extract and subsequently processed into soft candy using gelatin and glucose syrup. Chemical analyses included moisture content and reducing sugar, while sensory evaluation comprised scoring tests for color, characteristic yoghurt aroma, characteristic palm sugar aroma, sweetness, characteristic palm sugar sweetness, texture, and overall hedonic acceptance by 25 semi-trained panelists. Sensory data were analyzed using ANOVA followed by an LSD test when significant. Increasing palm sugar proportion was accompanied by an increase in moisture content from 22.7% to 28.3% and reducing sugar from 16.7% to 20.8%. Sugar formulation had a highly significant effect on color, characteristic yoghurt aroma, characteristic palm sugar aroma, characteristic palm sugar sweetness, texture, and overall acceptance, and a significant effect on sweetness. P2 showed the highest overall acceptance score (6.28; 'like'), with a brown color, moderate yoghurt aroma, noticeable palm sugar aroma and flavor, sweet taste, and chewy texture. All treatments exceeded the maximum moisture content specified in SNI 3547.2-2008, while reducing sugar remained below the 25% maximum limit. A 50:50 ratio of granulated sugar and Arenga palm sugar provided the best sensory balance under the conditions of this study.

Keywords: Arenga palm sugar, moisture content, reducing sugar, sappanwood, soft candy, yoghurt

Exploration of Clove Powder, Syzygium aromaticum (L.) Merr. & L.M.Perry, Utilization in MOCAF-Based Cookie Development: Chemical and Sensory Characteristics

Veronica Adellia Evena Barage

Symposium on Applied STEM, Maritime Technology, and Sustainable Engineering · General STEM · General STEM

PPAVI-2026-2DD0DDE3 · Oral

Abstract

Cookies are widely consumed food products that can be developed through the utilization of local food ingredients. The use of Modified Cassava Flour (Mocaf) with the addition of clove powder, Syzygium aromaticum, has the potential to produce cookies with diverse characteristics. This study aimed to determine the effect of clove powder addition on the chemical and organoleptic characteristics of Mocaf cookies and to determine the formulation most preferred by the panelists. Four treatments were applied, namely P0 (0%), P1 (2%), P2 (4%), and P3 (6%) clove powder addition. The chemical parameters included moisture content and acid-insoluble ash content, while the organoleptic evaluation included color, aroma, taste, texture, and overall acceptability. The data were analyzed using analysis of variance (ANOVA), followed by the Least Significant Difference (LSD) test at a 5% significance level. The addition of clove powder affected the organoleptic characteristics of Mocaf cookies. Increasing the concentration of clove powder resulted in a darker color, stronger clove aroma and flavor, and a crispier texture. The moisture content and acid-insoluble ash content of all treatments met the quality requirements of SNI 2973:2022. Based on the overall hedonic test, P1 with 2% clove powder addition obtained the highest preference score and demonstrated a good balance of sensory characteristics. The addition of 2% clove powder can be considered a suitable formulation for developing Mocaf cookies based on local food ingredients.

Keywords: Cookies, Modified Cassava Flour, Clove Powder, Sensory Evaluation, Chemical Analysis

Symposium on Business Transformation, Social Innovation, Humanities, and Sustainable Economy

Fear of Missing Out and Impulsive Buying among Digital Consumers: A Systematic Literature Review

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Symposium on Business Transformation, Social Innovation, Humanities, and Sustainable Economy · Business Transformation, Entrepreneurship, and Sustainable Economy · MSME digitalization

PPAVI-2026-EF7DE5F9 · Oral

Abstract

The growth of e-commerce and social commerce has reshaped consumer behavior, creating digital environments in which purchasing decisions may be influenced by social and time-sensitive cues. This study examines the relationship between Fear of Missing Out (FoMO) and impulsive buying among digital consumers through a systematic literature review of scientific articles published between 2019 and 2026. The reviewed literature indicates that FoMO is associated with emotional urgency and spontaneous purchasing decisions. Digital marketing features—including flash sales, countdown timers, limited-time offers, live-stream interactions, and influencer promotions—may intensify this relationship by heightening consumers' perceptions of scarcity and social participation. The literature also identifies social proof, hedonic shopping motivation, self-control, and electronic word of mouth as factors that may mediate or moderate the relationship between FoMO and impulsive buying. These findings offer a basis for further research on digital consumer behavior and suggest that businesses should consider the ethical implications of marketing practices that rely on urgency and scarcity. The review's conclusions are limited by the included studies and the review procedures; therefore, the search strategy, databases, selection criteria, and synthesis method should be reported clearly to support reproducibility.

Keywords: Fear of Missing Out, impulsive buying, digital consumers, social commerce, live-stream commerce, systematic literature review

Business English as a Lingua Franca on WhatsApp in International Trade: A Case Study of an Exporter in Pontianak

Ruwis

Symposium on Business Transformation, Social Innovation, Humanities, and Sustainable Economy · Business Transformation, Entrepreneurship, and Sustainable Economy · Sustainable entrepreneurship

PPAVI-2026-8AA90E49 · Oral

Abstract

This qualitative single-case study explored the dynamic English communication practices of a regional export entrepreneur in Pontianak, West Kalimantan, bridging local producers and global markets. Bounded by digital and logistical constraints, the study described the implementation of Business English as a Lingua Franca (BELF) on WhatsApp and analyzed linguistic, pragmatic, and digital challenges along with their mitigation strategies. Data were triangulated from a semi-structured interview, content analysis of the selected WhatsApp chat logs, a formal Quotation Letter, and multimodal visual materials (stuffing videos and photos), excluding field observations to ensure empirical honesty. The findings showed that dynamic English was implemented as an adaptive, goal-oriented tool. The exporter prioritized functional clarity over grammatical accuracy, adhered strictly to standardized trade jargon (FOB, CIF) as a business anchor, and established trust through transactional reliability. Furthermore, three-tier challenges were successfully resolved: linguistic barriers (foreign scripts, non-standard English) via AI translation tools and active clarification; pragmatic barriers (bounded fluency) through material visual evidence (branded sacks and stuffing videos); and digital challenges (asymmetrical interaction) by leveraging WhatsApp's asynchronous nature for process gains. In conclusion, digital trade success is driven by technological agency and pragmatic BELF adaptation rather than native-speaker grammatical perfection.

Keywords: Dynamic English, International Trade, BELF, Bounded Fluency, Pontianak Exporter

Communication Strategies in Responses to Negative Customer Reviews on Shopee: A Discourse Analysis of Somethinc Official Shop

Allissia Winarta, Cherish Arlyn, Clara Aurelya, Meity

Symposium on Business Transformation, Social Innovation, Humanities, and Sustainable Economy · Business Transformation, Entrepreneurship, and Sustainable Economy · Sustainable entrepreneurship

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Abstract

Negative reviews on e-commerce platforms can affect customers' perceptions of a brand, making seller responses an important part of addressing complaints and maintaining customer relationships. This study aimed to identify the communication strategies used by Somethinc Official Shop in responding to negative customer reviews on Shopee and to examine how the type of complaint influenced the use of these strategies. A qualitative approach was employed using discourse analysis. The data consisted of 24 review-response pairs from eight Somethinc products with more than 10,000 sales. For each product, one 1-star, one 2-star, and one 3-star review was selected. The data were analyzed through coding, categorization, pattern identification, and interpretation of communication strategies in the seller responses. The findings identified 79 coded text segments across eight communication strategies. The Empathic strategy was the most dominant, with 34 occurrences, followed by Interactive with 16 and Directive with 12. Informative occurred 10 times, Argumentative 4 times, and Persuasive 3 times, while Narrative and Descriptive were not identified. The responses tended to acknowledge customer complaints, provide explanations or invite further interaction, and guide customers toward appropriate actions. In addition, the type of complaint influenced the combination of communication strategies used in the responses. These findings indicate that Somethinc Official Shop's responses were generally customer-oriented, with communication strategies adapted to the characteristics of the complaints raised.

Keywords: communication strategies, negative customer reviews, discourse analysis, customer complaints, Shopee

Direct and Indirect Request Strategies in WhatsApp-Based Business Communication: Linguistic Realizations and Contextual Factors

Stefania

Symposium on Business Transformation, Social Innovation, Humanities, and Sustainable Economy · Business Transformation, Entrepreneurship, and Sustainable Economy · Sustainable entrepreneurship

PPAVI-2026-10F7242B · Oral

Abstract

Directness and indirectness are important aspects of written business communication because the way requests are expressed can influence clarity, politeness, and professional relationships. This study aims to analyze how directness and indirectness are realized in written business requests, identify the linguistic features that distinguish the two strategies, examine the factors influencing their use, and understand their effects on communication effectiveness. This study employs a qualitative descriptive research design. The data consist of written business communication in WhatsApp messages containing direct and indirect request expressions. The data were collected using a documentation method and analyzed by identifying, classifying, and interpreting the request expressions based on their linguistic features, context, and pragmatic functions. The analysis was supported by the theories of Newnam and Goode (2019), Joyce (2012), and Berrios et al. (2025). The findings show that directness is realized through informative statements, motivational expressions, formal announcements, declarative statements, and permission statements, while indirectness is realized through question forms, elliptical statements, politeness markers, indirect reminders, and implied requests. The use of these strategies is influenced by urgency, workplace hierarchy, professional politeness, social distance, and the communication platform. Directness contributes to clarity, efficiency, and faster task completion, whereas indirectness helps maintain politeness, reduce potential conflict, and preserve professional relationships. Therefore, effective written business communication requires an appropriate balance between directness and indirectness according to the context, purpose, and interpersonal relationships involved.

Keywords: directness, indirectness, business communication, written requests, communication effectiveness

Students' Perceptions of Hook Strategies in Job Application-Related Short-Form Videos at Politeknik Tonggak Equator

Nikita Tanuwijaya

Symposium on Business Transformation, Social Innovation, Humanities, and Sustainable Economy · Business Transformation, Entrepreneurship, and Sustainable Economy · Sustainable entrepreneurship

PPAVI-2026-A1560E13 · Oral

Abstract

This research aims to explore undergraduate students' perceptions at Politeknik Tonggak Equator regarding hook strategies used in job application-related short-form videos. Short-form video platforms such as TikTok and Instagram Reels have become important sources of career-related information, shaping how students understand job application content. However, audience responses may differ depending on the hook strategies used in the opening segment of the videos. This study uses a descriptive qualitative research design with a case-oriented approach. Data are collected through observation of selected short-form videos and semi-structured interviews with eight undergraduate students. The videos are analyzed to identify hook strategies such as relevance, questioning, discrepancy, and novelty, while the interviews explore students' perceptions in terms of attention, interest, and engagement. The findings are expected to show that different hook strategies are perceived differently in attracting attention, generating curiosity, and encouraging continued viewing. Questioning and discrepancy hooks are expected to generate stronger curiosity and attention, while relevance hooks may help students relate the content to their experiences. These responses may shape perceptions of the credibility, relevance, and effectiveness of the content. Therefore, this study is expected to demonstrate that hook strategies play an important role in supporting communication effectiveness in career-related short-form videos.

Keywords: hook strategies, short-form video, student perception, attention, interest, career-related content

AI Chatbot Use and Interpersonal Communication Preferences among Gen Z: A Qualitative Study of ChatGPT Users

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Symposium on Business Transformation, Social Innovation, Humanities, and Sustainable Economy · Social Innovation, Humanities, and Applied Communication · Applied communication

PPAVI-2026-BE7E14F3 · Oral

Abstract

AI chatbots such as ChatGPT offer rapid, personalized, and supportive responses that may shape users' expectations of communication. This study explores how Generation Z users perceive the social presence of ChatGPT and how their experiences relate to their preferences for interacting with AI chatbots and other people. The study is informed by Maslow's hierarchy of needs, the Media Equation, and Social Presence Theory. It focuses on users' perceptions of chatbot responses, communication comfort, self-disclosure, expectations of interaction, and comparisons between AI-mediated and human communication. It also considers how preferences may vary according to the topic and purpose of an interaction, including whether users turn to AI to discuss particular issues while valuing human relationships that involve reciprocity and personal closeness. The study combines a review of relevant literature with interviews with ChatGPT users. By examining users' accounts in relation to these theoretical frameworks, the study aims to clarify how perceived AI social presence relates to interpersonal communication preferences and to contribute to research on human–technology communication.

Keywords: AI chatbots, ChatGPT, interpersonal communication, social presence, communication preferences, Generation Z

Persuasive Language in Personality Type Descriptions on the 16Personalities Website: A Qualitative Content Analysis

Yohanes Alvin

Symposium on Business Transformation, Social Innovation, Humanities, and Sustainable Economy · Social Innovation, Humanities, and Applied Communication · Applied communication

PPAVI-2026-C6CE2515 · Oral

Abstract

Indikator Tipe Myers-Briggs (MBTI) tetap menjadi salah satu tes kepribadian online yang paling banyak digunakan meskipun ada perdebatan yang sedang berlangsung tentang validitas ilmiahnya. Selain kerangka klasifikasi kepribadian, kata-kata yang digunakan dalam deskripsi kepribadian dapat berkontribusi pada popularitasnya dengan menyajikan sifat-sifat kepribadian dengan cara yang menarik. Penelitian ini bertujuan untuk mengidentifikasi bentuk-bentuk bahasa persuasif yang digunakan dalam deskripsi tes kepribadian online berbasis MBTI dan menentukan frekuensinya. Pendekatan kualitatif digunakan, dengan menggunakan enam belas deskripsi kepribadian yang diterbitkan di situs web 16Personalities sebagai sumber data. Data dianalisis melalui analisis konten kualitatif berdasarkan dua puluh satu bentuk bahasa persuasif yang diusulkan oleh Kannan dan Tyagi. Temuan menunjukkan bahwa dua belas dari dua puluh satu bentuk hadir dalam deskripsi. Hiperbola dan asosiasi muncul di semua enam belas tipe kepribadian, sementara frasa kata benda panjang dan paralelisme sintaksis juga sering digunakan. Bentuk-bentuk yang tersisa terjadi lebih jarang. Temuan ini menunjukkan bahwa deskripsi menggambarkan tipe kepribadian sebagai positif, khas, dan relevan secara pribadi melalui pujian yang dilebih-lebihkan dan label identitas yang menarik. Penelitian ini juga menunjukkan bahwa analisis bahasa persuasif dapat diterapkan di luar iklan untuk konten tes kepribadian online.

Keywords: persuasive language, MBTI, online personality test, 16Personalities, qualitative content analysis

Analysis of the Implementation of Electronic-Based Government Systems (SPBE) through Heuristic Evaluation of E-Government Services in Manado City and Donggala Regency

Naomi Yunika Aulia, Siti Maskanah

Symposium on Business Transformation, Social Innovation, Humanities, and Sustainable Economy · Social Innovation, Humanities, and Applied Communication · Digital humanities

PPAVI-2026-6142A847 · Oral

Abstract

Digital transformation in the public sector has become a global imperative, adopted by the Indonesian Government through the regulatory framework of the Electronic-Based Government System (SPBE). This study presents an in-depth and comprehensive comparative analysis of e-government implementation in two local government entities with contrasting characteristics on the island of Sulawesi: the Manado City Government, representing a Smart City model with a high level of digital maturity, and the Donggala Regency Government, representing a developing region facing fundamental challenges in digital adoption. Using the Heuristic Evaluation method developed by Jakob Nielsen, combined with a policy analysis based on the results of the national SPBE evaluation, this study evaluates User Interface (UI), User Experience (UX), and the relationship between interface design quality and SPBE index scores. The results reveal a significant disparity, with Manado City (SPBE Index of 3.55 in 2024) demonstrating a high level of compliance with heuristic principles through interactive features such as “Manado 360” and the integration of “ManadoHub” services. In contrast, Donggala Regency (SPBE Index of 1.64 in 2023) faces critical challenges in Error Prevention and Flexibility of Use, as reflected in the absence of search functionality and the limited integration of transactional services. This study contributes theoretically to the understanding of the relationship between interface usability and SPBE policy governance, while also providing practical recommendations for local governments to adopt a user-centered design approach to bridge the digital divide and improve the quality of public services.

Keywords: SPBE, E-Government, Heuristic Evaluation, User Experience, Manado City, Donggala Regency

Mapping the Landscape of Open Government Data: A Bibliometric Analysis and Future Directions for Data-Driven Decision Making

Anggita Indraswari

Symposium on Business Transformation, Social Innovation, Humanities, and Sustainable Economy · Social Innovation, Humanities, and Applied Communication · Digital humanities

PPAVI-2026-4DDD3305 · Oral

Abstract

Open government data (OGD) is a global governance agenda that supports transparency, accountability, and citizen participation. However, the existing literature is still predominantly characterized by narrative and qualitative reviews, leaving the intellectual structure and current research trends relatively underexplored quantitatively. This study employs bibliometric analysis to map publication trends, the performance of authors, institutions, and countries, as well as the thematic structure of OGD research, and to identify future research directions relevant to data-driven decision making. Data were obtained from the Scopus database following the PRISMA protocol, resulting in 233 articles published between 2012 and 2026. Publication trends show a fluctuating pattern in the early years but have increased sharply since 2021, with the highest surge occurring in 2025. China, the United States, and the Netherlands are the most prominent contributors in terms of publications and citations, with China leading in the number of publications, the Netherlands having the highest citation impact, and the United States demonstrating consistent contributions across both indicators. Keyword co-occurrence mapping identified five main thematic clusters: e-government and data interoperability; data sharing, privacy, and local government; transparency, regulation, and digital transformation in the public sector; data governance, adoption, and trust; and data quality and open data portals. OGD research remains strongly oriented toward the government data provision perspective, while the utilization of data for decision making, the integration of blockchain technology for governance, and active citizen participation remain relatively underexplored areas. This study recommends that future research focus on (i) the mechanisms and barriers to utilizing OGD in data-driven decision making, (ii) the integration of blockchain technology to enhance trust and governance of open data, and (iii) citizen participation and the usability of open data portals.

Keywords: open government data, data-driven decision making, bibliometric analysis, keyword co-occurrence

A Comparative Analysis of Indonesia's EGDI and ASEAN Countries (2003–2024): Trends in OSI, HCI, and TII and the Factors Influencing Their Dynamics

Aikylla Zahra Permana, Anggita Indraswari

Symposium on Business Transformation, Social Innovation, Humanities, and Sustainable Economy · Social Innovation, Humanities, and Applied Communication · Digital humanities

PPAVI-2026-29FA6E6B · Poster

Abstract

E-government development in ASEAN shows diverse dynamics, particularly in the Online Service Index (OSI), Human Capital Index (HCI), and Telecommunication Infrastructure Index (TII), the main components of the E-Government Development Index (EGDI). Indonesia has recorded one of the most significant EGDI improvements over the past two decades, yet most prior studies assess EGDI at a single point in time, leaving component fluctuations insufficiently examined. This study analyzes Indonesia's EGDI development from 2003 to 2024, assesses OSI–HCI–TII trends, compares Indonesia with other ASEAN countries, and identifies the factors behind these dynamics. A descriptive quantitative approach was used, applying trend analysis (growth-rate calculation and time-series visualization) and comparative analysis of UN DESA data, complemented by qualitative content analysis of policy documents such as SPBE, Satu Data, and national digital infrastructure programs. Results show that Indonesia's EGDI grew by 89%, making it one of the fastest-improving countries in ASEAN. The largest surges occurred in OSI and TII, particularly after the SPBE Presidential Regulation (2018) and the acceleration of digital infrastructure such as Palapa Ring and the National Data Center. In contrast, HCI stagnated and even declined during 2020–2024, reflecting challenges in digital literacy and human resource competence. The study concludes that Indonesia's EGDI improvement is strongly influenced by digital policy synchronization, public service integration, and infrastructure development. Recommendations include strengthening human resource capacity, accelerating data interoperability, and prioritizing equitable ICT infrastructure to sustain EGDI improvement.

Keywords: E-Government Development Index, Online Service Index, Human Capital Index, Telecommunication Infrastructure Index, ASEAN, Indonesia

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