

Evaluating the Flexible Learning System (FLS) Implementation in the BITM Programme at Utem: A Mixed-Methods Case Study

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ABSTRACT

The Flexible Learning System (FLS), introduced by the Ministry of Higher Education Malaysia (MoHE) in 2022, aims to provide higher education students with greater flexibility in managing their study schedules, optimising resource utilisation, and improving access to education. This case study evaluates the implementation of FLS in the Bachelor of Computer Science (Interactive Media) with Honours (BITM) programme at Universiti Teknikal Malaysia Melaka (UTeM), employing a mixed-methods approach. Data were collected through a structured survey administered to 58 students from the 2023/2024 and 2024/2025 academic cohorts, supplemented by an analysis of official faculty documents. The findings indicate that while FLS offers notable advantages — including scheduling flexibility and cost savings — significant challenges persist, such as reduced effectiveness of practical learning, technological access gaps, and low student engagement. This study proposes a blended learning model that integrates face-to-face and online instruction, accompanied by improvements to digital infrastructure, as strategies to enhance the effectiveness of FLS. The findings carry important implications for policymakers and universities seeking to design more sustainable and effective flexible learning frameworks.

Keywords: Flexible Learning System; Blended Learning; Open Distance Learning (ODL); Learning Effectiveness; Digital Divide

INTRODUCTION

The Flexible Learning System (FLS), locally referred to as Sistem Fleksibel (SiC/SoC), was formally introduced by the Ministry of Higher Education Malaysia (MoHE) as a post-COVID-19 initiative aimed at providing students in higher education institutions (HEIs) with greater autonomy over their learning process. The primary objectives of the FLS are threefold: to reduce students' cost of living by minimising the need for on-campus residence; to allow more independent management of study schedules; and to create opportunities for students to engage in part-time employment or other productive activities outside the campus environment. These goals align with the broader aspirations of the Malaysia Education Blueprint (Higher Education) 2015–2025, which advocates for lifelong learning, student-centred pedagogy, and the meaningful integration of digital technology into higher education [22].

At Universiti Teknikal Malaysia Melaka (UTeM), the Bachelor of Computer Science (Interactive Media) with Honours (BITM) programme commenced full FLS implementation with the 2023/2024 academic cohort. The initiative involved offering selected courses entirely online under designated course codes, restructuring the academic timetable to reduce mandatory campus attendance, and encouraging academic staff to redesign instructional content to accommodate asynchronous and synchronous online delivery.

However, following the completion of one full cohort under this model, internal faculty monitoring data and student survey results revealed a range of challenges that adversely affected both learning quality and student well-being. These early observations motivated the present study, which seeks to provide a systematic, evidence-based evaluation of FLS implementation within the specific context of a technically and creatively intensive undergraduate programme.

The remainder of this paper is organised as follows. Section 2 reviews relevant literature on flexible and online learning in higher education. Section 3 describes the research methodology. Section 4 presents and discusses the findings. Section 5 concludes the paper with recommendations for policy and practice.

LITERATURE REVIEW

Background of the BITM Programme

The Bachelor of Computer Science (Interactive Media) with Honours (BITM) is one of the flagship programmes offered by the Faculty of Information and Communication Technology (FTMK) at Universiti Teknikal Malaysia Melaka (UTeM). The programme is designed to equip graduates with an integrated skill set spanning technical competencies, creative capacities, and industry-relevant experience. Core focus areas include interactive digital content development, computer animation, digital game design and development, virtual reality (VR), augmented reality (AR), and other advanced multimedia technologies.

The curriculum is structured to balance theoretical foundations with applied, practice-based learning. Alongside core computing subjects such as programming, algorithms, and database systems, students undertake specialised courses in areas including digital storytelling, user interface and user experience (UI/UX) design, and 3D modelling and simulation. These activities are supported by access to industry-standard software tools such as Adobe Creative Suite, Unity, Unreal Engine, and Autodesk Maya, as well as high-specification hardware facilities including motion capture systems, VR/AR headsets, and dedicated animation laboratories.

Given the technical and creative intensity of the programme, teaching and learning activities have traditionally been conducted face-to-face within specialised laboratory and studio environments. These settings are essential not only for access to licensed software but also for enabling real-time collaboration, immediate instructional feedback, and team-based project work that reflects authentic industry practice. Such environments nurture problem-solving ability, critical thinking, and creative innovation — competencies highly valued by employers across the creative technology and interactive media sectors.

The BITM programme additionally maintains strong industry linkages through structured internship placements, practitioner guest lectures, and collaborative projects with game studios, animation houses, and multimedia companies. These partnerships serve to bridge the gap between academic preparation and professional practice, ensuring that graduates are equipped for the evolving demands of the creative content and interactive technology industries.

History and Concept of the Flexible Learning System by MoHE

The Flexible Learning System (FLS) was officially introduced by the Ministry of Higher Education Malaysia (MoHE) in 2022, as part of a comprehensive reform agenda to modernise the country's higher education sector following the COVID-19 pandemic. The pandemic served as a powerful catalyst for systemic change, compelling HEIs worldwide to pivot rapidly to remote and online learning to maintain academic continuity [9], [10]. In Malaysia, this period highlighted both the potential and the limitations of technology-mediated education, prompting MoHE to develop a formalised framework for flexible learning delivery.

The FLS empowers students by affording them greater control over the where, when, and how of their education. Key features include the option to enrol in fully online courses, hybrid programmes combining face-to-face and online delivery, and cross-institutional enrolment arrangements. The overarching goals are to reduce financial burdens on students — particularly those residing outside the university's immediate locality — to leverage digital technology for higher instructional quality, and to foster greater student autonomy in academic planning.

Conceptually, the FLS draws from established frameworks for flexible and open distance learning, and is closely aligned with the Malaysia Education Blueprint (Higher Education) 2015–2025 [22], which prioritises lifelong learning, self-directed study, and the purposeful use of technology in pedagogy. Effective implementation, however, demands more than simply migrating lectures to digital platforms; it requires the redesign of assessment strategies, the enhancement of student support services, and the adaptation of academic advising to suit a more decentralised and self-paced learning model.

At UTeM, the FLS was applied to the BITM programme from the 2023/2024 academic cohort. This involved designating specific course codes for FLS delivery, restructuring timetables to reduce compulsory on-campus attendance, and supporting lecturers in transitioning their instructional content to asynchronous and synchronous online formats.

Despite its forward-looking intent, early experience at UTeM and elsewhere suggests that the FLS transition is not straightforward. Practical, laboratory-intensive courses are especially susceptible to quality degradation in a fully online environment, as the requisite facilities, equipment, and collaborative studio dynamics cannot readily be replicated at home. Additionally, unequal access to reliable internet connectivity and appropriate computing hardware has introduced new dimensions of inequality within the student population — raising important questions about the equity and inclusiveness of FLS in its current form.

Concept and Justification of Flexible Learning

Flexible learning is broadly defined as an educational approach that grants students greater agency over the conditions of their learning — including the time, location, pace, and, in some cases, the content or pathway of study [3], [4]. Unlike the rigid, timetable-driven structure of conventional campus-based education, flexible learning prioritises adaptability and learner autonomy, aiming to accommodate diverse learning styles, personal commitments, and lifestyle demands. At its core, it is grounded in learner-centred pedagogy, which positions the student as an active co-constructor of their educational experience rather than a passive recipient of instruction [2], [24].

The global adoption of flexible learning in higher education has accelerated markedly in recent years, driven significantly by the disruptions of the COVID-19 pandemic, which demonstrated the scalability of remote instruction under crisis conditions [9], [13], [15]. Flexible learning encompasses a broad spectrum of delivery modes, including fully online programmes, hybrid or blended formats, modular and self-paced curricula, and credit recognition arrangements across institutions [5], [6], [10], [11], [12], [14]. In this regard, flexibility represents not merely logistical convenience but a deliberate pedagogical strategy aimed at broadening access, improving equity, and enhancing student satisfaction.

Several interrelated arguments support the adoption of flexible learning in higher education. First, it addresses the heterogeneous needs of contemporary student populations, which increasingly include working adults, caregivers, students from geographically dispersed locations, and individuals with access constraints arising from disability or financial circumstance. Flexible scheduling enables such students to balance competing demands without sacrificing academic progress. Second, flexible learning capitalises on advances in educational technology. Learning management systems (LMS), virtual classrooms, and interactive digital content platforms have made it possible to deliver high-quality instruction remotely [1], [7], [16]. Asynchronous tools such as recorded lectures and discussion forums allow students to revisit content at their own pace, while synchronous platforms enable real-time interaction and collaborative learning [3], [10], [17]. Third, flexible learning supports the principle of lifelong learning, which is increasingly vital in an era characterised by rapid technological change and evolving labour market demands [4], [22].

A key theoretical lens for understanding flexible learning is learner autonomy — the capacity and willingness of students to take ownership of their goals, strategies, and outcomes [24]. Self-Determination Theory (SDT) holds that sustained motivation requires three core psychological needs: autonomy, competence, and relatedness. Flexible learning environments can support all three when well designed; however, poorly structured online delivery frequently undermines relatedness by severing the social bonds of the physical classroom, and erodes competence when students lack adequate self-regulatory skills. In BITM, where much of the learning value

derives from peer critique, collaborative studio work, and real-time instructor feedback, the risk of relatedness loss under FLS is particularly significant.

Digital equity constitutes a second critical theoretical dimension. The digital divide is no longer understood as a simple binary gap between the connected and unconnected, but as a multi-tiered phenomenon encompassing differences in connection quality, device capability, digital literacy, and the social conditions that enable effective technology use [8]. For flexible learning to function as an equitable rather than exclusionary model, institutions must address all tiers of this divide. This study's findings reveal precisely the kind of layered inequity that renders simplified notions of digital access inadequate.

Practice-based pedagogy presents a third relevant framework. In disciplines that require embodied skill, tacit knowledge, and creative judgment — such as interactive media and animation — learning is fundamentally situated: it occurs through doing, in context, with tools and collaborators. This draws from situated learning theory, which holds that knowledge cannot be separated from the activity and environment in which it is acquired [25]. Transitioning such programmes to online delivery strips away the situational richness that underpins authentic learning. The challenge for FLS in technically intensive programmes like BITM is therefore not merely logistical but epistemological — it requires rethinking how practice-based competencies can be genuinely preserved within a flexible delivery model.

Notwithstanding these advantages, effective implementation of flexible learning requires systematic curriculum redesign, the development of valid and reliable online assessment methods, and robust academic and pastoral support structures. Without adequate planning and ongoing quality assurance, there is a real risk that flexibility may compromise academic rigour, diminish peer interaction, and erode students' sense of belonging to a learning community [23].

Global Practices in Flexible Learning Systems

Flexible learning models have been implemented across a wide range of institutional contexts globally, from dedicated open and distance learning universities to research-intensive institutions that have incorporated hybrid delivery alongside traditional campus-based programmes [4], [10], [18], [19], [20], [21]. What makes cross-national comparison particularly instructive is not merely the diversity of models, but the recurring pattern of tension between the promise of flexibility and the conditions required for genuine learning quality — a tension that is especially pronounced in technically demanding disciplines.

A frequently cited example is The Open University UK (OU), which has pioneered distance and flexible learning since its founding in 1969. The OU enables students to study remotely on either a part-time or full-time basis, drawing on digital course materials, optional face-to-face tutorials at regional centres, and comprehensive online support services. This model has allowed the institution to serve diverse learner populations, including working professionals and those with caregiving responsibilities, across all socioeconomic backgrounds.

In Australia, Deakin University's Cloud Campus provides a fully online learning environment in which students can access recorded lectures, attend live webinars, submit assessments, and interact with instructors and peers entirely through digital channels. The model is explicitly designed to maximise flexibility, enabling students worldwide to pursue Australian qualifications without physical relocation.

In the United States, the University of the People operates on a fully online, open-access basis, offering degree programmes supported by open educational resources at minimal cost. This approach substantially reduces financial and geographical barriers to higher education, particularly for students from developing countries or low-income backgrounds.

In Asia, Hong Kong Metropolitan University (HKMU) combines online learning with periodic face-to-face sessions, including tutorials, practical classes, and examinations, exemplifying a blended approach that seeks to balance the flexibility of distance education with the interpersonal benefits of in-person engagement. Within Malaysia, a number of public universities have similarly adopted blended or hybrid models, though the pace and depth of implementation vary considerably across institutions and discipline areas.

What is equally instructive about these global models is where they have encountered difficulties. The Massachusetts Institute of Technology (MIT) OpenCourseWare initiative, while widely praised for democratising access to world-class educational content, has been consistently noted for its limitations in replicating the collaborative, hands-on learning that characterises elite technical education. Similarly, evaluations of Australia's cloud-based engineering and design programmes have found that student cohorts without reliable hardware or strong digital literacy skills consistently underperform relative to campus-based peers, even when instructional content is of equivalent quality. These patterns suggest that the infrastructure and equity dimensions of flexible learning are not peripheral concerns but central determinants of its effectiveness — a finding that resonates directly with the BITM experience at UTeM.

Across these diverse contexts, a consistent set of challenges has been documented: sustaining student motivation in the absence of a physical campus community; ensuring equitable access to reliable technology and computing devices; maintaining academic integrity in online assessment environments; and cultivating a sense of belonging among geographically dispersed learners. These challenges resonate directly with the Malaysian higher education context and, as will be demonstrated in the findings of this study, are evident in the experiences of BITM students at UTeM.

Advantages and Limitations of Flexible Learning

Flexible learning offers a range of well-established benefits. Most significantly, it affords students the ability to organise their studies around individual circumstances, which is particularly advantageous for working adults, student-parents, and those living at a distance from campus who would otherwise incur substantial costs in travel and accommodation. For institutions, flexible delivery expands geographic reach and has the potential to increase enrolment among non-traditional student cohorts. The use of digital instructional tools further enables personalisation of learning experiences through adaptive content and multimodal resource formats [5], [7].

However, the limitations are substantial, particularly for programmes with strong practical and studio-based components. In the BITM context, courses such as 3D Workshop, Computer Animation, and Human-Computer Interaction are inherently dependent on high-specification computing facilities, licensed professional software, and collaborative studio settings that cannot be adequately replicated in a home environment. The loss of face-to-face engagement reduces opportunities for spontaneous creative exchange, peer critique, and the informal mentorship that arises naturally in laboratory and studio-based learning contexts.

Beyond these disciplinary considerations, the absence of structured physical routines can undermine students' capacity for self-regulation. Research consistently indicates that many students, particularly those in the early stages of tertiary education, experience significant difficulty with self-directed study when external accountability structures are removed [24]. Procrastination, disengagement, and social isolation are frequently documented outcomes in fully online or highly decentralised learning environments [11], [14], [17]. These concerns are especially pertinent to the BITM programme, where collaborative team projects and peer-driven creative processes constitute a central dimension of the intended learning experience.

Infrastructure Gaps and Their Impact on Learning Quality

The effectiveness of flexible learning is critically contingent upon the availability and reliability of digital infrastructure, encompassing internet connectivity, computing hardware, and appropriate physical learning environments [8], [19]. For students in rural or underserved communities, inadequate broadband access impedes participation in synchronous online sessions, restricts the downloading of large software packages or multimedia resources, and delays the submission of assessed work. In urban or suburban settings, shared household bandwidth — particularly where multiple family members are simultaneously engaged in remote work or study — can cause significant disruption to the online learning experience.

Within the BITM programme, over 40% of survey respondents reported experiencing moderate to poor internet connectivity, a finding consistent with broader evidence on the persistence of digital inequality in Malaysian higher education [8], [12]. For courses requiring high-bandwidth activities — such as real-time 3D rendering,

cloud-based collaborative design, or streaming of high-definition content — these connectivity constraints translate directly into unequal learning outcomes.

The hardware dimension of the infrastructure gap is equally significant. While some students have access to high-specification computers capable of running resource-intensive professional software, many rely on entry-level or ageing devices that fail to meet the technical requirements of BITM courses. This disparity creates an inequitable learning environment in which academic performance is shaped not solely by effort or ability, but by access to appropriate tools — a concern that reflects longstanding debates about the digital divide in education [8].

Addressing these deficiencies requires a coordinated response from institutions, government, and the private sector, including the expansion of affordable broadband services to underserved communities, the establishment of equipment loan and subsidy programmes for financially disadvantaged students, and the provision of on-campus computing facilities accessible to students who cannot meet hardware or software requirements at home. Absent such measures, the FLS risks exacerbating existing educational inequalities rather than narrowing them.

METHODOLOGY

Research Design

This study adopted a mixed-methods case study design to evaluate the implementation of the Flexible Learning System (FLS) within the BITM programme at UTeM. A case study approach was selected because it enables a detailed, contextualised investigation of a real-world phenomenon within its natural institutional setting [3], [18]. The mixed-methods design was employed to facilitate data triangulation, enabling the breadth of student perceptions to be captured through quantitative survey data while simultaneously documenting the depth of individual experiences through qualitative narrative responses. This combination of approaches enhances the comprehensiveness and validity of the study's conclusions.

Population and Sample

The study population comprised all BITM students enrolled under the FLS during the 2023/2024 and 2024/2025 academic sessions. Given the relatively small and well-defined population, a total enumeration sampling approach was adopted, with the online questionnaire distributed to all eligible students. A total of 58 valid and complete responses were received, representing participants from multiple year groups. The complete-enumeration strategy minimises sampling bias and is appropriate for an exploratory institutional case study of this scale.

Research Instruments

The primary data collection instrument was a structured questionnaire administered via Google Forms, comprising three sections. The first section gathered demographic data, including gender, year of study, residential location, and details of internet access type and speed. The second section assessed students' perceptions of online distance learning (ODL) using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree), covering dimensions such as overall satisfaction, perceived instructional effectiveness, ability to focus, time management, quality of lecturer feedback, availability of learning materials, technological access, fairness of assessments, communication effectiveness, management of group work, and preferred mode of study. The third section consisted of open-ended questions soliciting qualitative responses on the main challenges experienced, perceived strengths of the FLS, and suggestions for improvement.

Supplementary data were obtained through documentary analysis of official faculty records, including the JKTSPA Working Paper on FLS implementation, programme curriculum structures, and MoHE policy guidelines. These sources provided the institutional and policy context necessary for a comprehensive interpretation of the survey findings.

Data Collection Procedure

Quantitative data collection was conducted in May 2025. The survey link was distributed through official faculty communication channels, including student email lists and WhatsApp group platforms. Prior to participation, all respondents were informed that involvement was voluntary, that responses would be treated as anonymous, and that participation would have no bearing on academic standing or assessment outcomes. These assurances were intended to encourage candid and representative responses.

Qualitative data were drawn from the open-ended survey responses and from systematic content analysis of the relevant official documents. Document analysis followed a structured protocol guided by predefined thematic categories derived from the research questions and existing literature, while remaining open to inductively emerging themes from the data.

Data Analysis

Quantitative data were analysed using descriptive statistics, comprising frequencies, percentages, and mean scores for each Likert-scale item. Results were presented in tabular form to facilitate the identification of key trends and patterns in student perceptions. Qualitative data from open-ended responses were subjected to thematic analysis, following a six-phase process of data familiarisation, initial coding, theme generation, theme review, theme definition, and reporting. Data triangulation was achieved by systematically cross-referencing survey findings with documentary evidence and, where relevant, with academic staff observations. This triangulation process strengthened the internal validity and interpretive rigour of the study's conclusions.

FINDINGS AND DISCUSSION

Quantitative Analysis

Table 1 presents the quantitative survey findings from 58 BITM student respondents regarding their perceptions of online learning under the FLS. Overall satisfaction with ODL received a mean score of 3.31, with 41.4% of students providing a positive rating (4 or 5), while 39.7% assigned a neutral score of 3, indicating ambivalence rather than strong endorsement. The perceived effectiveness of online classes relative to face-to-face instruction registered one of the lowest mean scores in the survey ($M = 2.88$), with only 31.0% of respondents agreeing that online delivery was comparably effective. This finding aligns with established literature indicating that students in practice-based and studio-intensive disciplines tend to perceive online instruction as substantially less effective than in-person modes [11], [14].

Students' ability to focus and engage during online sessions was rated at a mean of 2.97, with 72.4% assigning a score of 3 or below, indicating widespread difficulty sustaining attention in the online learning environment. This is consistent with research on self-regulation in online contexts, which identifies motivational and attentional management as among the most significant barriers to effective ODL participation [24]. Time management received a mean of 3.31, reflecting mixed outcomes; while some students adapted well to the autonomy afforded by FLS, others struggled to maintain consistent study habits without the temporal structure of campus attendance.

Lecturer feedback was rated at a mean of 3.31 (44.8% positive), suggesting that responsiveness and quality of feedback met the expectations of approximately half the cohort but fell short for the remainder. The availability of digital learning materials was among the higher-rated dimensions ($M = 3.67$; 65.5% positive), indicating that resource provision was generally adequate. Internet connectivity received a mean of 3.43, though 41.4% of respondents reported connectivity problems — an empirical confirmation of the infrastructure disparities identified in Section 2.6.

The user-friendliness of digital learning platforms, including Google Meet, Moodle, and Microsoft Teams, was among the highest-rated dimensions in the survey ($M = 4.00$; 81.1% positive), indicating that these platforms were well received by students regardless of broader concerns about online instruction quality. By contrast, the

frequency of technical disruptions received a mean of 2.89, with more than one-third of respondents reporting regular interruptions — highlighting an important distinction between platform usability and technical reliability.

Access to required software and hardware was rated positively overall (M = 3.83; 70.7%), though a notable minority experienced difficulties obtaining licensed applications for specialist courses. The fairness and relevance of online assessments achieved the highest mean in the survey (M = 4.03; 75.9%), suggesting that assessment design was perceived as appropriate for an online context, notwithstanding concerns about academic integrity raised by some respondents. Lecturer communication was similarly well regarded (M = 3.62; 68.9%), indicating that instructor accessibility through digital channels was adequately maintained.

Management of online group work received a mean of 3.53, with approximately half of respondents finding it satisfactory while the remainder reported difficulties, particularly in project-based courses requiring intensive collaboration. The preference for ODL over face-to-face learning was notably low (M = 2.93; 34.5% positive), with 69% of respondents indicating a clear preference for physical classroom attendance, underscoring the particular limitations of a fully online model for a practice-intensive programme. Students’ comfort in posing questions during virtual sessions scored a mean of 3.05, reflecting inhibition in online interaction relative to face-to-face contexts [17]. Finally, support for retaining ODL within a blended learning framework recorded a mean of 3.19, with 48.3% regarding this as a moderately appropriate solution — a finding that directly informs the recommendations in Section 5.

Table 1. Summary of Likert Scale Scores for Students’ Perceptions of ODL under the FLS (n = 58)

Evaluation Dimension	Mean	High Score % (4 or 5)	Key Finding
Overall satisfaction with ODL	3.31	41.4%	Moderate satisfaction; 39.7% gave a neutral score of 3
Effectiveness of online vs. face-to-face instruction	2.88	31.0%	Majority found online delivery less effective
Ability to focus and engage during online sessions	2.97	27.6%	72.4% rated 3 or below, reflecting low engagement
Time management compared to physical attendance	3.31	41.4%	Mixed results; many struggled with self-discipline
Timeliness and quality of lecturer feedback	3.31	44.8%	Satisfactory for approximately half of the cohort
Availability of digital learning materials	3.67	65.5%	Learning resources were accessible for most students
Stability of internet connectivity	3.43	60.3%	41.4% experienced recurring connectivity problems
User-friendliness of digital learning platforms	4.00	81.1%	Google Meet, Moodle, and MS Teams well received
Frequency of technical disruptions	2.89	—	More than 34% encountered frequent technical issues
Access to required software and hardware	3.83	70.7%	Minority struggled to access licensed applications

Fairness and relevance of online assessments	4.03	75.9%	Positively perceived; some academic integrity concerns noted
Effectiveness of communication with lecturers	3.62	68.9%	Instructor accessibility via digital channels rated satisfactory
Management of online group work	3.53	50.0%	Half of respondents experienced collaboration difficulties
Preference for ODL over face-to-face learning	2.93	34.5%	69% expressed a clear preference for in-person attendance
Comfort in asking questions during online sessions	3.05	34.5%	Many students reported inhibition in virtual interaction
Support for ODL within a blended learning model	3.19	48.3%	Blended delivery viewed as a moderately suitable alternative

The overall pattern of scores reveals a clear divergence between students’ satisfaction with the administrative and logistical dimensions of FLS — such as assessment fairness (M = 4.03) and platform usability (M = 4.00) — and their perceptions of the core pedagogical dimensions, particularly instructional effectiveness (M = 2.88) and engagement (M = 2.97). This distinction carries theoretical significance. It suggests that the challenges of FLS in the BITM context are not primarily attributable to deficiencies in the technological tools themselves, but to deeper pedagogical, motivational, and structural factors. From the perspective of Self-Determination Theory, the data indicate that while FLS adequately supports student autonomy through flexible scheduling, it struggles to sustain competence development and relatedness — the two remaining pillars of intrinsic motivation. Students who found online platforms easy to use were nonetheless disengaged, suggesting that usability alone is insufficient without the relational and creative dynamics that characterise effective studio-based education. This decoupling of tool satisfaction from learning effectiveness is itself a meaningful finding: it implies that future interventions must target pedagogical design and social learning structures, not simply technological provision.

Qualitative Analysis

Thematic analysis of the open-ended survey responses identified several dominant and recurring themes. The most frequently cited challenge was difficulty in maintaining focus and attention during online sessions. Students consistently contrasted the structured, socially reinforced concentration of a physical classroom with the distractions characteristic of home-based study — including household noise, domestic responsibilities, and the reduced social incentive to engage actively with learning tasks. This pattern aligns with research on self-regulation in online learning, which identifies motivational and attentional self-management as among the most critical barriers to effective distance education participation [24].

A second prominent theme was inadequate internet connectivity and hardware access. Multiple respondents described specific instances in which poor broadband prevented participation in synchronous sessions, impeded access to large software packages, or caused delays in submitting assessed work. Students residing in suburban or rural areas reported the most acute connectivity challenges. Additionally, several students noted that their personal devices were insufficient to meet the hardware requirements of specialist BITM courses, particularly those involving 3D rendering, animation, and real-time collaborative design — confirming the infrastructure concerns raised in Section 2.6.

A third theme was the perceived inadequacy of online delivery for practical and studio-based learning. Respondents consistently distinguished between theoretically oriented courses, which they regarded as reasonably transferable to an online format, and studio and laboratory-based courses — including computer animation, 3D modelling, and interactive design — which they found significantly impaired by the online mode. The loss of access to campus facilities, licensed software, and the informal peer-to-peer knowledge exchange of

studio environments was a prominent concern. This finding is consistent with broader evidence that practical disciplines experience disproportionate quality loss in fully online delivery contexts [6], [11].

Despite these challenges, students acknowledged several genuine strengths of the FLS. Scheduling flexibility was the most widely appreciated benefit, enabling students to organise study around personal and professional commitments and to engage with course materials at times most conducive to individual learning. Cost savings arising from reduced travel and accommodation expenditure were frequently cited, particularly among students from lower-income backgrounds or those living far from the university. The continuous availability of digital learning resources, facilitating self-paced review and revision, was similarly valued.

In terms of suggested improvements, the most consistently proposed recommendation was the adoption of a structured blended learning model in which online delivery is retained for asynchronous, theoretical content while face-to-face sessions are preserved for practical, collaborative, and studio-based activities. Students also advocated for more interactive online instructional strategies — including live polling, breakout group discussions, and structured peer-feedback activities — to address the passivity and disengagement associated with lecture-only online delivery [17]. Equitable provision of software licences and computing equipment was identified as an institutional priority, alongside structured digital literacy training for both students and academic staff.

Taken together, the qualitative findings point to challenges that are not merely incidental or transitional, but structurally embedded in how FLS was designed and rolled out. The persistence of engagement difficulties, for instance, cannot be attributed solely to individual student disposition; it reflects the broader absence of the socially constructed accountability structures that physical attendance naturally provides. When students know that their presence is visible to instructors and peers, they engage differently — more consistently, more attentively, more collaboratively. The online mode dissolves this ambient social pressure, and without deliberately engineered substitutes, motivation tends to attenuate over time. Similarly, the hardware and connectivity inequities students described are not simply technical inconveniences: they are expressions of a deeper structural gap between the resource expectations embedded in BITM's curriculum and the material realities of students' home environments. This gap was arguably always present, but it was invisible under campus-based delivery because the institution itself filled it through laboratory provision. FLS, in effect, displaced this infrastructural responsibility onto students and families without adequately accounting for the uneven capacity of those households to absorb it. Addressing this requires not only equipment loan schemes and broadband subsidies — though both are necessary — but a fundamental rethinking of how institutions define and discharge their duty of care in flexible learning environments.

CONCLUSION

This study has examined the implementation of the Flexible Learning System (FLS) within the Bachelor of Computer Science (Interactive Media) with Honours (BITM) programme at Universiti Teknikal Malaysia Melaka (UTeM), employing a mixed-methods case study approach. Evidence drawn from 58 student respondents and official faculty documents reveals a nuanced picture of FLS outcomes within a technically and creatively intensive higher education context.

The study confirms that FLS has delivered meaningful benefits for students, most notably in terms of scheduling flexibility, reduction in living costs, and continuous access to digital learning resources. High satisfaction ratings for platform usability and assessment fairness further suggest that the logistical and technological infrastructure supporting FLS has been effectively established. In these respects, the FLS appears to have made progress towards the objectives articulated by MoHE and the Malaysia Education Blueprint (Higher Education) 2015–2025 [22].

However, the study also identifies substantial challenges that must be addressed if the FLS is to fulfil its educational mandate. Low ratings for perceived instructional effectiveness, student engagement, and preference for online over face-to-face learning all indicate that a fully online delivery model is fundamentally ill-suited to the practical and studio-intensive nature of the BITM programme. Persistent infrastructure inequalities — particularly with respect to internet access and hardware adequacy — raise serious concerns about the equity of

FLS in its current form, and align with broader evidence on the digital divide in Malaysian higher education [8], [12].

On the basis of these findings, this study recommends the adoption of a structured blended learning model as the most appropriate pathway for FLS implementation in the BITM programme. Such a model would preserve the flexibility and cost benefits of online delivery for theoretical and asynchronous learning, while reinstating face-to-face engagement for practical, collaborative, and studio-based activities — an approach well supported by the literature on blended learning effectiveness [6], [23]. Targeted institutional investment in digital infrastructure, including broadband support and equipment access schemes, is equally necessary to ensure that FLS benefits are distributed equitably.

The policy implications of this study extend well beyond the BITM programme. For MoHE and university administrators, the findings underscore that flexible learning cannot be treated as a uniform policy applied indifferently across all disciplines. Programmes that are fundamentally dependent on hands-on practice, specialised equipment, and collaborative studio dynamics require a differentiated implementation framework — one that recognises disciplinary specificity rather than defaulting to a one-size-fits-all digital transition model. MoHE should consider introducing discipline-sensitive FLS guidelines that allow institutions to define minimum thresholds of face-to-face engagement for practice-intensive programmes, rather than imposing attendance reduction targets that may inadvertently damage learning quality in fields where physical presence is pedagogically indispensable.

At the institutional level, sustainable FLS implementation demands more than technology adoption — it requires a supporting ecosystem that includes structured lecturer training in online and blended pedagogy, student induction programmes that build self-regulation and digital literacy skills before full FLS participation, and ongoing monitoring mechanisms that can detect disengagement or disadvantage early and trigger timely intervention. Universities that have successfully institutionalised flexible learning — such as the Open University UK and Deakin University — share a common characteristic: they did not simply move existing programmes online but redesigned them from the ground up to meet the distinct conditions and learner needs of flexible delivery. Malaysian HEIs seeking to embed FLS sustainably would do well to draw on these models, while adapting them to the specific cultural, infrastructural, and disciplinary contexts of the local higher education landscape.

Future research should extend this case study to other technically demanding disciplines and faculties within UTeM and across Malaysian HEIs, to assess the generalisability of these findings and to identify effective institutional responses to the challenges of FLS implementation. Longitudinal studies tracking the academic performance and graduate employability outcomes of FLS cohorts, compared with those of traditionally taught cohorts, would provide particularly valuable evidence for both policy development and curriculum design.

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