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Research Article

Design and Development of a JD–R-Informed Digital Toolkit for Managing Lecturer Workload and Role Conflict

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Abstract: *University lecturers manage teaching, research and administration under overlapping deadlines and competing expectations. Guided by Job Demands–Resources theory, this design-oriented paper describes Academic digital toolkit for workload and role conflict management. Its HTML prototype combines a Workload Mapper, Priority Planner, Role Conflict Navigator, Boundary Planner and Progress Dashboard. Using a design science approach, the paper explains the application design and demonstrates task entry, prioritization, conflict comparison and decision recording with fictional examples. The prototype provides a functional planning workflow but has not undergone formal lecturer usability testing. Future evaluation will assess usability and practical value.*

1. INTRODUCTION

University lecturers perform work that extends well beyond scheduled contact hours. Teaching preparation, assessment, student supervision, grant applications, publication, faculty service and professional development must often be coordinated within the same period. Kenny and Fluck (2023) demonstrate why credible academic workload representations should account for varied teaching, research and service activities rather than assume that classroom hours adequately describe academic work. Malaysian evidence also links academic workload and work–family conflict to stress, burnout and satisfaction, although these relationships vary by institutional and individual context (Kim & Yeo, 2024).

The practical challenge is frequently one of visibility and decision-making. A lecturer may see a manuscript deadline, a teaching assessment and an urgent committee request as separate items; the

competition between them becomes apparent only when time is allocated. Academic digital toolkit was conceptualized to make these demands visible in a single lecturer-facing workspace and support a documented response when tasks compete. The objective is not to automate the academic judgement of what should matter most, but to make planning decisions more transparent and discussable.

The aim of the present innovation is to transform these practical concerns into a lecturer-facing digital workflow. Its focus is intentionally narrower than an institutional system that allocates official teaching hours or rates academic performance. The proposed contribution lies in bringing planning, priority review and structured role-conflict response into one workspace, supported by a functional prototype rather than a claim of proven outcomes.

2. LITERATURE REVIEW

2.1 Academic Workload, Role Conflict and Work–Life Boundaries

Academic workload is multidimensional. Teaching tasks involve lesson design, assessment and student support; research involves writing, data collection, collaborations and dissemination; service obligations include committees and reporting. When expectations compete within a short period, the lecturer must decide whether to reschedule, negotiate a deadline, request support or redistribute available time. Role conflict refers to incompatible or difficult-to-reconcile role expectations and has long been distinguished from role ambiguity in organizational research (Rizzo et al., 1970). A digital task list may display the conflict but does not necessarily prompt a useful response.

The problem also extends to boundaries between work and personal life. A study of Malaysian academics conducted during COVID-19 identified relationships involving perceived stress, work–life balance and quality of life, illustrating the relevance of work–life boundaries while not establishing that a planning application can improve them (Aye et al., 2024). Accordingly, academic digital toolkit focuses on planning support rather than psychological diagnosis or a promise to reduce burnout.

2.2 JD–R Theory and Digital Design

The Job Demands–Resources model distinguishes aspects of work that require sustained effort from job resources that can support goal attainment and employee functioning (Demerouti et al., 2001). Subsequent developments of JD–R theory consider how demands and resources jointly shape motivation, strain and proactive responses (Bakker & Demerouti, 2017; Bakker et al., 2023). Three job-demand dimensions inform the present design: workload (task volume and required effort), role conflict (competing expectations) and work–life interference (work encroaching on personal boundaries).

These dimensions are translated into interface requirements rather than measured as validated psychological constructs. A time estimate is a self-reported planning input, not a recognized workload scale; a conflict prompt encourages reflection, not a clinical assessment; and weekly capacity is a user-defined preference, not a university employment standard. This distinction guards against equating software usage indicators with wellbeing, engagement or lecturer performance outcomes.

2.3 Positioning Against Prior Workload Tools

Academic workload software is not novel. Ariffin et al. (2020) developed e-WLOAD to support management decisions on the distribution of lecturers' teaching workload, while Kenny and Fluck (2023) validated a broader academic workload estimation tool to support transparent workload conversations. These projects demonstrate existing approaches to workload allocation and estimation.

Academic digital toolkit instead proposes an individual-facing workflow connecting task visibility, deadline grouping, role-conflict comparison, action recording and personal boundary reflection. Whether this combination offers a meaningful advantage over available planning applications requires a systematic competitor review and user evaluation.

3. METHODOLOGY

3.1 Design Science Approach

The innovation aims to develop a usable, theory-informed digital planning aid for lecturers who encounter concurrent academic responsibilities. Specifically, the design objectives are to: (i) represent recorded tasks, due dates and estimated effort in one workspace; (ii) make competing expectations easier to identify and discuss; and (iii) support individual boundary planning, decision documentation and progress reflection. These objectives concern the feasibility of the artefact; they are not hypotheses about changes in psychological states.

A design science orientation is appropriate because its emphasis is the creation, demonstration and evaluation of a purposeful artefact (Hevner et al., 2004). The process is informed by Peffers et al. (2007), who describe problem identification, solution objectives, design and development, demonstration, evaluation and communication. For this innovation, the documented stages are problem framing from the literature, specification of the modules, development of an offline-capable HTML prototype, and demonstration using fictional example tasks. Expert review, lecturer pilot testing and impact evaluation are future stages; they are not reported as completed research.

3.2 Prototype Development and Evaluation Plan

The current artefact is a browser-based HTML application that can be opened as an offline demonstration. The interface contains a common workspace for task entry, summaries, priorities, conflict prompts and reflections. The prototype stores example entries locally within the browser rather than in an institutional database. No real participants were recruited to generate the sample records displayed in this paper. The documented development work therefore supports a functional demonstration, not an empirical claim of user satisfaction or reduced job demands.

Future evaluation should follow a staged approach. An expert review can first examine content relevance, clarity and responsible design. A small lecturer pilot can then assess whether users can complete basic tasks, interpret the urgency–importance matrix, compare deadlines and locate saved decisions. Human-centred design guidance supports iterative testing with actual users (International Organization for Standardization, 2019); perceived usability could subsequently be assessed with the System Usability Scale (Bangor et al., 2008). No usability scores are reported here.

4. FINDINGS

4.1 Functional Outputs of the Prototype

In this design paper, “findings” refer only to the implemented prototype functions and an illustrative demonstration. Academic digital toolkit contains five connected modules summarized in Table 1. They enable users to record responsibilities, group pending tasks, compare overlapping expectations, specify planning boundaries and review completion. These functions were demonstrated using fictional entries; they are not findings from a participant sample.

Table 1. Academic digital toolkit modules and implemented planning functions.

Module	**Implemented Functionality**
Workload Mapper	Task entry by academic role, deadline, importance and estimated time; completion status.
Priority Planner	Urgency–importance grouping based on due dates and user-selected priority.
Role Conflict Navigator	Two-task comparison prompts and a saved written response or decision.
Boundary Planner	User-defined working hours, weekly planning capacity and personal boundary statement.
Progress Dashboard	Task completion summaries, reflection and export of recorded task information.

4.2 Dashboard Prototype

Figure 1 presents the actual HTML dashboard. Its navigation, task counters, estimated hours, role distribution, upcoming priorities and planning indicators are linked to user-entered tasks. Values in the screenshot are fictional demonstration inputs. For example, the 18 estimated hours and 17% task-completion figure are not validated measures of workload, strain or performance.

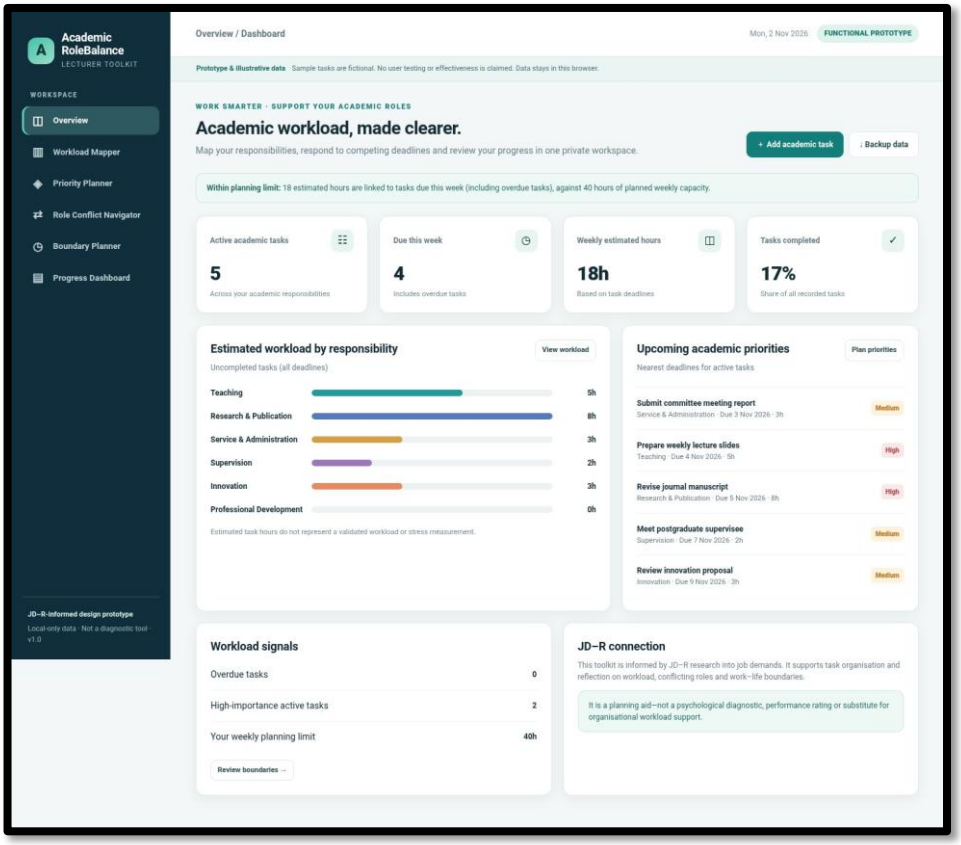


Figure 1. Academic digital toolkit dashboard (functional HTML prototype, 2 November 2026). Fictional demonstration data; not research results.

4.3 Illustrative Role Conflict Scenario

Consider a fictional lecturer preparing a class while finalizing a journal manuscript due the next day. In the Workload Mapper, the lecturer records "Prepare tomorrow's lecture" under Teaching with four estimated hours and "Submit research manuscript" under Research with five estimated hours. Both are assigned a high priority and the same due date. The dashboard updates its counts and estimated hours automatically; the Priority Planner groups both tasks as urgent and important based on the entered information.

The lecturer then opens the Role Conflict Navigator and selects the two tasks for comparison. Rather than automatically deciding that teaching or research is more important, the application prompts review of the deadlines, expected effort, institutional significance and support options. One possible written response is to complete essential lecture preparation first and discuss manuscript timing with research collaborators. The user saves this as a decision record, completes a task when appropriate and reviews the updated Progress Dashboard. The case demonstrates interface functions, not evidence that actual role conflict has been resolved.

5. DISCUSSION

5.1 Practical and Theoretical Contribution

At the individual level, the toolkit may improve the visibility of user-recorded responsibilities and support more deliberate discussions about competing expectations. Academic teams may find a structured decision log useful for clarifying constraints; this is a possibility rather than a demonstrated organisational benefit. At the institutional level, a future platform might be customised for different academic appointments or integrated with approved systems, subject to technical, privacy and user requirements. Leadership and organizational support remain important in JD–R theory, so an individual planning tool must not be portrayed as a substitute for reasonable workloads or supportive management (Tummers & Bakker, 2021).

Theoretical alignment should not be confused with effectiveness. The JD–R literature provides a rationale for attending to demands and resources (Bakker et al., 2023), while the prototype provides planning affordances rather than validated changes in psychological states. Its proposed distinctiveness is the combination of individual task visibility with decision prompts when responsibilities conflict. A systematic comparison with existing products and formal lecturer feedback will determine whether this combination offers meaningful added value.

5.2 Commercialization, Ownership and Responsible Use

The initial commercialization pathway would begin with lecturer interviews and a comparative review of existing planning applications, followed by prototype refinement and a small institutional pilot. A secure hosted service or institutionally licensed version could be considered only after validating demand, ownership, maintenance costs, accessibility and secure handling of academic task records. The present HTML prototype has no demonstrated sales, revenue or institutional adoption, and no pricing or market-size estimates are asserted.

The innovation is supported by an extended-paper working draft intended for authors' review; no acceptance, publication or DOI is claimed for Academic RoleBalance. The existing prototype and its dated source files provide a basis for documenting the design process. Copyright ownership and any UiTM-related intellectual-property obligations must be clarified before commercialization. No copyright registration number or issued certificate is claimed. The application should use fictional or

appropriately anonymized examples in public demonstrations and should not be deployed as an employee surveillance, psychological assessment or staff performance-rating system.

5.3 Limitations and Next Steps

The principal limitation is the absence of formal user and impact evaluation. The dashboard is descriptive, records are user-entered and no validated scores of job demands, work engagement, work–life balance or lecturer performance are generated. Local browser data also make the current version unsuitable for institutional deployment without additional safeguards. Its originality is best described as a proposed integration of individual planning and structured conflict-response functions, not as the first digital workload application.

5.4 Proposed Evaluation Indicators

To distinguish operational functionality from actual usefulness, evaluation should consider several complementary forms of evidence. A task-based walkthrough can show whether lecturers can understand the interface and complete key workflows. Observed errors, task completion, time to locate a feature and qualitative feedback can reveal practical weaknesses. A short questionnaire such as the System Usability Scale may provide a descriptive summary of perceived usability after a real pilot (Bangor et al., 2008). These indicators should be collected transparently and reported only after testing, with the participant sample and procedures clearly described.

Table 2. Proposed evaluation domains and evidence to be collected in future testing.

Domain	**Potential Evidence**
Functionality	Success in recording tasks, comparing conflicts, saving a response and retrieving task history.
Usability	Observed errors, task completion, user comments and SUS scores after actual testing.
Fit with academic work	Lecturer feedback on task categories, deadlines, priority prompts and planning constraints.
Responsible use	Understanding of privacy notices, risks of misuse and clarity of non-diagnostic functions.

An expert review should first assess whether the wording of the role-conflict prompts is understandable and sufficiently neutral. For example, a lecturer may be unable to change a teaching deadline even when the application displays another task as high priority. The system must therefore avoid suggesting that all duties are equally flexible or that individual planning alone can address structural workload problems. A later usability pilot could recruit lecturers with varied teaching and administrative responsibilities so that potential differences in workflow needs become visible. The evaluation protocol should define inclusion criteria, consent, storage arrangements and the purpose of the collected feedback in advance.

In a future organizational deployment, users should be able to distinguish their private planning records from any data shared with managers. Access controls, retention practices and institutional permissions would need to be specified before development of cloud storage or multi-user functionality. A digital planner can offer prompts and visibility, but sustainable academic work also depends on supportive leadership and appropriate organizational resources (Tummers & Bakker, 2021). This qualification is central to the interpretation of the proposed innovation.

6. CONCLUSION

Within these boundaries, Academic digital toolkit offers a demonstrable way to translate selected JD–R concepts into practical software functions. The integrated Workload Mapper, Priority Planner, Role Conflict Navigator, Boundary Planner and Progress Dashboard provide a coherent lecturer-facing workflow for reviewing competing responsibilities and documenting actions. The next scholarly contribution depends on whether future lecturers find the toolkit understandable, relevant and useful in genuine academic settings.

References

Ariffin, A. H., Abdul Wahid, R., Sulaiman, S., Mansor, M., & Abd Wahab, M. H. (2020). The development of an e-workload distribution system: A focus on the fair distribution of teaching workloads of lecturers. *Asian Journal of University Education,* 16(4), 31–43. https://doi.org/10.24191/ajue.v16i4.11955.

Aye, L. M., Tan, J. E. H., & Ramasamy, S. (2024). Work-life balance mediating stress and quality of life in academics during COVID-19 in Malaysia. *Journal of Public Health in Africa,* 15(1), Article 562. https://doi.org/10.4102/jphia.v15i1.562.

Bakker, A. B., & Demerouti, E. (2017). Job demands–resources theory: Taking stock and looking forward. *Journal of Occupational Health Psychology*, 22(3), 273–285. https://doi.org/10.1037/ocp0000056.

Bakker, A. B., Demerouti, E., & Sanz-Vergel, A. (2023). Job demands–resources theory: Ten years later. *Annual Review of Organizational Psychology and Organizational Behavior*, 10, 25–53. https://doi.org/10.1146/annurev-orgpsych-120920-053933.

Bangor, A., Kortum, P. T., & Miller, J. T. (2008). An empirical evaluation of the System Usability Scale. *International Journal of Human–Computer Interaction*, 24(6), 574–594. https://doi.org/10.1080/10447310802205776.

Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands–resources model of burnout. *Journal of Applied Psychology*, 86(3), 499–512. https://doi.org/10.1037/0021-9010.86.3.499.

Hevner, A. R., March, S. T., Park, J., & Ram, S. (2004). Design science in information systems research. *MIS Quarterly,* 28(1), 75–106. https://doi.org/10.2307/25148625.

International Organization for Standardization. (2019). *Ergonomics of human-system interaction—Part 210: Human-centred design for interactive systems (ISO 9241-210:2019).* Retrieved from: https://www.iso.org/standard/77520.html.

Kenny, J., & Fluck, A. E. (2023). Life at the academic coalface: Validation of a holistic academic workload estimation tool. *Higher Education,* 86, 507–526. https://doi.org/10.1007/s10734-022-00912-x.

Kim, L., & Yeo, S. F. (2024). Are you happy with your work? Side effects of workloads and work–family conflict in higher education. *The TQM Journal*, 36(9), 437–455. https://doi.org/10.1108/TQM-03-2024-0114.

Peffers, K., Tuunanen, T., Rothenberger, M. A., & Chatterjee, S. (2007). A design science research methodology for information systems research. *Journal of Management Information Systems*, 24(3), 45–77. https://doi.org/10.2753/MIS0742-1222240302.

Rizzo, J. R., House, R. J., & Lirtzman, S. I. (1970). Role conflict and ambiguity in complex organizations. *Administrative Science Quarterly,* 15(2), 150–163. https://doi.org/10.2307/2391486.

Tummers, L. G., & Bakker, A. B. (2021). Leadership and job demands–resources theory: A systematic review. *Frontiers in Psychology*, 12, Article 722080. https://doi.org/10.3389/fpsyg.2021.722080.