# Students' Experience of MOOC Content Design: A Case Study of the Introduction to Database Course at a Malaysian Technical University

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## ABSTRACT

Massive Open Online Courses (MOOCs) have become a mainstream mode of flexible learning in higher education, allowing students to manage their study schedules independently and to access course materials beyond the constraints of a physical classroom. Because the design of MOOC content directly shapes how students engage with and benefit from a course, evaluating this design is essential to improving the quality of online learning experiences. Existing MOOC evaluation research is fragmented across many frameworks, and technical subjects such as database management remain under-studied. This study assessed the content design of an Introduction to Database course delivered as a MOOC at Universiti Teknikal Malaysia Melaka (UTeM), using the MOOC Design Framework as an evaluation lens. A quantitative, cross-sectional survey design was adopted. A total of 368 undergraduate students who completed the course provided feedback through a validated questionnaire covering course materials (e.g., lecture videos, dialogue videos, and lecture slides) and course activities (e.g., quizzes, forums, and assessments). The questionnaire demonstrated excellent internal consistency (Cronbach's alpha = .97). Results indicate consistently positive student perceptions of both the materials and the activities, with lecture videos and lecture slides rated as the most useful materials and forum discussions and mid-term tests rated as the most helpful activities. These findings suggest that the MOOC Design Framework is a practical tool for evaluating content design, and that systematically designed video-based materials together with interactive assessment activities effectively support student learning in a technical, database-oriented subject. The study contributes empirical evidence from a Malaysian higher education setting to the growing body of research on MOOC content design and offers practical guidance for instructors developing similar technical MOOCs.

**Keywords:** content design, MOOCs, MOOC Design Framework, student experience, higher education

## INTRODUCTION

### Massive open online course (MOOC)

MOOCs are a beneficial tool in education because they provide a platform through which teaching and learning materials can be made available to anyone who wishes to enrol in a course, without restricting the number of participants. The Malaysia Ministry of Education initiated the Malaysian MOOC initiative as a national strategy to widen access to higher education and to support blended and lifelong learning. Albelbisi and Yusop's (2020) systematic review of the initiative found that, in its early years, Malaysian MOOC implementation faced several persistent challenges: (1) low enrolment in MOOC courses; (2) MOOC courses designed mainly as supplementary resources to existing campus courses rather than as stand-alone offerings; (3) low instructor self-efficacy arising from unfamiliarity with MOOC tools and platforms; (4) limited internet access as a barrier to cyber-infrastructure and participation; and (5) learner anxiety about studying through an unfamiliar online medium. More recently, Selamat et al. (2025) revisited Malaysia's MOOC landscape after sixteen years of national implementation and reported that, while enrolment and institutional adoption have grown substantially,

concerns about content quality, learner engagement, and the pedagogical design of MOOC materials remain central to sustaining the initiative's effectiveness. This suggests that the quality of content design, rather than platform availability alone, continues to be a key determinant of MOOC success in the Malaysian higher education context, motivating the present study's focus on empirically evaluating MOOC content design.

### Problem statement and research gap

While MOOC implementation across Malaysian higher education continues to grow, scholarly research examining MOOC content design frameworks remains inadequately explored. In a recent systematic review of forty MOOC evaluation studies, Mir and Khan (2026) identified twenty distinct evaluation frameworks in use, sixteen of which had been applied in only a single study, and noted that fourteen studies used no named framework at all. This fragmentation makes it difficult to compare findings across studies or to build cumulative knowledge about what constitutes effective MOOC content design, particularly for technical, quantitative subjects such as database management, where most existing MOOC-design studies have instead focused on language, humanities, or generic-skills courses (e.g., Ghani et al., 2020). Moreover, while several theoretically grounded models exist for evaluating online and open courses more broadly — including the Community of Inquiry framework (Garrison et al., 2000), the 7Cs of Learning Design (Conole, 2014), the OpenupEd quality label (Rosewell & Jansen, 2014), and the Technology Acceptance Model (Davis, 1989; Hou, 2025) — few studies have empirically applied a MOOC-specific, multi-dimensional design framework to a technical course and reported detailed student feedback on both materials and activities. This study addresses that gap by applying the MOOC Design Framework (Ichimura & Suzuki, 2017) — selected for its explicit synthesis of ten MOOC-specific dimensions spanning pedagogical, technological, and organisational layers — to evaluate the content design of an Introduction to Database MOOC, and by positioning the resulting findings against these alternative frameworks and against prior MOOC research in technical and programming domains (Rõõm et al., 2022).

### Research objectives

Building on this gap, the present study pursues three specific objectives: (1) to evaluate students' perceptions of the content design of an Introduction to Database MOOC, using the materials and activities dimensions of the MOOC Design Framework (Ichimura & Suzuki, 2017); (2) to assess the reliability of the questionnaire instrument used for this evaluation; and (3) to situate these findings within the broader landscape of MOOC design and quality-assurance frameworks, in order to inform the design of future technical-subject MOOCs at UTeM and similar institutions.

## LITERATURE REVIEW

### MOOCs design model

Bates (2015) discusses two main MOOC design models, xMOOCs and cMOOCs, that are used in MOOC development. With the aid of specially created platform software, xMOOCs may accept very large numbers of participants, store and broadcast digital content at any time, and automatically track student performance and the assessment process. Some examples of popular platforms that adopted the xMOOC design are Coursera, EdX, Udacity, and OpenLearning. Other features included in the design are video lectures, which are usually made available weekly and can be streamed or downloaded by participants. Online tests or quizzes are typically given periodically throughout the course, and students can receive quick, computerised feedback. Some platforms allow peer evaluation, in which students are randomly placed into small groups, particularly for assignments that require more in-depth discussion or evaluation. Participants may occasionally be provided with copies of slides, supplemental audio recordings, links to other resources, and online publications for downloading. There are also areas where participants can post questions, request assistance, or provide feedback on the course materials. To showcase student accomplishments, most xMOOCs offer some form of recognition for successfully completing a course, such as badges or certificates. Although there is limited evidence that MOOC credentials are formally accepted by employers, there is an emerging movement to recognise informal learning through MOOC open badges; Buchem and Borrás-Gené (2020) found that MOOC participants were motivated by open badges regardless of the MOOC platform used. More recent systematic reviews reinforce and extend this finding: Major and Mira da Silva (2023) and Alj et al. (2024), reviewing the broader MOOC gamification literature, both

concluded that badges, leaderboards, and point-based rewards consistently improve learner motivation and engagement, although their effect on reducing MOOC dropout remains less conclusive and appears to depend heavily on how well such game elements are integrated into the overall pedagogical design.

Unlike xMOOCs, cMOOCs are built on network learning, or the theory of connectivism (Yeager et al., 2013), in which knowledge is gained through connections and conversations made among participants online. The technical platform used by cMOOCs, which combines webcasts, participant blogs, tweets, hashtag-linked social media posts, and online discussion forums, is not standardised (Bates, 2015). Downes (2014) identifies four important design considerations for cMOOCs: autonomy of learners in deciding what knowledge or skills they want to acquire; diversity, in terms of the tools used, the variety of materials, and the range of participants and their knowledge level; interactivity, in terms of cooperative learning and communication between participants; and openness, in terms of access, content, activities, and assessment. The practice of cMOOCs relies mainly on social media and is typically not institutionally based or supported. The content of cMOOCs is participant-driven, chosen and contributed by participants themselves through a variety of tools and media such as YouTube videos, blog posts, tweets, or open discussion forums.

Conceptually, xMOOCs are more like a traditional classroom guided by an instructor or lecturer, in comparison to cMOOCs, which are more flexible and allow anyone to create content and share it. However, both design models share the vision of providing open education and knowledge to the public at little or no cost.

**Previous research related to design framework of MOOC**

The purpose of a MOOC design framework is to encourage personal and collaborative learning through an interactive pedagogical structure. Such frameworks also help build a learning network in which participants are rewarded and challenged, with the broader aim of inspiring people to learn. Researchers have considered many dimensions in constructing MOOCs (refer to Table 1). More recently, Sebbaq and El Faddouli (2024) synthesised the MOOC design and quality-assurance literature into a comprehensive micro-level framework spanning pedagogical, technological, and organisational quality indicators, reaffirming that systematic, multi-dimensional evaluation frameworks, such as the one adopted in this study, remain central to assuring MOOC quality.

**Table 1:** Design Frameworks of MOOC

| | References | The objective of the study | Research Method | Participants | Framework Dimension |
|---|---|---|---|---|---|
| 1. | (Alario-Hoyos et al., 2014) | Conceptual Framework for Educators to Describe and Design MOOCs | Qualitative | Not Stated | 1. Available Resources<br>a. Human<br>b. Intellectual<br>c. Equipment<br>d. Platform<br>2. Design Decisions<br>a. General Description<br>b. Target Learners<br>c. Pedagogical Approach<br>d. Objective and Competences<br>e. Learning Contents<br>f. Assessment Activities<br>g. Complementary Technologies |

| | | | | | |
|---|---|---|---|---|---|
| 2. | (Ichimura & Suzuki, 2017) | To synthesize current research into MOOC design dimensions to highlight what is important for the future quality of such courses. | Systematic Literature Review | none | 1. General Structure<br>2. Resources<br>3. Vision<br>4. Learner Background and Intention<br>5. Pedagogy<br>6. Communication<br>7. Assessment<br>8. Technologies<br>9. Learning Analytics Data<br>10. Support |
| 3. | (Amado et al., 2022) | To present a conceptual framework for massive open online courses designed regarding continuous teacher training. | Qualitative (Face-to-Face and Online Interview)<br><br>Quantitative (Survey by questionnaire) | 103 Trainers from the Teachers' Training Center | 1. Resources<br>• Human and technological infrastructure<br>2. Design<br>• Course Overview, Target Learners, Pedagogical Approaches, Goals, Learning Materials, Content & Activities, And Assessment Activities<br>3. Organization and Monitoring<br>• Accreditation and other monitoring and evaluation |
| 4. | (Sebbaq & El Faddouli, 2024) | To synthesise the MOOC design and quality-assurance literature into a comprehensive, multi-dimensional quality framework for MOOCs. | Comprehensive/systematic literature review | None (literature-based) | 1. Pedagogical Quality<br>2. Technological Quality<br>3. Organizational Quality<br>4. Learner Support and Assessment Quality |

Beyond the MOOC-specific design frameworks summarised in Table 1, several broader theoretical and quality-assurance models have been used to evaluate online and open courses, and it is useful to situate the MOOC Design Framework used in this study against them (see Table 2). The Community of Inquiry framework (Garrison et al., 2000), originally developed for text-based computer conferencing, has since been extended to MOOCs and validated with large samples (Kovanović et al., 2018) and applied in developing-country contexts (Edumadze & Govender, 2024); it offers a strong theoretical account of learner presence but focuses on interaction and discourse rather than on the design of content materials themselves. Conole's (2014) 7Cs of Learning Design, applied to MOOCs in blended contexts by Buch et al. (2018), provides a flexible, process-oriented approach to designing learning activities but was not developed specifically for the MOOC format. The OpenupEd quality label (Rosewell & Jansen, 2014) offers 32 institutional and course-level benchmarks for MOOC quality assurance, making it well suited to policy and accreditation purposes, but its checklist orientation is less suited to capturing individual students' perceptions of specific materials and activities. The Technology Acceptance Model (Davis, 1989), recently applied to a MOOC context by Hou (2025), explains learners' behavioural intention to use a MOOC through perceived usefulness and ease of use, but does not directly evaluate the quality of content design. Most recently, Mir and Khan (2026) synthesised twenty such frameworks into an integrated six-dimension evaluation model, but noted that this synthesis has not yet been empirically applied and validated in individual course-level studies. Compared with these alternatives, the MOOC Design Framework (Ichimura & Suzuki, 2017) was selected for the present study because it was purpose-built for MOOCs through a systematic synthesis of the MOOC literature, and its ten dimensions allow both course materials and course

activities to be evaluated at a level of granularity suited to a single-course case study, while still connecting to the broader pedagogical, technological, and organisational quality concerns raised by the frameworks above.

**Table 2:** Comparison of the MOOC Design Framework with Related Online-Learning and MOOC Evaluation Models

| Framework | Type / Origin | Primary Unit of Analysis | Key Strength | Limitation Relative to This Study |
|---|---|---|---|---|
| Technology Acceptance Model (Davis, 1989; Hou, 2025) | Behavioural-intention theory | Perceived usefulness/ease of use → intention to use | Well validated across technology contexts | Focuses on acceptance/intention rather than content-design quality directly |
| Community of Inquiry (Garrison et al., 2000; Kovanović et al., 2018; Edumadze & Govender, 2024) | Theoretical model (originally text-based conferencing) | Learner presence (cognitive, social, teaching) | Strong theoretical grounding; validated survey instrument | Focuses on interaction/presence rather than content-design attributes |
| MOOC Canvas (Alario-Hoyos et al., 2014) | Conceptual design tool (11 dimensions) | Course design decisions | Practical planning tool for educators during course design | Oriented to design planning rather than post-implementation student evaluation |
| 7Cs of Learning Design (Conole, 2014; Buch et al., 2018) | Generic learning-design framework applied to MOOCs | Learning-activity design process | Flexible; applicable across course types | Not MOOC-specific by origin; less granular on content-material evaluation |
| OpenupEd Quality Label (Rosewell & Jansen, 2014) | Institutional benchmarking framework (32 benchmarks) | Institution and course benchmarks | Broad quality-assurance coverage; policy-relevant | Checklist orientation; not designed to capture individual student perceptions |
| MOOC Design Framework (Ichimura & Suzuki, 2017) | Synthesis of MOOC literature (10 dimensions) | Course-level content and institutional design | Comprehensive and MOOC-specific; spans pedagogy to infrastructure | Primarily descriptive; not yet validated across technical subjects (addressed by this study) |
| Teacher-training MOOC framework (Amado et al., 2022) | Conceptual framework | Institutional and course level | Explicit organisation/monitoring and accreditation dimension | Developed for continuous teacher training; not generic to higher-education subjects |
| MOOC Quality Assurance Framework (Sebbaq & El Faddouli, 2024) | Comprehensive/systematic literature synthesis | Micro-level quality indicators | Integrates pedagogical, technological, and organisational quality | Literature-based; lacks a validated instrument for direct student surveying |
| Integrated MOOC Evaluation Model (Mir & Khan, 2026) | Systematic review synthesis of 20 frameworks | Six dimensions incl. course structure, engagement, instructional quality | Recent, comprehensive synthesis addressing framework fragmentation | Newly proposed; not yet empirically applied or validated in individual studies |

Student feedback on the MOOC experience can be assessed using the dimensions listed in Table 1. Previous studies that have assessed student feedback are described in the following sections.

**Previous research related to students' feedback evaluation on content design and activities in MOOC**

A study by Ghani et al. (2020) presents an effective way to develop a MOOC platform for learning the Arabic language for tourism, to fulfil Arabic learners' needs, using the ADDIE model. The study involved 61 students from University Malaysia Kelantan (UMK) and the Kolej Poly-Tech MARA Kota Bharu branch (KPTMKB), all majoring in Tourism. Data were collected through survey questionnaires and analysed using IBM SPSS statistical software. The questionnaire used in the study was divided into Part A: learners' demography, Part B: learners' needs, and Part C: learners' suggestions for improvement. The analysis of students' needs — covering Simple Greeting, Tourism Terminology, Basic Conversation, Basic Arabic, Culture, Basic Sentence, Basic Grammar, Listening Comprehension, Reading, Speaking, Writing, Main Interface, Text, Picture, Exercises, Game, Vocabulary, and Video — yielded a high score, with mean values ranging from 3.42 to 3.70.

Bogdanova and Snoeck (2018) investigated aspects of student behaviour, performance, and perception of a course, reflecting on the possibilities of transitioning from a Small Private Online Course (SPOC) in a blended-learning context to an exclusively online MOOC. This experience offers valuable insights for conceptual-modelling educators planning to introduce blended or online learning and to utilise formative assessment in their pedagogical activities. The study employed a survey covering preferred course materials, preferred type of feedback, preferred learning routine, attitudes towards formative assessment, and an open question on experiences related to the online course. The findings show that the most preferred materials were slides (30 of 37 students, or 81%) and recorded lectures (27 of 37 students, or 73%), while live lectures were the least popular, chosen by less than half of the students.

More recent studies extend these findings by identifying the specific content-related factors that drive student satisfaction in MOOCs. Using educational data mining on large-scale user-generated reviews, Nilashi et al. (2022) found that instructor quality, content quality, and course structure were the strongest predictors of learner satisfaction across multiple MOOC platforms, underscoring that well-organised and clearly presented content contributes directly to a positive learning experience. In a related study, Lv et al. (2025), examining MOOC learning environments enhanced with generative artificial intelligence, reported that perceived content usefulness and interactivity remained key predictors of learning satisfaction even as MOOC platforms increasingly incorporate AI-based personalisation, suggesting that sound content-design principles continue to underpin effective MOOC experiences regardless of the underlying delivery technology. These recent findings collectively support the rationale for the present study's focus on systematically evaluating content design using an established MOOC design framework.

Within technical and programming-oriented MOOCs specifically — a domain closer to the Introduction to Database subject examined in this study — Rõõm et al. (2022) examined the factors influencing learner success in a computer-programming MOOC and found that prior programming experience, self-regulation, and the perceived clarity of exercises were significant predictors of successful completion, reinforcing the importance of well-structured, clearly sequenced technical content. Relatedly, Rizvi et al. (2024) found that learner preferences for content formats such as video versus text vary systematically by region and cultural background, suggesting that content-design decisions found effective in one national context, such as Malaysia, may not generalise directly to others — a consideration relevant to future replications of the present study.

**Proposed MOOC content design**

This section describes the design and of MOOC based on the MOOC Design Framework (Ichimura & Suzuki, 2017). The application of MOOC Design Framework can be referred to Figure 1. There are ten main learning MOOC dimensions that are learning analytics, pedagogy, communication, technologies, learner background, assessment, resources, vision and support and general structure. Learning requirements consists of resources, technologies and learners' background. Learning Content Design consists of pedagogy, communication and assessment. For learning analytics, student performance indicators such as assessment score and module completeness are used. The learning pedagogy applied is focused on the constructive approach. Constructivist Approach allows learners to be active in the process of constructing meaning and knowledge rather than passively receiving information. It fosters critical thinking and provides learners with a learning environment that helps them make connections with their learnings. Other learning contents include video, quizzes, slides and

gamification elements such as badges, and leaderboard score. Communication means used are discussion boards and student community groups. Target learners are primarily from existing students for database subject. Assessments methods employed are quizzes, questionnaires, and module completion progress. University support services are also available to support students and educators.

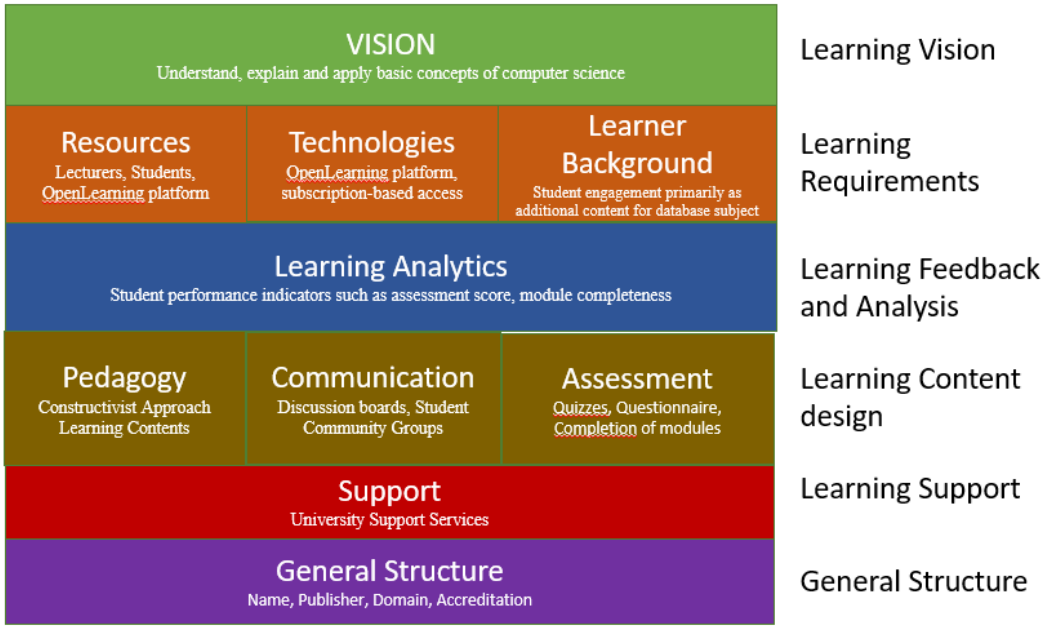



**Figure 1:** Application of MOOC Design Framework

The content design aims to enhance students' learning experience through lecture videos, dialog videos, and lecture slides. Students can make self-assessments by completing tasks such as quizzes, listening assessments, forums, midterm tests, project essays, written assignments, and project video presentations. In MOOC, the course materials of the Introduction to the Database subject were developed to cover the essential aspects of the course. Based on MOOC's learning tools and features, the materials and activities were systematically organized to ensure that students can access and learn easily. The materials and activities created for each topic are hoped to enhance student understanding and meet their learning needs. The MOOC program allows students to learn at their own pace and interact one-on-one with the instructor.

## METHODOLOGY

This study adopted a quantitative, cross-sectional survey design to evaluate the content design of the Introduction to Database MOOC. All 368 undergraduate students who were enrolled in and completed the subject during the 2020/2021 academic session were invited to participate (total population sampling), and all 368 provided usable responses. The MOOC content itself was developed collaboratively, as described below, which supports the content validity of the materials and activities evaluated; instrument reliability was subsequently assessed statistically (see Reliability of results, below). Data were analysed using descriptive statistics (frequencies and percentages) for the questionnaire items, supplemented by Cronbach's alpha to assess internal consistency (Cronbach, 1951; Pallant, 2020).

Focus group discussions and workshops were conducted within six months amongst database subject matter experts to design the MOOC content. Lengthy lecture durations were divided into short learning content without compromising the learning objectives. Relevant MOOC activities such as quizzes, practice, assessments, and feedback were incorporated to improve student engagement. Gamification elements such as points and badges were also included.

The subject chosen for the MOOC design and development is an introductory course on database and file management systems. This subject focuses on providing an understanding of data modeling, file management, and database system functionality in an information system. The subject is compulsory for undergraduates of

the Faculty of Information and Communication Technology, Universiti Teknikal Malaysia Melaka. At the end of the course, students should be able to describe database management concepts, analyze and design a relational database based on the requirements, and solve simple and complex queries. Figure 2 shows the MOOC banner for the subject course selected for the MOOC programme.




**Figure 2:** MOOC Banner for Subject Course Selected

Students' feedback was collected using a questionnaire to assess the learning content design of the material and activities of the MOOC program. In addition, the student's capability to complete the MOOC program successfully was also evaluated. These questions were rated using a 5-point likert scale, with response scales ranging from Strongly Disagree to Strongly Agree. Table 3 and Table 4 show the questions used to evaluate content design and activities.

The five response categories were 1 = Strongly Disagree, 2 = Somewhat Disagree, 3 = Somewhat Agree, 4 = Agree and 5 = Strongly Agree. Positive feedback for each item was calculated as the number of students who selected Somewhat Agree, Agree or Strongly Agree, divided by the total number of respondents and multiplied by 100. This paper reports the 16 content design items listed in Tables 3 and 4 (eight on course materials and eight on course activities), adapted from Lee et al. (2016) and Bogdanova and Snoeck (2018). These items were selected because the study evaluates selected dimensions of the MOOC Design Framework, namely the course materials (pedagogy) and course activities (assessment and communication), which students experience directly and can judge meaningfully. The other dimensions of the framework, such as resources, technologies and support, concern institutional decisions and were not evaluated by students.

**Table 3:** The Questionnaire of Content Design (CD) for Material

| Content Design (CD) for Material | Reference |
|---|---|
| CD1. The course materials cover the essential aspects of the course.<br>CD2. The course materials are well organized<br>CD3. Overall, the course materials are clear.<br>CD5. Overall, the course materials help my understanding of the topics covered.<br>CD6. The course materials provided meet my learning needs.<br>CD8. The following course materials (e-content) are useful for my learning:<br>a. Lecture Video<br>b. Dialogue Video<br>c. Lecture Slide | (Lee, Keum, Kim, Choi, & Rha, 2016) |

**Table 4:** The Questionnaire of Content Design (CD) for Activities

| Content Design (CD) for Activities | Reference |
|---|---|
| CD4. Overall, the course activities were able to enhance my understanding of the topic covered.<br>CD7. The course activities provided meet my learning needs.<br>CD9. The following course activities (e-activities) are useful for my learning:<br>a. Quiz<br>b. Listening Assessment<br>c. Forum<br>d. Mid-Term Test<br>e. Project-Essay Writing<br>f. Project-Video Presentation | (Bogdanova & Snoeck, 2018) |

# RESULTS AND ANALYSIS

## Students' preferences of content design (CD) for material

This section discusses students' preferences for Content Design of materials in the MOOC programme. Figure 3 shows the survey results from student feedback for the Introduction to Database subject taught on the MOOC platform. From the survey, most students felt that the course materials covered the essential aspects of the course. Students also felt that the course materials were well organised and clear, and helped them understand each topic covered. In addition, they felt that the course materials provided met their learning needs.

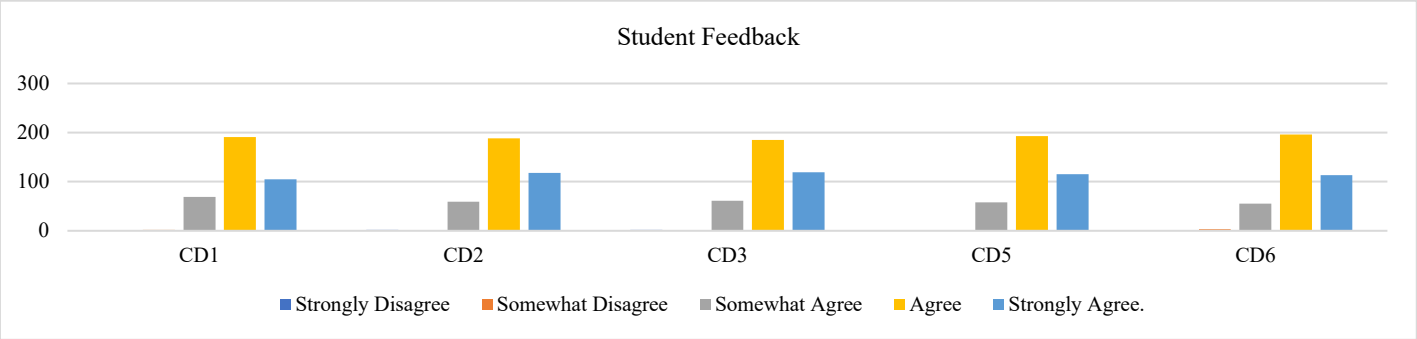
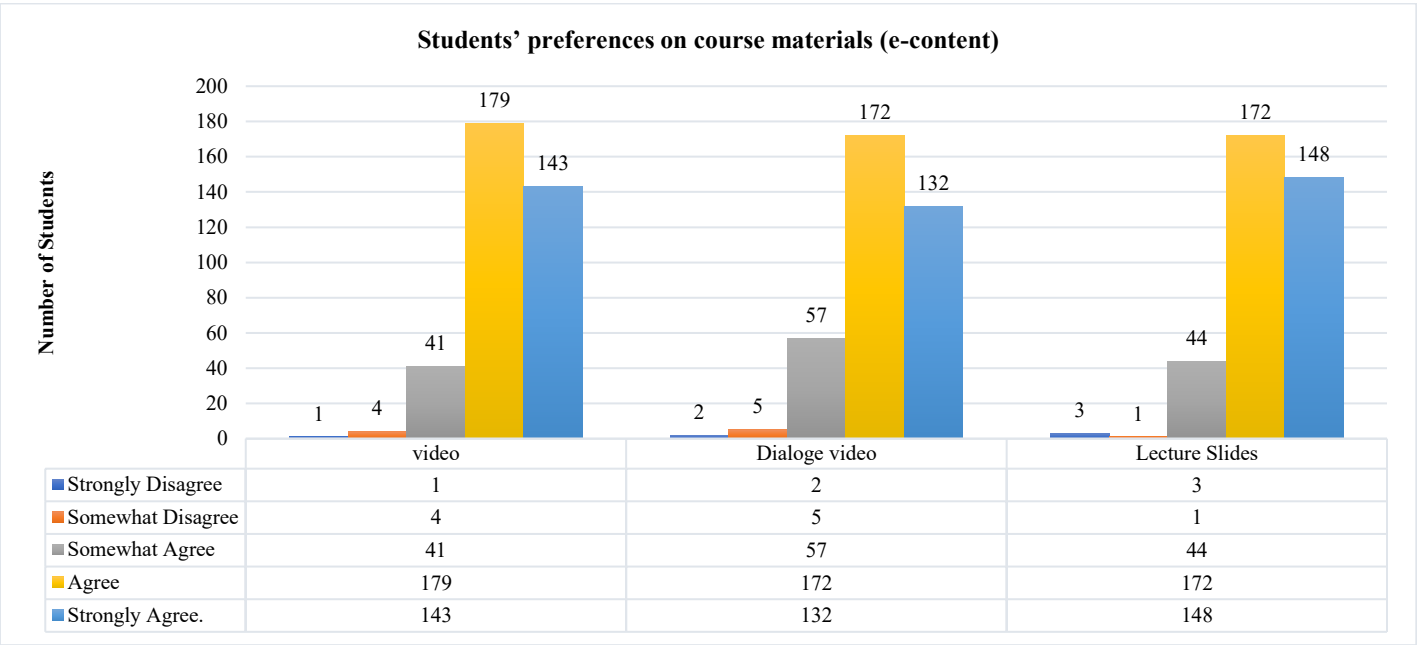



**Figure 3:** Student Feedback for the Introduction to Database subject taught on the MOOC platform

Assessing student feedback on the organization and clarity of content helps students learn the Introduction to Database subject. Thus, this study also evaluates preferences for course materials such as videos, video dialogues, and lecture slides prepared in the MOOC. Figure 4 shows the results of a survey of student preferences for course materials (e-content) used in MOOCs. According to the study, the most popular materials were the video (363 students, 99%) and the lecture slides (364 students, or 99%). The dialogue video was the least popular among students (only 361 students, or 98% of students).



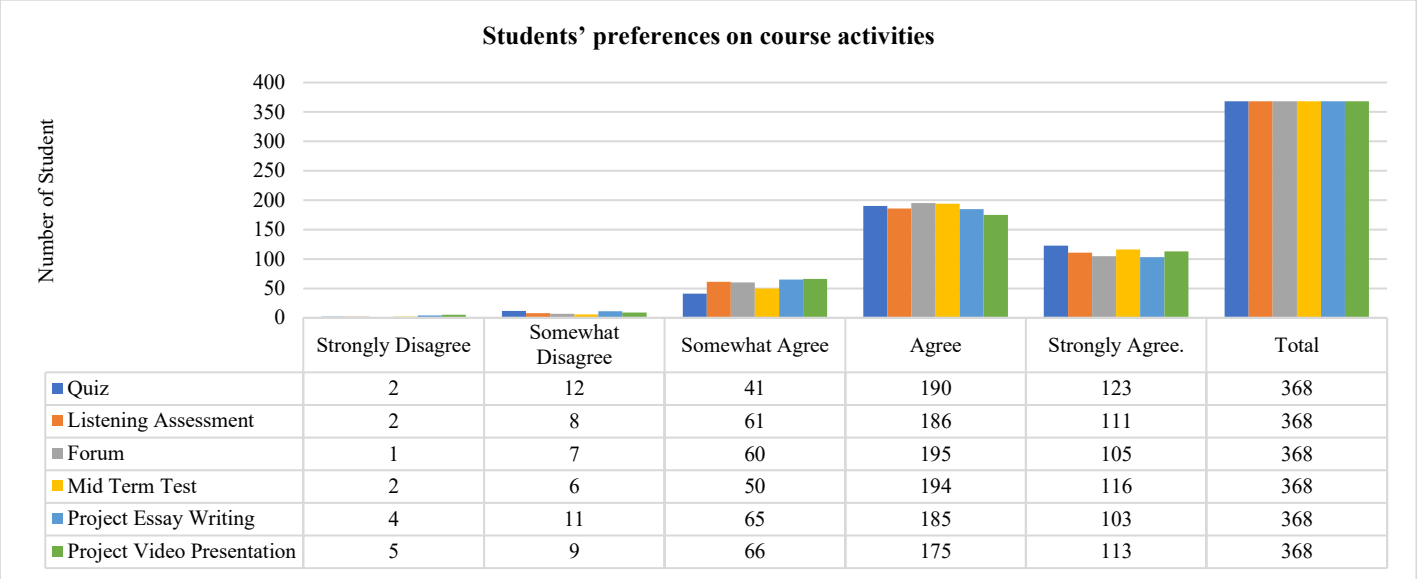

| | video | Dialoge video | Lecture Slides |
|---|---|---|---|
| Strongly Disagree | 1 | 2 | 3 |
| Somewhat Disagree | 4 | 5 | 1 |
| Somewhat Agree | 41 | 57 | 44 |
| Agree | 179 | 172 | 172 |
| Strongly Agree. | 143 | 132 | 148 |

**Figure 4:** Students' preferences on course materials (e-content) used in MOOC for Introduction to Database Subject.

Since online learning involves self-study, some self-assessment activities are provided to allow students to determine their level of understanding related to the topic at hand. Therefore, this study also assessed students' preferences in content design (CD) for the activities provided in MOOC.

**Students' preferences of content design (CD) for activities**

Figure 5 shows the results of a survey of student preferences for course activities used in MOOCs that students consider helpful for their learning. According to the study, the most popular activities were the Forum (360 students, or 98%) and the Midterm Test (360 students, or 98%). The listening assessment was second (358 students, or 97%). The Quiz, Project Essay Writing, and Project Video Presentation were the least popular, with only 96% of students agreeing that these activities were helpful to them.




| | Strongly Disagree | Somewhat Disagree | Somewhat Agree | Agree | Strongly Agree. | Total |
|---|---|---|---|---|---|---|
| Quiz | 2 | 12 | 41 | 190 | 123 | 368 |
| Listening Assessment | 2 | 8 | 61 | 186 | 111 | 368 |
| Forum | 1 | 7 | 60 | 195 | 105 | 368 |
| Mid Term Test | 2 | 6 | 50 | 194 | 116 | 368 |
| Project Essay Writing | 4 | 11 | 65 | 185 | 103 | 368 |
| Project Video Presentation | 5 | 9 | 66 | 175 | 113 | 368 |

**Figure 5:** Students' preferences on activities provided in MOOC for Introduction to Database Subject.

**Reliability of results**

Cronbach's alpha tests were used in this study to determine if the multiple-question Likert-scale surveys were reliable (Cronbach, 1951). According to Pallant (2020), to pass the reliability test, Cronbach's Alpha values must be greater than 0.7. The Cronbach's Alpha value for the 16 content design items in this study is 0.97 (refer to Table 5), with 0.95 for the eight course materials items and 0.94 for the eight course activities items. Therefore, it is confirmed that the results obtained for this survey are reliable.

**Table 5:** Cronbach alpha value of the content design (CD) items.

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.97 | 0.97 | 16 |

## DISCUSSION AND FUTURE WORKS

This paper reports on the first phase of the transition of a traditional course, Introduction to Database, into a MOOC at UTeM, evaluated through the lens of the MOOC Design Framework (Ichimura & Suzuki, 2017). The analysis is based on 368 students from the Faculty of Information and Communication Technology and the Faculty of Technology Management and Technopreneurship who enrolled in the subject during the 2020/2021 academic session. Students' feedback on the content design and activities of the MOOC was examined using a quantitative, questionnaire-based approach, and the reliability of the instrument was confirmed with a Cronbach's alpha of .97 for the 16 content design items.

Overall, the findings show that students perceived the materials and activities designed by the instructor team to be of satisfactory quality, particularly the lecture videos, lecture slides, forum discussions, and mid-term tests. These results are consistent with recent literature indicating that content quality, structure, and interactivity remain central predictors of student satisfaction in MOOC environments (Lv et al., 2025; Nilashi et al., 2022), and they reinforce the value of applying a structured, multi-dimensional design framework, such as the one used

in this study, when developing MOOC content for technical subjects like database management.

This study is not without limitations. First, the analysis was cross-sectional and confined to a single course and a single cohort within one institution, which limits the generalisability of the findings to other subjects, institutions, or student populations. Second, reliance on self-reported Likert-scale data means that the results reflect students' perceptions of content design rather than objective measures of learning. Third, the study did not examine whether positive perceptions of content design translated into improved learning outcomes; the findings therefore reflect students' perceived usefulness of the materials and activities rather than their effect on learning. Fourth, positive feedback included Somewhat Agree responses, which is a broad measure of agreement, and the differences between activities were small (within two percentage points). Fifth, only the materials and activities dimensions of the MOOC Design Framework were evaluated, not the framework as a whole.

Future research should address these gaps in several ways. First, as originally proposed, subsequent studies could examine the relationship between students' MOOC experience and their academic performance (e.g., examination scores and course completion) and compare outcomes across learning approaches, such as MOOC, blended and face-to-face delivery, to determine whether favourable perceptions of content design correspond to measurable learning gains. Second, given recent evidence that gamification elements such as badges and leaderboards enhance motivation and engagement but do not uniformly reduce dropout (Alj et al., 2024; Major & Mira da Silva, 2023), future iterations of the MOOC could experiment with more targeted gamification strategies and evaluate their effect on completion rates. Third, in light of the growing integration of generative artificial intelligence into online learning environments (Lv et al., 2025), future work could explore how AI-supported personalisation of MOOC content and feedback affects students' experience of technical subjects such as database management. Finally, applying comprehensive quality-assurance frameworks such as that proposed by Sebbaq and El Faddouli (2024) could help validate and extend the dimensions considered in this study. Taken together, the findings from this study provide empirical evidence, from a Malaysian technical university context, to justify the continued use and refinement of MOOCs, and offer a practical basis for ensuring the quality of content design and activities offered to students in future MOOC-based technical courses.

## CONCLUSION

This study evaluated the content design of an Introduction to Database MOOC at UTeM using the MOOC Design Framework (Ichimura & Suzuki, 2017), gathering feedback from 368 undergraduate students on both course materials and course activities. The results show consistently positive student perceptions, with video-based materials and interactive, assessment-oriented activities rated most favourably, and the measurement instrument demonstrated excellent reliability (Cronbach's alpha = .97). By comparing the MOOC Design Framework against related theoretical and quality-assurance models — including the Community of Inquiry framework, the 7Cs of Learning Design, the OpenupEd quality label, the Technology Acceptance Model, and Mir and Khan's (2026) integrated evaluation model — this study clarifies where a MOOC-specific, multi-dimensional design framework adds value beyond more generic or interaction-focused models, particularly for technical subjects such as database management. The findings contribute empirical, Malaysian, technical-university evidence to a literature that remains fragmented across frameworks and disciplinary contexts, and they offer a practical, evidence-based basis for designing and refining future MOOC-based technical courses, both at UTeM and at similar institutions.

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