Devis Wawan Saputra

Academic CV: AI in Education and Learning Analytics

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RESEARCH PROFILE

My interest in learning analytics grew out of two parts of my career: teaching and leading an engineering program at Institut Teknologi Del, and managing workplace learning at Suitmedia. I studied informatics at Institut Teknologi Bandung and later completed an MBA in Germany. Working with students, curricula, and onboarding systems made me ask what learner data can reliably tell us, especially when the findings may shape educational decisions. My recent work uses ASSISTments, OULAD, and other public datasets to examine prediction, data quality, and the limits of observational evidence. I hope to pursue a PhD focused on making learning analytics more rigorous and useful to educators.

RESEARCH INTERESTS

Learning analytics; learner modeling and knowledge tracing; causal inference with observational education data; evaluation and calibration of predictive models; assessment design; early warning and learner support.

EDUCATION

MBA in International Business Oct 2012 to Jun 2014

University of Applied Sciences Würzburg-Schweinfurt (FHWS, now THWS), Germany

Final grade: 1.8 (German scale; 1.0 is highest). MBA thesis: *Leadership on Flat Organizational Structure: Focusing on Organization Using Self Managing Team and Open Allocation Strategy*, a qualitative case study of Valve and GitHub.

German Language Course Aug 2011 to Oct 2012

Hartnackschule Berlin, Germany (intensive course in preparation for the MBA; reached B2)

Bachelor of Engineering in Informatics Aug 2004 to Mar 2010

Institut Teknologi Bandung (ITB), Indonesia

Thesis: *Image Retrieval System Using Geotagged Information*. Combined EXIF geolocation metadata with vector-space retrieval and assessed TF, IDF, and TF-IDF weighting using precision, recall, and non-interpolated average precision.

WORKING PAPERS

Saputra, D. W. (2026). When Knowledge-Tracing Rankings Depend on Available History: A Source-Correction and Matched-Information Audit on ASSISTments 2009 and 2015.

Status: Manuscript submitted to arXiv; endorsement pending.

Code and manuscript: github.com/devissaputra/knowledge_tracing_benchmark

- Audited a pinned processed version of ASSISTments 2009 against the corrected official source. Of 4,148 learners represented in both, 817 had different normalized sequences of skills and responses.
- Compared three models on the same 20,592 held-out ASSISTments 2015 responses from 582 learners. With up to 20 preceding events available, order-aware logistic regression achieved a Brier score of 0.17389, compared with 0.17514 for the GRU. The result depends on the information provided to each model and does not isolate an effect of model architecture.

Saputra, D. W. (2026). Early Assessment Submission and Subsequent Course Outcome: A Day-30 Landmark Observational Analysis of OULAD with Explicit Weighting Diagnostics.

Status: Working manuscript.

Code and manuscript: github.com/devissaputra/causal_learning_analytics

- Used a day-30 landmark in the OULAD CCC 2014J course presentation to establish who was eligible and when assessment submission and later outcomes were measured. The analysis included 1,820 of 1,983 eligible learners: 1,624 had submitted an assessment by day 30 and 196 had not.
- The inverse-probability-weighted difference in favorable outcomes was 0.386 (95% bootstrap interval 0.324 to 0.445); the overlap-weighted estimate was 0.326. Large weights, an effective sample size of about 510, and remaining covariate imbalance limit the result to an observational association, not a causal effect.

FURTHER EMPIRICAL STUDIES

Independent research, AI in Education 2025 to present

Code, data provenance, and write-ups: devissaputra.github.io

- **Wrong-answer-conditioned retrieval (SciQ).** Tested whether adding a wrong-answer option improved BM25 retrieval. The study covered 884 SciQ questions and 2,652 proxy cases, with a shuffled-answer control. Question-only MRR was 0.9472, versus 0.9433 with wrong-answer expansion; the latter did not show a distinct retrieval advantage. Link
- **Enrollment-time dropout-risk audit (UCI 697).** Examined an enrollment-time model using 4,424 student records and 20 predictors, excluding later academic-performance variables. On 885 held-out records, ROC-AUC was 0.8316 and Brier score was 0.1447. Subgroups with insufficient data were reported as not evaluable. Link
- **Classroom discourse classification (TalkMoves).** Classified teacher discourse moves using 175,129 labeled utterances from 565 transcript groups. Duplicate transcripts were handled before group-level splitting. On 113 held-out groups, logistic regression reached macro-F1 0.5198, compared with 0.1152 for a majority-class baseline. Link

ACADEMIC EXPERIENCE

Lecturer, Engineering Management May 2016 to Jun 2023

Institut Teknologi Del, Laguboti, Indonesia

- Supervised more than 50 undergraduate theses and capstone projects, supporting students with regular milestones, project discussions, and written feedback. Taught engineering economics, entrepreneurship, and systems thinking.
- Designed practical exercises for the Astra Lean Production System teaching laboratory, giving approximately 30 to 60 students each year hands-on experience with lean manufacturing concepts.

Head, Engineering Management Program Nov 2017 to May 2021

Institut Teknologi Del, Laguboti, Indonesia (concurrent with lecturer role)

- Led the revision of the Engineering Management curriculum for 2019 to 2024, bringing together alumni feedback, faculty review, and industry input across 144 SKS and eight semesters.
- Worked with eight lecturers to sequence more than 40 courses, align assessments with learning outcomes, and prepare the curriculum for academic review and approval.

PROFESSIONAL EXPERIENCE

Independent Learning Consultant and Researcher Jan 2025 to present

Medan, Indonesia (remote)

- Work on independent consulting and research projects, preparing needs analyses, competency maps, onboarding materials, and assessment plans alongside studies in learning analytics.

Learning and Development Manager Feb 2023 to Aug 2024

Suitmedia, Jakarta, Indonesia (remote, concurrent with lecturer role until Jun 2023)

- Delivered 120 SCORM-compliant Rocketversity courses in Moodle for approximately 100 new hires. An internal case study reported a 30% reduction in onboarding time.
- Managed a four-person Rocketversity team, working with the Director to prioritize the backlog, review materials, and release courses in iterations.

Program Manager, Health Technology Initiative May 2015 to Oct 2015

Summit Institute for Development, Mataram, Indonesia

- Coordinated four developers and six field workers during the THRIVE OpenSRP implementation across 16 districts, working with project partners and investigators to address rollout issues.
- Worked with local health partners to develop a clearer form-completion protocol for midwives and health workers, with the aim of making data entry more consistent.
- Investigated slow XLSForms using field timing tests and helped split large forms into more manageable parts. Most revised forms loaded in under 10 seconds in the reported tests.

Research and Development Engineer Feb 2011 to Aug 2011

PT Cipta Srigati Lestari, Jakarta, Indonesia

- Developed Java-based optimization tools for supply-chain planning and operational decisions, turning client requirements into computational models.

PEER-REVIEWED PUBLICATIONS

Silalahi, F. T. R., **Saputra, D. W.**, Panjaitan, G., Butar-Butar, M., & Manurung, N. M. (2023). **Influencing student choice: A case study of a boarding private university in Indonesia.** In *Proceedings of the International Conference of Economics, Business, and Entrepreneur (ICEBE 2022)* (pp. 429-443). Atlantis Press. https://doi.org/10.2991/978-2-38476-064-0_46

Saputra, D. W. (2022). Optimalisasi rute distribusi kurir menggunakan metode Traveling Salesman Problem (studi kasus: JNE Balige) [**Optimization of courier distribution routes using the Traveling Salesman Problem method: A case study of JNE Balige**]. *G-Tech: Jurnal Teknologi Terapan*, *6*(2), 159-165. https://doi.org/10.33379/gtech.v6i2.1577

Meliala, G. N., & **Saputra, D. W.** (2020). Usulan tata letak gudang non semen menggunakan metode class based storage di PT Intiaga Sukses Abadi Cabang Medan [**Proposed non-cement warehouse layout using the class-based storage method at PT Intiaga Sukses Abadi, Medan Branch**]. *Jurnal Industri Kreatif*, *4*(1), 17-26. https://doi.org/10.36352/jik.v4i01.23

Siboro, B. A. H., Sinaga, R. H. M., & **Simanjuntak, D. W. S.** (2019). Rancang bangun alat pengering andaliman dengan menggunakan metode Quality Function Deployment (QFD) [**Design and construction of an andaliman dryer using the Quality Function Deployment (QFD) method**]. *Jurnal Sains dan Teknologi*, *19*(2), 133-140. https://doi.org/10.36275/stsp.v19i2.210

Tampubolon, S. L., **Simanjuntak, D. W. S.**, & Simanjuntak, M. (2019). Analisis kepuasan wisatawan terhadap atribut wisata menggunakan metode CSI dan IPA pada wisata pemandian di Kabupaten Tapanuli Utara [**Analysis of tourist satisfaction with tourism attributes at bathing sites in North Tapanuli Regency using the Customer Satisfaction Index (CSI) and Importance Performance Analysis (IPA) methods**]. *Jurnal Sains dan Teknologi*, *19*(2), 141-151. https://doi.org/10.36275/stsp.v19i2.216

Sinaga, R. H. M., & **Saputra, D. W.** (2019). **Performance investigation of geothermal power plant based on exergy and exergoeconomic analyses (case study: Sarulla Geothermal Power Plant).** *IOP Conference Series: Materials Science and Engineering*, *546*, 072006. https://doi.org/10.1088/1757-899X/546/7/072006

The two Jurnal Sains dan Teknologi articles were published under the author name Devis Wawan Saputra Simanjuntak.

BOOKS AND INSTITUTIONAL OUTPUTS

Saputra, D. W., Siboro, B. A. H., & Sinaga, C. (2022). *Metodologi pelaksanaan kerja praktik di bidang Manajemen Rekayasa* [**Methodology for implementing internships (kerja praktik) in Engineering Management**]. Feniks Muda Sejahtera.

Siboro, B. A. H., Manik, Y., Pardede, S., Panjaitan, O., Siahaan, M., Simamora, E., Sinaga, R. H. M., **Saputra, D. W.**, et al. (2022). *Peningkatan nilai andaliman: Rantai pasok, produk turunan, dan teknologi tepat guna* [**Andaliman value enhancement: Supply chain, derivative products, and appropriate technology**] (Y. Manik, C. E. Setyowati, & T. Setyowati, Eds.). Kanisius.

Saputra, D. W. (Coordinator). (2019). ***Curriculum of the Engineering Management Program, 2019 to 2024*** [Institutional document]. Institut Teknologi Del.

INTELLECTUAL PROPERTY

Registered copyright, 27 February 2020: *Rancang Bangun Alat Pengering Andaliman dengan Menggunakan Metode Quality Function Deployment (QFD)* [**Design and construction of an andaliman dryer using the Quality Function Deployment (QFD) method**], with B. A. H. Siboro and R. H. M. Sinaga. The team built the dryer and handed it over to a local farmer for field use.

METHODS, TOOLS, AND LANGUAGES

Computing	Python, NumPy, pandas, scikit-learn, PyTorch, SQL, Java, Linux
Modeling	Logistic regression, Bayesian knowledge tracing, GRU, BM25 retrieval, TF-IDF classifiers
Evaluation	ROC-AUC, Brier score, calibration, MRR, macro-F1, cluster bootstrap, propensity score and overlap weighting, effective sample size and balance diagnostics
Research practice	Landmark observational designs, qualitative case studies, field timing studies; Git, GitHub Actions, learner-level data splits, dataset checksums and provenance records
Learning systems	Hands-on: Moodle, SCORM, Articulate 360 (Rise, Storyline). Familiar with: xAPI, Workday Learning, SAP SuccessFactors, Cornerstone OnDemand.
Learning design	Needs analyses, ADDIE and SAM, curriculum mapping, competency-based assessment
Languages	Indonesian and Batak (native); English, professional working proficiency (TOEFL iBT 101, 2012); German, B2 (Hartnackschule Berlin, 2012)
Selected training	Advanced Machine Learning and Deep Learning (Indonesia AI, 2025)