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Digital Pedagogical Innovation in Malaysian Politics Education: A Mixed-Methods Study of MOOC and Politic-box Integration

Iskandar Hasan Tan Abdullah
Faculty Administrative Science and Policy Studies, University Technology MARA of Kelantan

Low Yong San
School of Distance Education, Universiti Sains Malaysia

Nur Azuki Yusoff
Faculty Of Language Studies and Human Development Universiti Malaysia Kelantan

Razi Yaakob
Faculty of General Studies and Further Education, University Sultan Zainal Abidin
*Corresponding Author Email: yslow@usm.edu.my

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Abstract

This paper examines a pedagogical innovation introduced for the Malaysian Politics (PAD270) course at University Technology MARA (UiTM) of Kelantan Branch, designed to address persistent challenges in student comprehension, engagement, and academic performance. Conventional teaching approaches were found to be increasingly inadequate in meeting the learning preferences of digitally oriented students, particularly due to fragmented access to course materials dispersed across multiple social media platforms. In response, the study developed a dual-platform instructional strategy comprising a Massive Open Online Course hosted on the UiTM platform and a mobile-friendly application known as *Politic-box*. A mixed-methods research design was employed, involving 100 diploma level students, combining quantitative performance analysis with qualitative feedback on user experience and learning effectiveness. The findings reveal a notable improvement in both cognitive understanding and academic outcomes, evidenced by a 10%–14% increase in the proportion of students achieving grades of B- and above across multiple semesters. Additionally, students reported enhanced engagement, improved self-directed learning, and greater clarity in understanding complex political concepts. Overall, this study highlights the effectiveness of digital-first pedagogical tools in transforming political science education.

Kewwords: Teaching and Learning Innovation, Malaysian Politics Course, Politic-box, Digital Pedagogy and Massive Open Online Course

Introduction

The rapid digital transformation of higher education has fundamentally altered the expectations, learning behaviours, and engagement patterns of university students worldwide. Traditional lecture-centred pedagogies are increasingly unable to meet the needs of contemporary learners who are highly dependent on mobile technologies, interactive content, and flexible learning environments. This challenge is particularly significant in social science disciplines such as Political Science and Public Administration, where students are required to comprehend abstract political theories, governance systems, constitutional structures, and complex socio-political developments simultaneously. As a result, many students experience cognitive overload, low engagement, fragmented understanding, and declining academic motivation. In Malaysian higher education institutions, the challenge becomes more critical when instructional delivery relies heavily on disconnected digital platforms such as WhatsApp, Telegram, Google Drive, Instagram, and conventional lecture notes. Although these platforms provide accessibility, they often lack pedagogical integration and structured learning pathways. Students are frequently required to navigate multiple applications simultaneously to access lecture materials, announcements, discussions, and assessments. This fragmented ecosystem creates confusion, reduces instructional coherence, and weakens students' ability to engage meaningfully with course content. Consequently, learning becomes passive, inconsistent, and overly dependent on memorisation rather than conceptual understanding and analytical thinking.

The Malaysian Politics course (PAD270) at University Technology MARA represents a particularly important context for examining this issue. The course requires students to analyse political institutions, governance systems, public policy processes, and contemporary national issues. However, many students struggle to connect theoretical concepts with practical political realities due to limited interactivity, insufficient digital support, and inaccessible learning resources. This situation highlights the urgent need for innovative pedagogical approaches capable of transforming political science education into a more engaging, student-centred, and technology-enhanced learning experience. The importance of studying digital pedagogical innovation is further reinforced by the emergence of Education 5.0 and Industry 5.0, which emphasise human-centred technology integration, digital literacy, critical thinking, and lifelong learning competencies. Universities are no longer expected merely to transmit knowledge; they are expected to produce graduates who are adaptive, technologically competent, analytically skilled, and capable of functioning effectively in complex digital environments. Therefore, the integration of digital learning platforms in political science education is not simply a technological upgrade, but a strategic educational necessity.

To address these challenges, this study introduces an integrated digital pedagogical innovation consisting of a Massive Open Online Course (MOOC) and a mobile-learning application known as Politic-box. Unlike conventional fragmented digital learning approaches, Politic-box consolidates learning materials, discussion spaces, revision tools, case studies, and assessments into a unified mobile-accessible ecosystem. This innovation was specifically designed to improve accessibility, enhance student engagement, support self-directed learning, and strengthen conceptual understanding in Malaysian Politics education. The significance of this study lies not only in evaluating academic performance outcomes but also in demonstrating how digital pedagogical innovation can improve learning quality, student

satisfaction, and instructional effectiveness in social science education. While previous studies have extensively explored digital learning in STEM disciplines, limited attention has been given to technology-enhanced pedagogical innovation within Political Science and Public Administration education, particularly in the Malaysian context. Therefore, this study contributes to filling an important research gap by providing empirical evidence on the effectiveness of integrated digital learning ecosystems in improving teaching and learning outcomes.

Furthermore, this study provides practical benefits for multiple stakeholders. For students, the innovation offers flexible, organised, and user-friendly learning support that encourages independent learning and stronger conceptual mastery. For educators, the study provides a scalable instructional model capable of improving teaching efficiency, content organisation, and student engagement. For higher education institutions and policymakers, the findings offer evidence-based guidance for designing sustainable digital learning strategies aligned with the goals of Education 5.0 and national higher education transformation initiatives. Ultimately, this research demonstrates that digital pedagogical innovation is not merely a supplementary educational tool, but an essential mechanism for enhancing learning effectiveness, academic achievement, graduate preparedness, and institutional competitiveness in the digital era.

Literature Review

Instructional Challenges in Political Science Education

Political Science education is widely recognised as a discipline that presents distinctive pedagogical challenges. One of the most significant issues is cognitive overload, whereby students are required to simultaneously process abstract theoretical constructs alongside extensive factual and institutional knowledge. According to John Sweller (2011), excessive cognitive demands can hinder knowledge retention and meaningful learning. This issue is particularly evident in topics such as governance systems, legislative processes, and public policy analysis, which demand both conceptual understanding and contextual interpretation. Recent studies further confirm that students in higher education continue to experience difficulties in managing complex interdisciplinary knowledge structures (Paas & van Merriënboer, 2022). In addition, technological friction remains a persistent barrier in digitally mediated learning environments. While digital tools have become integral to higher education, the use of fragmented platforms—such as messaging applications and social media—often leads to inefficiencies in content delivery and communication (Hrastinski, 2008). Contemporary research highlights that such platforms lack pedagogical structure, resulting in inconsistent access to learning materials and reduced instructional coherence (Bond et al., 2023). This fragmentation can negatively affect students' ability to organise and synthesise information effectively. Another critical concern is student engagement. Traditional lecture-based approaches frequently limit opportunities for interaction, immediate feedback, and active participation. As demonstrated by Scott Freeman et al. (2014), active learning strategies significantly outperform passive instructional methods in improving student performance. More recent meta-analyses reaffirm that interactive and student-centred pedagogies are essential for enhancing motivation, critical thinking, and conceptual mastery in social science disciplines (Theobald et al., 2022).

MOOCs and Self-Instructed Materials (SIM)

To address these pedagogical limitations, the integration of Massive Open Online Courses (MOOCs) and Self-Instructed Materials (SIM) has emerged as a promising approach. MOOCs are widely acknowledged for their scalability, flexibility, and accessibility, enabling learners to engage with content beyond traditional classroom constraints (Kaplan & Haenlein, 2016). However, recent scholarship emphasises that the effectiveness of MOOCs depends heavily on instructional design quality, learner support mechanisms, and content organisation (Zawacki-Richter et al., 2023). The conceptual foundation of SIM originates from the work of Michael G. Moore (1973), who argued that effective self-learning materials must be self-explanatory, self-contained, and self-evaluating. These principles ensure that learners can independently navigate content, access comprehensive resources within a unified system, and continuously assess their understanding. Contemporary instructional design research reinforces these characteristics as critical for promoting autonomous learning and cognitive engagement in digital environments (Hodges et al., 2022). The development of the *Politic-box* application reflects these principles by providing an integrated, mobile-friendly learning ecosystem. It consolidates lecture notes, case studies, and assessment tools into a single platform, enabling "anytime, anywhere" access. This design aligns with the global shift towards hybrid and flexible learning models accelerated by the COVID-19 pandemic (Dhawan, 2020; Bozkurt et al., 2022).

Rapid Application Development (RAD) and the ADDIE Model

The creation of effective educational technologies requires a systematic and theory-driven development approach. The Rapid Application Development (RAD) model, introduced by James Martin (1991), emphasises iterative prototyping, user feedback, and continuous refinement. This approach is particularly relevant in educational contexts, where user experience directly influences learning outcomes.

Complementing RAD is the ADDIE Model, a widely adopted instructional design framework articulated by Robert Maribe Branch (2009). The model consists of five phases: Analysis, Design, Development, Implementation, and Evaluation. Within the context of Politicbox:

a) Analysis identifies learning gaps in the PAD270 curriculum.
b) Design and Development focus on structuring content and optimising user interface design.
c) Implementation integrates the application into institutional teaching practices at Universiti Teknologi MARA (UiTM).
d) Evaluation measures effectiveness through student feedback and academic performance indicators.

The integration of RAD and ADDIE ensures both technical flexibility and pedagogical robustness, a combination increasingly recommended in recent educational technology research (Almelhi, 2023).

Technology Acceptance Model (TAM) and Measuring Impact

The successful adoption of digital learning tools is strongly influenced by user acceptance. The Technology Acceptance Model (TAM), developed by Fred Davis (1989), remains one of the most influential frameworks for explaining technology usage behaviour. Subsequent extensions of TAM by Viswanath Venkatesh and colleagues (2000; 2003) incorporate additional constructs such as system quality, user satisfaction, and behavioural intention. Recent empirical studies confirm that these variables significantly influence student

engagement and learning outcomes in digital environments (Al-Emran et al., 2023). In the context of *Politic-box*, students' perceptions of usability and usefulness play a critical role in determining engagement levels. When learners perceive the platform as intuitive and beneficial, they demonstrate higher levels of participation, improved knowledge acquisition, and enhanced analytical skills. Regression-based studies in similar contexts consistently report strong positive relationships between TAM constructs and academic achievement (Cheng & Yuen, 2022).

Academic Outcomes and the "A-Grade" Phenomenon

Academic performance remains a key indicator of pedagogical effectiveness. Traditional assessment outcomes in political science courses typically follow a normal distribution, with relatively few high-achieving students. However, the integration of digital learning tools has been shown to significantly alter this pattern. Research indicates that active and technology-enhanced learning environments contribute to improved academic performance compared to conventional teaching approaches (Freeman et al., 2014; Theobald et al., 2022). In the case of Politic-box, empirical observations reveal a consistent increase in the proportion of students achieving grades of A− and above. This "A-grade phenomenon" suggests that digital tools not only enhance access to learning materials but also deepen conceptual understanding and analytical capability.

Implications for Employability and Industry 5.0

Beyond academic achievement, digital pedagogical innovations play a crucial role in enhancing graduate employability. The emergence of Industry 5.0, as discussed by Saeid Nahavandi (2019), emphasises the integration of human intelligence with advanced technologies. This paradigm shift requires graduates to possess a combination of digital literacy, critical thinking, and problem-solving skills. Engagement with platforms such as Politic-box enables students to develop competencies in digital navigation, data interpretation, and policy analysis. These skills are highly relevant for careers in public administration, governance, policy development, and strategic management. Recent workforce studies further highlight that digitally graduates are more adaptable and better prepared for complex, technology-driven work environments (World Economic Forum, 2023).

Research Design and Approach

This study employed a longitudinal mixed-methods design, enabling the researcher to capture both immediate and sustained impacts of the intervention across multiple academic semesters. The quantitative component focused on measuring student acceptance, engagement, and academic performance, while the qualitative component explored student perceptions, usability experiences, and learning challenges. The integration of these methods provided methodological triangulation, enhancing the validity and reliability of the findings (Johnson et al., 2020). A total of 100 diploma-level students enrolled in PAD270 were selected using purposive sampling, ensuring that participants had direct exposure to both the MOOC and the Politic-box application. Data collection was conducted in two phases: (i) pre-implementation as a baseline and (ii) post-implementation after exposure to the digital tools.

Instructional Design Framework: ADDIE Model

The development of the MOOC component was guided by the ADDIE instructional design framework, introduced by Robert Maribe Branch (2009). This model comprises five systematic phases: Analysis, Design, Development, Implementation, and Evaluation.

a) Analysis Phase:
A needs assessment was conducted through informal interviews, classroom observations, and document analysis to identify key learning barriers. Findings indicated that students struggled with conceptual overload, inconsistent access to materials, and lack of structured revision tools.

b) Design Phase:
Based on the analysis, the course was restructured into nine thematic modules, each aligned with specific learning outcomes. Instructional strategies incorporated multimedia elements, case-based learning, and formative assessments to promote active engagement.

c) Development Phase:
Course materials were developed using a combination of academic references, policy documents, and curated multimedia resources. The content was standardised to ensure coherence and alignment with curriculum objectives.

d) Implementation Phase:
The MOOC was deployed via the UiTM UFUTURE platform, allowing students to access structured content asynchronously. This facilitated flexible learning and reduced dependence on physical classroom sessions.

e) Evaluation Phase:
Continuous assessment was conducted using quizzes, assignments, and analytics from the learning management system to monitor student progress and engagement.

Application Development: Rapid Application Development (RAD)

In parallel, the *Politic-box* application was developed using the Rapid Application Development (RAD) model, proposed by James Martin (1991). The RAD approach emphasises iterative prototyping, user feedback, and rapid deployment, making it highly suitable for educational technology development. The application design was grounded in the principles of Self-Instructed Materials (SIM), originally conceptualised by Michael G. Moore (1973). Accordingly, *Politic-box* was developed to ensure that learning materials were:

1. Self-explanatory – enabling independent understanding without instructor intervention;
2. Self-contained – consolidating all relevant resources within a single platform;
3. Self-evaluating – incorporating quizzes and feedback mechanisms for continuous assessment.

The interactive nature of RAD allowed continuous refinement of the application based on student feedback, ensuring usability, accessibility, and relevance.

Significance of the Study

This study is significant from theoretical, practical, pedagogical, and institutional perspectives. First, the study contributes theoretically to the growing body of literature on digital pedagogy, technology acceptance, and mobile learning in higher education. Although numerous studies have examined MOOCs and online learning environments, limited research has specifically investigated integrated mobile-learning ecosystems within Political Science and Public

Administration education in Malaysia. Therefore, this study expands existing knowledge by demonstrating how digital pedagogical innovation can enhance learning engagement, conceptual understanding, and academic performance in social science disciplines.

Second, the study provides important practical implications for educators and curriculum designers. The Politic-box innovation offers a structured and centralised learning ecosystem that reduces students' dependence on fragmented communication platforms. By integrating instructional materials, assessments, discussions, and revision tools within a single mobile-friendly platform, the innovation improves instructional efficiency, accessibility, and learning continuity. This is particularly important for contemporary students who increasingly rely on smartphones as their primary learning devices.

Third, the study is highly beneficial for students. The integration of MOOC and Politic-box supports flexible learning, self-paced revision, independent knowledge exploration, and continuous engagement beyond classroom hours. The findings indicate that students experienced improved understanding, greater motivation, enhanced satisfaction, and stronger academic performance after using the platform. These outcomes demonstrate the effectiveness of digital pedagogical innovation in creating a more meaningful and student-centred learning environment.

Fourth, the study provides institutional and policy-level value. The findings can assist universities, policymakers, and educational administrators in developing sustainable digital education strategies aligned with Education 5.0 and Industry 5.0 agendas. The innovation may serve as a scalable model for other social science courses facing similar challenges related to student engagement, digital fragmentation, and instructional accessibility.

Finally, this study is important for future graduate employability. By engaging with integrated digital learning environments, students develop critical competencies such as digital literacy, analytical thinking, information management, and self-directed learning. These competencies are increasingly essential in modern workplaces characterised by technological integration and rapidly changing professional demands.

Data Collection Methods

The data collection methods consist of Quantitative Data dan Qualitative data.

Quantitative Data

Quantitative data were collected in a structured questionnaire based on the Technology Acceptance Model (TAM) developed by Fred Davis (1989). Responses were measured using a five-point Likert scale. Additionally, academic performance data consist of grades and assessment scores were collected to evaluate learning outcomes.

Qualitative Data

Qualitative data were obtained through by Open-ended survey responses, focus group discussions and Informal student reflections. The data were analysed using thematic analysis, following the procedures outlined by Braun and Clarke (2021). This approach enabled the identification of recurring themes related to usability, engagement, and perceived learning effectiveness.

Data Analysis Techniques

Quantitative data were analysed using Statistical Package for the Social Sciences (SPSS). Descriptive statistics which are mean and standard deviation were used to summarise responses, while inferential analyses, including correlation and regression, were conducted to examine relationships between TAM variables and academic performance. Prior studies have demonstrated that such statistical techniques are effective in validating technology adoption models in educational contexts (Al-Emran et al., 2023). Qualitative findings were coded and categorised into themes, which were then triangulated with quantitative results to provide a holistic interpretation of the data. This integration ensured that statistical trends were supported by experiential insights, strengthening the overall conclusions of the study.

Findings and Analysis

The impetus for this research arose from a thorough qualitative investigation into student performance. Prior to the innovation, PAD270 students faced several critical pain points. There was a notable lack of centralized, easily accessible online materials, forcing students to rely on fragmented information sources. Furthermore, students were experiencing "app fatigue." They were expected to navigate multiple social media and communication platforms including WhatsApp, Telegram, Instagram, and WeChat simultaneously. This forced multitasking created technical conflicts, such as port contention on their devices and difficulties in managing diverse course groups. Ultimately, these barriers hindered effective learning, leaving students disengaged from the core conceptual framework of Malaysian politics. The research underscored that the traditional reliance on disconnected, manual, or scattered digital resources was actively impeding student comprehension and academic success.

The Innovation: MOOC and the "Politic-box" Ecosystem

Firstly, to address these challenges, the pedagogical team implemented two comprehensive solutions. First, the development of a MOOC hosted on the UiTM UFUTURE platform provided a centralized repository for learning modules. This ensured that students had a single, official source of truth for all course-related materials, encompassing video lectures, topic explanations, and reference sets. The second, and perhaps more transformative, solution was the creation of the "*Politic-box*" which consist of eBrief Case PAD270. This tool was specifically designed to streamline the student experience by consolidating the functions of various social media applications into a cohesive mobile-accessible interface. Unlike the previous fragmented model, "Politic-box" allowed students to interact with course content, participate in discussions, and access reference materials via their smartphones, regardless of time or location. By adopting the Rapid Application Development (RAD) methodology and ensuring the platform was self-explanatory, self-contained, and self-directed, the developers successfully moved the course away from a computer-dependent model to a flexible, mobile-first ecosystem.

Findings and Statistical Impact

The effectiveness of this innovation was validated through a longitudinal research design involving 100 students, utilizing a modified Technology Acceptance Model (TAM). The quantitative results were compelling.

Semester	Grade	Total Students
20214	A	0
	A-	3
	B+	2
	B	9
	B-	5
	C+	4
	C	4
	C-	0
	D and Below	0
20222	A	0
	A-	1
	B+	21
	B	22
	B-	23
	C+	4
	C	9
	C-	0
	D and Below	0
20224	A	1
	A-	2
	B+	7
	B	13
	B-	12
	C+	4
	C	5
	C-	0
	D and Below	1
20232	A	9
	A-	14
	B+	17
	B	17
	B-	16
	C+	9
	C	5
	C-	0
	D and Below	0
20234	A	17
	A-	59
	B+	35
	B	15
	B-	5
	C+	7
	C	2
	C-	0
	D and Below	0
20242	A	2
	A-	7
	B+	10
	B	22

	B-	2
	C+	1
	C	0
	C-	0
	D and Below	2
20244	A	6
	A-	7
	B+	18
	B	10
	B-	12
	C+	0
	C	0
	C-	0
	D and Below	0

Before the introduction of the MOOC and "Politicbox" (semester 20224), records showed that 3 students achieved a grade of A- or above in the PAD270 subject. Post-implementation, data collected from semester 20214 through 20244 revealed a consistent upward trend in the number of students securing A- grades or higher, demonstrating a tangible correlation between the innovative tools and improved academic achievement.

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PraQ	5.0606	100	1.25209	.12584
	PosQ	18.6465	100	1.75146	.17603
Pair 2	PraSQ	4.7500	100	1.14922	.11492
	PraSQ	18.0800	100	1.37569	.13757
Pair 3	PraKUS	4.8000	100	1.21439	.12144
	PraKUS	18.6500	100	1.48647	.14865
Pair 4	PraCS	3.5354	100	.81207	.08162
	PraCS	13.7374	100	1.28242	.12889
Pair 5	PraPS	3.4800	100	.87016	.08702
	PosPS	14.1600	100	1.15225	.11522
Pair 6	PraC	3.3600	100	.65935	.06594
	PosC	14.5800	100	5.24776	.52478
Pair 7	PraUS	3.3800	100	1.48242	.14824
	PosUS	14.0800	100	1.24462	.12446

Variables	Mean Pre	Mean Post	Increment
Quality System (Q)	5.06	18.65	+13.59
Service Quality (SQ)	4.75	18.08	+13.33
Knowledge Understanding (KUS)	4.80	18.65	+13.85
Psychomotor (PS)	3.48	14.16	+10.68
Cognitive (C)	3.36	14.58	+11.22

Statistical analysis further reinforced these findings. A comparison between pre and post implementation phases showed significant increases in mean scores across seven key dimensions, including System Quality which rose from 5.06 to 18.65 and Psychomotor Skills which increased from 3.48 to 14.16.

Model Summary[c]

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.432[a]	.187	.679	1.12062	.787	22.319	1	100	<.001
2	.472[b]	.222	.606	1.10163	.635	4.373	1	100	.039

a. Predictors: (Constant), PreKUS
b. Predictors: (Constant), PreKUS, PraSQ
c. Dependent Variable: PreQ

Model Summary[d]

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.559[a]	.667	.658	1.70024	.767	6.993	1	100	.010
2	.558[b]	.628	.610	1.65265	.761	6.667	1	100	.011
3	.525[c]	.680	.655	1.61046	.753	6.097	1	100	.015

a. Predictors: (Constant), PosUS
b. Predictors: (Constant), PosUS, PreKUS
c. Predictors: (Constant), PosUS, PreKUS, PosPS
d. Dependent Variable: PosQ

Perhaps most striking was the regression analysis: before the innovation, knowledge and service quality explained only 22.2% of the variation in learning quality. After the deployment of "Politicbox," this figure rose to 68.0%, driven by the integration of user satisfaction and psychomotor skill development. This suggests that the innovation did not merely supplement

existing methods but it fundamentally altered the learning dynamic, making active engagement, user satisfaction, and practical application the primary drivers of success rather than rote theoretical memorization.

Conclusion

This study demonstrates that the integration of a MOOC with a mobile-first learning application, *Politic-box*, significantly enhances both academic performance and student engagement in political science education. Hence by addressing key instructional challenges namely cognitive overload, fragmented content delivery, and limited interactivity and the innovation successfully transformed the learning experience into a more structured, accessible, and student-centred process. The findings provide strong empirical evidence that digital pedagogical tools, when grounded in established frameworks such as ADDIE, RAD, and the Technology Acceptance Model, can fundamentally reshape learning dynamics. The substantial increase in explanatory power from 22.2% to 68.0% underscores the importance of user satisfaction, system quality, and active engagement as key determinants of learning effectiveness. Importantly, this study contributes to the broader discourse on Education 5.0 and Industry 5.0 by demonstrating how technology-enhanced learning environments can foster not only academic achievement but also essential employability skills, including digital literacy, critical thinking, and self-directed learning. While the findings are promising, future research should explore larger sample sizes, cross-institutional comparisons, and long-term impacts on graduate employability. Nevertheless, the *Politic-box* model offers a scalable and adaptable framework for digital transformation in social science education, particularly within resource-constrained institutional contexts. This study extends the Technology Acceptance Model by integrating psychomotor engagement as a critical predictor in mobile-based political science learning environments

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