Validity and Reliability Assessment of a Motivation Questionnaire for a Collaborative Online Social Learning E-Module: A Pilot Study

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ABSTRACT

Students may experience various challenges in online learning environments that can negatively affect their motivation. A collaborative online social learning e-module may help address this issue by promoting interaction, participation, and knowledge sharing among students. However, limited instruments are available to assess students' motivation after participating in such learning environments. Therefore, this study aimed to adapt and establish the pilot study validity and reliability of the Motivation Questionnaire for Collaborative Online Social Learning E-Module (MQ-COSLE). The 16-item questionnaire was adapted from an existing collaborative learning motivation instrument and evaluated by three experts for content validity. Subsequently, a pilot study was conducted with 42 undergraduate students selected through purposive sampling. All items achieved an item-level content validity index (I-CVI) of 1.00, while both the scale-level content validity index based on average agreement (S-CVI/Ave) and universal agreement (S-CVI/UA) were 1.00. The questionnaire also demonstrated excellent internal consistency, with an overall Cronbach's alpha coefficient of 0.965. Although this value indicates strong reliability, it may also suggest potential redundancy or overlap among some items. Overall, the findings provide evidence supporting the content validity and internal consistency of the MQ-COSLE. The MQ-COSLE may be used to evaluate students' motivation in comparable collaborative online social learning environments.

Keywords:
Motivation; Validity; Reliability; Collaborative learning; Questionnaire

Introduction

Students' motivation plays an important role in online learning because it influences whether they initiate, sustain, and actively participate in learning activities. Students may engage in learning because they enjoy the activities, recognise their value, believe that they can complete them successfully, or anticipate positive outcomes from their participation (Ryan & Deci, 2020; Guay, 2022). These motivational factors become particularly important in online learning environments, where students are often required to manage their participation with less direct and immediate support from lecturers. Although motivation is closely related to satisfaction, enjoyment, engagement, and self-regulated learning, these concepts represent different aspects of the learning experience. Satisfaction refers to students' overall evaluation of their learning experience, whereas enjoyment concerns the positive emotions experienced during a particular activity. Engagement reflects the extent to which students participate behaviourally, cognitively, and emotionally, while self-regulated learning concerns how students plan, monitor, and manage their learning processes (Kuo et al., 2014; Pekrun, 2006; Fredricks et al., 2004; Zimmerman, 2002). Motivation, in contrast, explains the reasons that initiate and sustain students' participation. This distinction is particularly important in learning environments that require students to communicate, contribute, and collaborate with others.

The importance of motivation becomes more evident in collaborative learning. Students are expected to exchange ideas, share knowledge, provide feedback, negotiate meaning, and work together to achieve common learning goals (Xiong et al., 2015; Shonfeld & Magen-Nagar, 2020). Successful collaboration therefore depends not only on the quality of the learning content and activities but also on students' willingness to contribute, interact with their peers, and remain involved throughout the learning process. When collaborative learning is conducted online, students can communicate and complete group activities without being restricted by time and location (Liang & Tse, 2024;

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Admiraal et al., 2026). However, the absence of face-to-face contact may reduce opportunities for immediate interaction, feedback, and social support. Consequently, students may participate less actively when they do not recognise the value of the activities, lack confidence in their ability to contribute, or feel disconnected from their group members. Online social learning tools may help address these challenges by facilitating communication, interaction, and knowledge sharing. Through such tools, students can exchange ideas, share learning resources, provide feedback, and continue discussions beyond scheduled learning sessions. Social media platforms have also been used in higher education because they enable students to remain connected and participate asynchronously according to their availability (Sahoo & Pradhan, 2025; Tran et al., 2025).

Nevertheless, communication tools alone may not provide a complete and systematically organised learning experience. Students also require structured content, clear instructions, appropriate activities, and accessible learning resources. E-modules can provide these elements in an electronic format and allow students to access learning materials through digital devices at suitable times and locations (Fidiastuti et al., 2021; Jaenudin & Melati, 2022). When an e-module is integrated with an online social learning platform, it can support both structured learning and collaborative interaction among students. In the present study, the M-COSHE Module provided structured learning content, instructions, and collaborative activities, while a Facebook group facilitated discussion, communication, and peer interaction. Facebook was selected because the participants were familiar with using social media for learning and could access the group beyond scheduled class sessions. This integration was intended to create a collaborative online social learning environment in which students could engage with the module content while interacting with their peers. Further details regarding the implementation of the M-COSHE Module and the Facebook group are presented in the Methods section. Previous studies have shown that e-modules may support students' motivation. Dini et al. (2023) reported higher motivation when an e-module was integrated with guided inquiry activities, while Fidiastuti et al. (2021) found improvements in both motivation and academic achievement. Similarly, Delita et al. (2022) reported that collaborative e-module activities supported students' self-efficacy, motivation, and learning outcomes. Badeo and Koc (2021) also found that a comic-based learning module improved students' understanding and motivation. Collectively, these findings suggest that e-modules may enhance motivation when they provide appropriate content, engaging activities, and meaningful learning experiences.

However, evidence that e-modules can support motivation does not fully explain the specific reasons students choose to participate in a collaborative online social learning environment. Students may participate because they are interested in the activities, recognise their educational value, believe that they are capable of completing the required tasks, or expect positive reinforcement such as praise, recognition, or good grades. Therefore, an appropriate questionnaire is needed to assess these distinct motivational reasons after students have participated in collaborative online social learning activities. Xiong et al. (2015) developed the Students' Readiness for Computer-Supported Collaborative Learning instrument to assess motivation for collaborative learning, prospective collaborative learning behaviours, and online learning aptitude. The motivation dimension of the instrument comprised four constructs: Interest, Perceived Value, Self-Efficacy, and Reinforcement. However, the original instrument was designed to measure students' readiness before participating in computer-supported collaborative learning. It was not specifically developed to assess students' motivation after completing activities within a collaborative online social learning e-module.

Accordingly, the motivation dimension developed by Xiong et al. (2015) was adapted to correspond with the purpose, timing, and learning context of the present study. The adapted questionnaire focuses on students' motivation after participating in collaborative activities supported by an e-module and an online social learning platform. It was named the Motivation Questionnaire for Collaborative Online Social Learning E-Module (MQ-COSLE). The detailed adaptation procedures and changes made to the questionnaire items are described in the Research Instruments section. Self-Determination Theory was used as a theoretical lens to explain the four motivational dimensions measured by MQ-COSLE. Interest is associated with intrinsic motivation because students may participate when they find an activity enjoyable or inherently satisfying. Perceived Value is related to identified regulation because students may participate when they personally recognise the importance or usefulness of the activity. Self-Efficacy is associated with perceived competence because students are more likely to participate when they believe that they can successfully complete the required tasks. Reinforcement is primarily related to external motivation because participation may be encouraged by grades, praise, recognition, or other positive outcomes. Praise and supportive relationships may also strengthen students' perceptions of competence and relatedness (Ryan & Deci, 2000; Ryan & Deci, 2020).

However, MQ-COSLE does not directly measure the basic psychological needs of autonomy, competence, and relatedness proposed by Self-Determination Theory. Instead, the theory is used to provide a conceptual explanation for the four motivational dimensions retained from Xiong et al. (2015). Thus, MQ-COSLE remains specifically focused on Interest, Perceived Value, Self-Efficacy, and Reinforcement. Before an adapted questionnaire can be used in a new learning context, evidence is required to demonstrate that its items are relevant, appropriate, and consistently measure the intended construct. Validation is therefore necessary to determine whether the questionnaire items adequately represent students' motivation within a collaborative online social learning e-module environment. Reliability assessment is also important to establish whether the items produce consistent responses. However, limited evidence is available regarding the validity and reliability of a motivation questionnaire specifically adapted to assess students' motivation after participating in a collaborative online social learning e-module.

Therefore, this study aimed to conduct a pilot study validation and reliability assessment of the Motivation Questionnaire for Collaborative Online Social Learning E-Module (MQ-COSLE). This study focused on content validity and internal consistency reliability of the MQ-COSLE.The validation process focused on content validity through expert evaluation, while reliability was assessed through internal consistency analysis in a pilot study involving undergraduate students. The findings provide pilot study evidence regarding the relevance, appropriateness, and consistency of MQ-COSLE for assessing students' motivation in comparable collaborative online social learning environments.

Literature Review

Students' Motivation in Online Collaborative Learning

Online collaborative learning has the potential to support students' motivation by providing a flexible and accessible environment in which they can participate, exchange ideas, and complete shared learning tasks (Al-Jarf, 2026). It may also facilitate knowledge sharing and information management among group members, thereby enabling students to learn through interaction rather than through individual engagement with content alone (Salimi et al., 2025). However, flexibility and access do not necessarily lead to sustained motivation. Their motivational benefits depend largely on the quality of the learning design, the relevance of the collaborative tasks, and the extent to which students receive meaningful interaction and support from their peers. Social interaction is therefore a central factor in motivating students within online collaborative learning environments. Peer support, communication, and a sense of connection may encourage students to contribute ideas, respond to others, and remain involved in group activities (Shonfeld & Magen-Nagar, 2020). In contrast, poorly coordinated collaboration, limited feedback, or unequal participation may weaken students' willingness to engage. This suggests that motivation in online collaborative learning is not generated merely by placing students in groups; rather, it develops when the learning environment provides clear purposes for interaction, opportunities for meaningful contribution, and sufficient support for students to participate confidently.

Online social learning tools may strengthen these conditions when they are appropriately aligned with the curriculum, learning outcomes, and collaborative activities (Gharbaoui et al., 2024). Social media platforms, for example, enable students to continue discussions, share resources, and interact beyond scheduled class sessions (Tran et al., 2025; Sahoo & Pradhan, 2025). Aisyah et al. (2021) also reported positive student responses to a social-media-supported online learning environment. Nevertheless, the educational value of these platforms should not be assumed solely from their accessibility or familiarity. Their contribution to motivation depends on whether they are used for purposeful academic interaction, structured knowledge sharing, and activities that encourage students to participate meaningfully. Without such pedagogical structure, social media use may remain informal, fragmented, or unrelated to the intended learning goals.

E-modules may complement online social learning tools by providing organised content, clear instructions, and structured learning activities. Several studies have reported positive relationships between the use of e-modules and students' motivation, self-efficacy, academic achievement, and learning outcomes (Delita et al., 2022; Dini et al., 2023; Fidiastuti et al., 2021; Badeo & Koc, 2021). For instance, Fidiastuti et al. (2021) found that an e-module used among 50 Biology Education students supported both motivation and academic achievement. Most participants recorded moderate to high motivation scores, while 58% passed the Genetics test. These findings indicate that the e-module was

potentially beneficial; however, the interpretation of its effectiveness should remain cautious because the reported descriptive results do not, by themselves, establish that the e-module caused the observed motivational and achievement outcomes.

Similarly, Delita et al. (2022) reported that an e-module incorporating collaborative elements supported students' self-efficacy, motivation, and learning outcomes. Their study involving 30 Indonesian university students found statistically significant improvements in self-efficacy. Although these findings highlight the potential value of collaborative e-module design, the relatively small sample and context-specific implementation may limit the extent to which the results can be generalised to other disciplines, institutions, or online learning environments. Moreover, improvements in self-efficacy should not automatically be interpreted as equivalent to improvements across all dimensions of motivation, as students may feel capable of completing a task without necessarily finding it interesting, valuable, or rewarding. Badeo and Koc (2021) also found that a comic-based learning module enhanced students' conceptual understanding and motivation in mechanics. Their findings demonstrate that attractive presentation and contextually appropriate learning materials may contribute to students' interest and willingness to learn. Nevertheless, the motivational effects of a comic-based module may differ from those of an e-module designed for collaborative online social learning. In the latter context, students' motivation may depend not only on the quality of the learning materials but also on their perceptions of collaborative value, confidence in contributing to group tasks, and expectations of feedback or reinforcement.

Taken together, previous studies provide useful evidence that online collaboration, social interaction, social media tools, and e-modules may support students' motivation. However, much of the literature has concentrated on evaluating the effectiveness, usability, or learning outcomes of particular interventions. Less attention has been given to the quality of instruments used to measure motivation after students have participated in a learning environment that integrates structured e-module content with online social interaction and collaborative activities. This limitation is important because motivation is a multidimensional construct. A general motivation score may not adequately distinguish whether students participate because they are interested in the activities, recognise their value, believe they are capable of completing them, or expect positive reinforcement. Instruments developed for general online learning, conventional e-modules, or readiness for collaborative learning may not fully reflect students' motivational experiences after completing activities in a collaborative online social learning e-module. Therefore, a contextually adapted instrument is required, together with evidence that its items are relevant to the intended learning environment and demonstrate acceptable internal consistency. Therefore, the gap lies not merely in the use of a different learning context, but in the absence of a validated instrument that measures students' motivation after participating in a structured collaborative online social learning e-module. This need provides the pilot study for the validation and reliability assessment of the Motivation Questionnaire for Collaborative Online Social Learning E-Module (MQ-COSLE).

Self-Determination Theory

Self-Determination Theory (SDT), developed by Ryan and Deci (2000), provides the primary theoretical basis for explaining motivation in this study. SDT proposes that the quality and persistence of motivation are influenced by the extent to which three basic psychological needs—autonomy, competence, and relatedness—are supported. Autonomy refers to the experience of volition and meaningful choice, competence concerns the perception that one is capable of performing a task successfully, and relatedness reflects a sense of connection, acceptance, and belonging with others (Ryan & Deci, 2000; Thomas, 2025). When these needs are adequately supported, students are more likely to internalise the value of learning activities, sustain their participation, and engage more meaningfully in the learning process. Conversely, when students feel controlled, incapable, or socially disconnected, their motivation may become weaker or more dependent on external incentives.

A central contribution of SDT is its distinction between different qualities of motivation rather than treating motivation as a single construct. Motivation exists along a continuum ranging from intrinsic motivation to several forms of extrinsic motivation that differ in their degree of internalisation (Guay, 2022; Shen et al., 2024). Intrinsic motivation occurs when students participate because an activity is inherently interesting or enjoyable (Ryan & Deci, 2024). This form of motivation has been associated with sustained engagement, deeper learning, and positive educational outcomes (Howard et al., 2020). Extrinsic motivation, in contrast, refers to participation driven by outcomes that are separable from the activity itself. SDT further differentiates extrinsic motivation into external, introjected, identified, and

integrated regulation (Ryan & Deci, 2020; Van den Broeck et al., 2021). External regulation is driven primarily by rewards, grades, or avoidance of punishment, whereas identified and integrated regulation represent more autonomous forms of extrinsic motivation because students recognise the personal importance of an activity and connect it with their own goals or values.

This distinction is particularly relevant to collaborative online learning because students may participate for qualitatively different reasons. Some students may contribute because they enjoy interacting and solving problems with their peers, while others may participate because they recognise the value of collaboration, believe they are capable of making a meaningful contribution, or expect grades, praise, and recognition. These different reasons cannot be adequately represented by a single general motivation score. An instrument designed for collaborative online learning should therefore distinguish between intrinsic, internalised, competence-related, and externally reinforced reasons for participation.

Previous research supports the relevance of SDT across both conventional and online learning environments. Howard et al. (2020) found that intrinsic motivation and identified regulation were positively associated with academic performance and student well-being, whereas more controlled forms of motivation were generally linked to less favourable outcomes. Similarly, Almukhambetova and Hernández-Torrano (2020) emphasised that teacher and peer support can strengthen students' autonomy and motivation. In online learning, Chiu (2022) reported that autonomy, competence, and relatedness contributed to student engagement, with relatedness playing a particularly important role in environments where physical separation may reduce spontaneous interaction and social connection. Collectively, these studies suggest that motivation in online learning is shaped not only by the characteristics of digital platforms but also by the extent to which the learning environment supports students' sense of choice, capability, and connection. However, findings from general online learning contexts cannot be transferred uncritically to collaborative online social learning. In a collaborative environment, students must contribute to group activities, respond to peers, manage shared responsibilities, and remain socially connected over time. Their motivation may therefore depend on a combination of enjoyment, perceived usefulness, confidence in contributing, and anticipated social or academic outcomes.

The four dimensions of MQ-COSLE—Interest, Perceived Value, Self-Efficacy, and Reinforcement—were retained because they represent distinct motivational reasons that may influence students' participation in collaborative online social learning (Xiong et al., 2015). Interest reflects an intrinsic reason for participation, as students may engage because they enjoy the collaborative activities or find them stimulating. Perceived Value represents a more internalised form of motivation because students participate when they recognise that collaboration is useful, meaningful, or relevant to their learning. Self-Efficacy reflects students' confidence in their ability to complete collaborative tasks, assist their peers, and contribute effectively to group outcomes. Reinforcement represents externally or socially influenced reasons for participation, including grades, praise, recognition, and positive responses from group members. These dimensions can be conceptually interpreted through SDT, although the correspondence is not exact. Interest is most closely associated with intrinsic motivation, while Perceived Value is aligned with identified regulation because students personally recognise the importance of an activity. Self-Efficacy is conceptually related to the need for competence, as both concern students' perceptions of their capability to act effectively. Reinforcement is primarily associated with external regulation when participation is encouraged by grades or rewards. However, praise and supportive relationships may also contribute to perceived competence and relatedness when they communicate encouragement, acknowledgement, or social acceptance (Ryan & Deci, 2020; Guay, 2022; Howard et al., 2020).

Nevertheless, these conceptual associations should not be interpreted as evidence that MQ-COSLE directly measures the basic psychological needs proposed by SDT. The questionnaire does not contain separate measures of autonomy, competence, or relatedness, nor was it designed as a direct operationalisation of SDT. Instead, SDT is used as an explanatory framework for understanding the motivational meanings represented by Interest, Perceived Value, Self-Efficacy, and Reinforcement. In particular, Self-Efficacy should not be treated as identical to competence, and Reinforcement should not be assumed to represent relatedness simply because it includes praise or positive social responses. These constructs are theoretically related but remain conceptually distinct.

A further limitation is that the present pilot study did not examine whether the four proposed dimensions are empirically distinguishable. Evidence of content validity and internal consistency alone cannot confirm the

dimensional structure of the questionnaire or establish that each set of items measures a unique motivational construct. A high overall reliability coefficient may indicate consistency, but it may also reflect conceptual overlap or redundancy among items. Therefore, the proposed four-dimensional structure should be evaluated in future research using a larger and more diverse sample through exploratory factor analysis and confirmatory factor analysis. Table 1 summarises the proposed conceptual mapping between the MQ-COSLE dimensions and SDT. This mapping provides a theoretical rationale for interpreting the questionnaire but should be regarded as provisional rather than as evidence of direct construct equivalence. Establishing the empirical distinctiveness of Interest, Perceived Value, Self-Efficacy, and Reinforcement remains an important next step in the broader validation of MQ-COSLE.

Table 1
Proposed Conceptual Mapping between MQ-COSLE Dimensions and Self-Determination Theory

MQ-COSLE dimension	Main connection with SDT	Explanation
Interest	Intrinsic motivation	Students participate because they enjoy collaborative learning. It may be supported by autonomy, competence and relatedness.
Perceived Value	Identified regulation	Students participate because they understand and accept the importance of collaborative learning.
Self-Efficacy	Competence	Students believe that they can perform well and contribute to group activities.
Reinforcement	External regulation, competence and relatedness	Grades and praise reflect external motivation. Praise may support competence while positive relationships may support relatedness.

Measuring Motivation in Online Learning

Motivation in online learning has been measured using various theoretical perspectives and instruments. However, these measures differ considerably in their purposes, targeted constructs, timing of administration, and learning contexts. Some instruments assess general motivational orientations, whereas others focus on students' readiness, perceived task value, intrinsic motivation, or responses to particular instructional conditions. Consequently, evidence that an instrument is valid and reliable in one online learning context does not necessarily demonstrate its suitability for evaluating motivation after students have participated in a collaborative online social learning e-module. Chen and Jang (2010), for example, examined online learning motivation through Self-Determination Theory among 262 learners enrolled in two online certificate programmes. Their study investigated relationships among contextual support, psychological need satisfaction, self-determined motivation, and learning outcomes. The findings contributed to an understanding of how online learning conditions may support or undermine motivation. Nevertheless, the instrument was designed to test a theoretical model of general online learner motivation rather than to assess students' motivational responses to a specific collaborative learning intervention. It also focused primarily on the quality and regulation of motivation and did not distinguish the four dimensions of Interest, Perceived Value, Self-Efficacy, and Reinforcement that underpin MQ-COSLE.

Fryer and Bovee (2016) extended this line of inquiry by examining students' motivation for e-learning and the role of perceived teacher support. Their longitudinal analysis showed that teacher support was associated with students' motivational beliefs, including task value and ability beliefs, while ability beliefs were particularly relevant to e-learning completion. This study demonstrates that motivation in digital learning is influenced by instructional and interpersonal support rather than by technology alone. However, its focus was on motivation for completing individual e-learning assignments. The instrument was not designed to capture students' reasons for participating in peer interaction, contributing to group activities, or responding to social reinforcement within a collaborative online environment. More recently, Mendoza et al. (2023) investigated situational intrinsic motivation during an online language-learning task. Students who received need-supportive task instructions reported higher intrinsic motivation than those receiving standard instructions. The study provides useful evidence that motivation may vary in response to specific task design and can therefore be measured after an online learning experience. However, its measurement

was deliberately narrow because it focused on situational intrinsic motivation. It did not assess perceived value, self-efficacy, reinforcement, or motivation arising from collaborative and social interaction. Thus, although the study supports context-sensitive measurement, its instrument does not represent the broader range of motivational reasons relevant to collaborative online social learning.

A more closely related instrument was developed by Xiong et al. (2015) to assess learners' perceived readiness for computer-supported collaborative learning. The instrument comprises three dimensions: Motivation for Collaborative Learning, Prospective Behaviours for Collaborative Learning, and Online Learning Aptitude. The motivation dimension includes Interest, Perceived Value, Self-Efficacy, and Reinforcement. Its initial development and validation represented an important contribution because it recognised that readiness for computer-supported collaboration involves motivational, behavioural, and technological considerations rather than technical ability alone. However, the instrument was specifically designed as a pre-participation readiness measure. Its items therefore captured students' expectations and perceived preparedness before entering a computer-supported collaborative learning environment, rather than their motivation after experiencing a particular intervention.

Khalifeh et al. (2020) subsequently used the instrument developed by Xiong et al. (2015) with 326 higher education students in Iran. They reported strong internal consistency for the 15-item Motivation for Collaborative Learning dimension, with a Cronbach's alpha coefficient of 0.90. Their findings provide evidence that the original motivation items can function consistently in another higher education context. Nevertheless, their study retained the original readiness orientation and examined students' general preparedness for computer-supported collaborative learning. It did not assess motivation following participation in structured e-module activities, nor did it evaluate whether revised item wording was relevant to a collaborative online social learning context. Accordingly, its reliability evidence cannot be assumed to apply automatically to MQ-COSLE. Taken together, these studies show that established instruments can measure several important aspects of online learning motivation. However, their conceptual and methodological differences also reveal three important limitations. First, many studies assess general or relatively stable motivational orientations rather than motivation associated with a specific learning experience. Second, readiness instruments are commonly administered before participation, whereas post-intervention questionnaires require wording that reflects students' actual experiences. Third, existing measures often focus on individual online learning, instructor support, or intrinsic motivation and give less attention to the combination of structured e-module use, collaborative activities, peer interaction, and online social reinforcement.

The timing of measurement is particularly important. Students' anticipated motivation before an activity may differ from the motivation they report after experiencing the task design, interaction patterns, workload, feedback, and group processes. A student may initially expect collaborative learning to be enjoyable or useful but evaluate it differently after completing the activities. Conversely, students with low initial expectations may develop greater interest, confidence, or perceived value through successful participation. Therefore, an instrument developed as a readiness measure should not be used as a post-participation measure without appropriate adaptation and renewed validation.
Context also matters because motivation is not independent of the learning environment in which it is assessed. The motivational demands of an individual online course differ from those of a learning environment that combines an e-module, collaborative tasks, and a social media platform. In such an environment, students' motivation may be shaped simultaneously by their interest in the activities, recognition of collaborative value, confidence in contributing to the group, and expectations of grades, praise, or positive peer responses. A broad measure of online learning motivation may obscure these distinct reasons for participation.

Furthermore, evidence of reliability from an original instrument does not establish the validity or reliability of an adapted version. Changes in item wording, instructional context, target population, response timing, or mode of administration may alter how students interpret and respond to the items. Therefore, even when the original motivation dimension has demonstrated strong internal consistency, MQ-COSLE requires its own validity and reliability evidence. In particular, expert evaluation is needed to determine whether the adapted items remain relevant, clear, and representative of the intended motivational dimensions, while pilot testing is required to examine whether the items function consistently in the new context.These limitations establish a clear measurement gap. Existing instruments have examined readiness for collaborative learning, general online learner motivation, teacher-supported e-learning motivation, and situational intrinsic motivation. However, limited attention has been given to validating an instrument that assesses students' motivation after completing structured activities in a collaborative online social learning e-

module. MQ-COSLE was therefore adapted to address this contextual and temporal gap while retaining the four motivation dimensions of Interest, Perceived Value, Self-Efficacy, and Reinforcement. The present study provides an initial validation and reliability assessment by examining the questionnaire's content validity and internal consistency reliability.

Research Questions

This study addressed the following research questions:

1. What is the content validity of the adapted MQ-COSLE based on experts' evaluation?
2. What is the internal consistency reliability of the MQ-COSLE and its four dimensions among undergraduate students in the pilot study?

Methods

Research Design

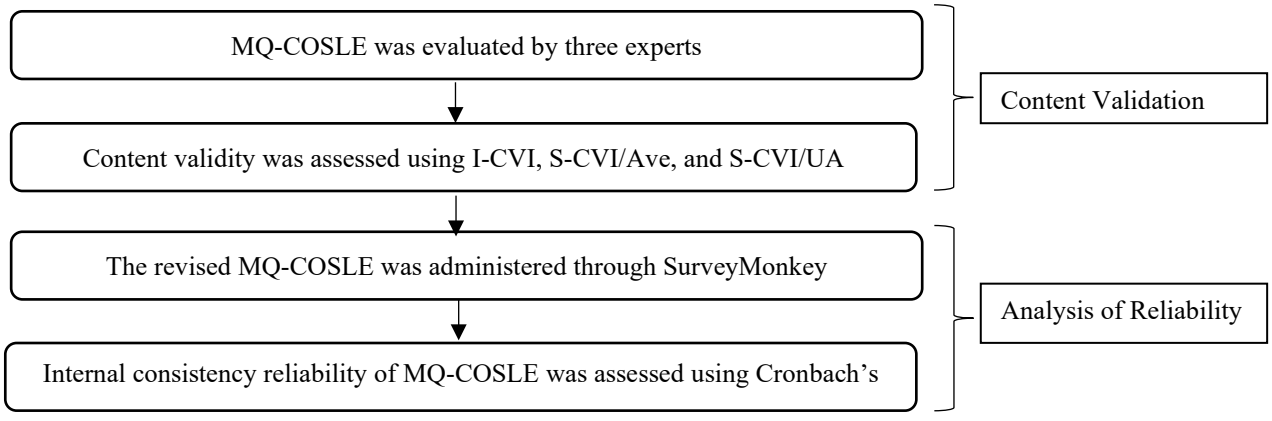
This study employed a pilot study to obtain pilot study evidence of the content validity and internal consistency reliability of the Motivation Questionnaire for Collaborative Online Social Learning E-Module (MQ-COSLE) prior to its use in the main study. MQ-COSLE was adapted from the Motivation for Collaborative Learning dimension developed by Xiong et al. (2015). The adaptation process involved reviewing and revising the original items to ensure their relevance to the context of the Collaborative Online Social Learning E-Module (M-COSHE).

In this study, M-COSHE refers to the e-module used as the instructional intervention, whereas MQ-COSLE refers to the questionnaire developed to assess students' motivation after completing the module-based collaborative learning activities. Distinguishing between the intervention and the measurement instrument was important because the pilot study focused specifically on determining whether MQ-COSLE was appropriate, relevant, and sufficiently consistent for use in the subsequent main study.

Research Procedure

The research procedure involved two main stages: content validation and pilot testing, as illustrated in Figure 1.

Figure 1
Research Procedure



First, the 16-item MQ-COSLE was evaluated by three experts using a structured evaluation form. The experts assessed the relevance and clarity of each item and provided written suggestions for improvement. Their ratings were used to calculate the item-level content validity index (I-CVI) and the scale-level content validity indices based on average

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agreement (S-CVI/Ave) and universal agreement (S-CVI/UA) (Polit & Beck, 2006; Yusoff, 2019). The questionnaire was subsequently revised based on the experts' quantitative ratings and written feedback to ensure that the items accurately reflected students' motivation while using the M-COSHE e-module for online collaborative learning activities conducted through a Facebook group. The revisions focused mainly on improving grammatical accuracy, clarifying item wording, refining the demographic response options, and separating a double-barrelled Reinforcement item. The four original dimensions—Interest, Perceived Value, Self-Efficacy, and Reinforcement—were retained. Following the content validation process, the revised MQ-COSLE was administered through SurveyMonkey to 42 undergraduate students after they had completed the M-COSHE online collaborative learning activities in the Facebook group. The pilot data were then analysed using Cronbach's alpha to assess the internal consistency reliability of the questionnaire.

Samples

Two sets of samples were involved in this study: (set i) three experts in online learning and (set ii) 42 undergraduate students. All samples were selected through purposive sampling based on criteria relevant to the instrument validation and pilot-testing procedures.

Set i: Experts Panel

The expert panel comprised three lecturers from Malaysian universities who were selected based on their relevant academic and professional experience. The selection criteria included expertise in online learning, experience teaching information technology or education-related courses, familiarity with the use of social learning tools for educational purposes, and a minimum of five years of teaching experience. The selected experts had between 16 and 24 years of teaching experience. These criteria were established to ensure that the experts were qualified to evaluate the relevance, clarity, and appropriateness of the questionnaire items. In particular, the panel assessed whether the items adequately represented students' motivation and were suitable for undergraduate students participating in collaborative online learning. The experts' demographics are presented in Table 2.

Set ii: 42 Undergraduate Students

The pilot study involved 42 undergraduate students from a Malaysian university who were selected through purposive sampling. A sample of 42 students was considered sufficient for obtaining pilot study evidence of the instrument's internal consistency reliability (Bujang et al., 2024; Hazzi & Maldaon, 2015). To be eligible for participation, students were required to have experience with online courses, be enrolled in information technology or education-related programmes, and have used social media for learning purposes. Table 3 presents the demographic and learning-background characteristics of the 42 undergraduate students who participated in the pilot study. Most participants were female, comprising 34 students (81%), while eight participants (19%) were male. All participants were second-year students (n = 42, 100%). Regarding their online learning experience, all participants reported having more than six months of experience with online learning (n = 42, 100%). Similarly, all participants had previously used an e-module for learning purposes and had experience using Facebook for online learning activities. These characteristics indicate that the participants were familiar with online learning, e-modules, and Facebook-supported learning. Therefore, they were considered suitable for evaluating the internal consistency reliability of MQ-COSLE within the context of collaborative online social learning.

Table 2

Demographic of the Experts

Expert	Designation	University	Years of teaching
Expert 1	Associate Professor	University A	24
Expert 2	Associate Professor	University B	20
Expert 3	Senior Lecturer	University C	16

Table 3

Demographic Characteristics of the Experts Involved in MQ-COSLE Validation

Characteristic		Frequency (f)	Percentages (%)
Gender	Male	8	19
	Female	34	81
Year of study	1	0	0
	2	42	100
	3	0	0
	4	0	0
Previous experience with online learning	Less than two months	0	0
	3-6 months	0	0
	More than 6 months	42	100
Previous experience using e-module for learning purposes	Yes	42	100
	No	0	0
Previous experience using Facebook for online learning activities	Yes	42	42
	No	0	0

Research Instruments

Motivation Questionnaire for Collaborative Online Social Learning E-Module (MQ-COSLE) consisted of two sections. Section A contained five demographic items developed by the researchers to obtain information about the participants' background. Section B comprised 16 items measuring students' motivation for online collaborative learning while using the M-COSHE e-module as per Table 4. These items in section B were adapted from the Motivation for Collaborative Learning dimension developed by Xiong et al. (2015). The original motivation dimension contained 15 items across four constructs: Interest, Perceived Value, Self-Efficacy, and Reinforcement. In the present study, the item wording was modified to reflect students' motivation during and after their participation in online collaborative learning activities supported by the M-COSHE e-module and Facebook group. One double-barrelled Reinforcement item was divided into two separate items, increasing the total number of motivation items from 15 to 16. All Section B items were rated using a five-point Likert scale ranging from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*).

Table 4
Examples of MQ-COSLE Items

Section	Description	Example of items	Reference	Items (n)
A	Demographic		Self-developed	7
B	I participated in collaborative learning activities using the e-module during online classes because……		Adapted from Xiong et al. (2015)	16
	Interest (IN1-IN4)	IN1 because I like to work with my classmates in group activities.		
	Perceived Value (PV1-PV4)	PV1 because compared with doing individual assignments, it is more effective to learn by doing group work.		
	Self-Efficacy (SE1-SE4)	SE1 because I believe I can do well in group work.		
	Reinforcement (RF1-RF4)	RF1 because I hope to achieve a good grade for this course.		

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Results

Content Validity of MQ-COSLE

The content validity analysis indicated complete agreement among the three experts for all MQ-COSLE items, as presented in Table 4. Each of the 16 items was rated as relevant and clear by all three experts, resulting in an item-level content validity index (I-CVI) of 1.00 for every item. Accordingly, both the scale-level content validity index based on average agreement (S-CVI/Ave) and universal agreement (S-CVI/UA) were 1.00. These findings provide pilot study evidence that the MQ-COSLE items were relevant, clear, and appropriate for measuring students' motivation within the intended collaborative online social learning context.

Table 5
Result of Content Validity of MQ-COSLE

Dimension / Item		Item statement	E1	E2	E3	Experts in Agreement	I-CVI	UA
Interest (IN)	IN1	because I like to work with my classmates in group activities after joining activities in Facebook group.	1	1	1	3/3	1.00	1.00
	IN2	because I enjoy the experience of working together with classmates after joining activities in Facebook group.	1	1	1	3/3	1.00	1.00
	IN3	because it is fun to work together in a group after joining activities in Facebook group.	1	1	1	3/3	1.00	1.00
	IN4	because it is important for me to do group work after joining activities in Facebook group.	1	1	1	3/3	1.00	1.00
Perceived Value (PV)	PV1	because comparing with doing individual assignments, it is more effective to learn by doing group work after joining activities in Facebook group.	1	1	1	3/3	1.00	1.00
	PV2	because it can help my learning process after joining activities in Facebook group.	1	1	1	3/3	1.00	1.00
	PV3	because working in groups allows me to solve more complex topics than working individually after joining activities in Facebook group.	1	1	1	3/3	1.00	1.00
	PV4	because there are many opportunities for discussion by working in groups after joining activities in Facebook group.	1	1	1	3/3	1.00	1.00
Self-Efficacy (SE)	SE1	because I believe I can do well in the group work after joining activities in Facebook group.	1	1	1	3/3	1.00	1.00
	SE2	because I believe I can help my groupmates to solve the work together after joining activities in Facebook group.	1	1	1	3/3	1.00	1.00
	SE3	because I believe I can work well with my groupmates after joining activities in Facebook group.	1	1	1	3/3	1.00	1.00

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Dimension / Item		Item statement	E1	E2	E3	Experts in Agreement	I-CVI	UA
	SE4	because I believe I can play an important role in the accomplishment of the group task after joining activities in Facebook group.	1	1	1	3/3	1.00	1.00
Reinforcement (RF)	RF1	because I hope to achieve a good grade for this course after joining activities in Facebook group.	1	1	1	3/3	1.00	1.00
	RF2	because I hope to receive praise from lecturers about my good performance after joining activities in Facebook group.	1	1	1	3/3	1.00	1.00
	RF3	because I hope to receive praise from classmates about my good performance after joining activities in Facebook group.	1	1	1	3/3	1.00	1.00
	RF4	because I hope to have a good relationship with my groupmates after joining activities in Facebook group.	1	1	1	3/3	1.00	1.00
						S-CVI/Ave	1.00	
						S-CVI/UA		1.00

Note. The experts first reviewed the items qualitatively for relevance, clarity, wording and contextual suitability. Their comments were considered during item refinement. The values shown are the final binary judgements for the complete 16-item version, where 1 = Agree and 0 = Disagree.

E = expert; I-CVI = item-level content validity index; UA = universal agreement; S-CVI/Ave = scale-level content validity index based on the average method; S-CVI/UA = scale-level content validity index based on the universal agreement method.

Internal Consistency Reliability of MQ-COSLE

Reliability of Interest

As presented in Table 6, the Interest (IN) dimension demonstrated good internal consistency, with an overall Cronbach's alpha coefficient of 0.891. This value exceeded the recommended threshold of 0.80, indicating that the four items consistently measured the Interest dimension (Tavakol & Dennick, 2011). The corrected item–total correlation coefficients ranged from 0.717 to 0.849, indicating strong associations between each item and the total dimension score. Furthermore, the Cronbach's alpha coefficients if an item was deleted ranged from 0.826 to 0.877, all of which were lower than the overall coefficient of 0.891. This suggests that deleting any item would reduce, rather than improve, the internal consistency of the dimension. Accordingly, all four Interest items were retained for subsequent use.

Table 6
Reliability of Interest

Variable	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected item–total correlation	Cronbach's alpha if item deleted	Overall Cronbach's alpha
IN1	12.02	3.682	0.717	0.877	0.891
IN2	11.93	3.629	0.849	0.826	
IN3	12.05	3.754	0.759	0.859	
IN4	12.00	3.951	0.720	0.873	

Reliability of Perceived Value

As presented in Table 7, the Perceived Value (PV) dimension demonstrated good internal consistency, with an overall Cronbach's alpha coefficient of 0.891. This value exceeded the recommended threshold of 0.80, indicating that the four items consistently measured the Perceived Value dimension (Tavakol & Dennick, 2011).The corrected item–total correlation coefficients ranged from 0.687 to 0.824, indicating that all items were adequately associated with the total dimension score. In addition, the Cronbach's alpha coefficients if an item was deleted ranged from 0.840 to 0.890, all of which were lower than the overall coefficient of 0.891. This indicates that removing any item would not improve the internal consistency of the dimension. Therefore, all four Perceived Value items were retained.

Table 7
Reliability of Perceived Value

Variable	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected item–total correlation	Cronbach's alpha if item deleted	Overall Cronbach's alpha
PV1	12.12	3.522	0.687	0.890	0.891
PV2	11.90	3.747	0.824	0.845	
PV3	11.95	3.266	0.812	0.840	
PV4	11.95	3.510	0.747	0.865	

Reliability of Self-Efficacy

As presented in Table 8, the Self-Efficacy (SE) dimension demonstrated excellent internal consistency, with an overall Cronbach's alpha coefficient of 0.932. This value exceeded the recommended threshold of 0.80, indicating a high level of consistency among the four items measuring Self-Efficacy (Tavakol & Dennick, 2011). The corrected item–total correlation coefficients ranged from 0.801 to 0.874, indicating strong associations between each item and the total dimension score. Furthermore, the Cronbach's alpha coefficients if an item was deleted ranged from 0.901 to 0.926, all of which were lower than the overall coefficient of 0.932. This indicates that deleting any item would not improve the internal consistency of the dimension. Accordingly, all four Self-Efficacy items were retained.

Table 8
Reliability of Self-Efficacy

Variable	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected item–total correlation	Cronbach's alpha if item deleted	Overall Cronbach's alpha
SE1	11.86	4.125	0.874	0.905	0.932
SE2	11.93	3.873	0.801	0.926	
SE3	11.79	3.782	0.873	0.901	
SE4	11.79	3.880	0.828	0.916	

Reliability of Reinforcement

As presented in Table 9, the Reinforcement (RF) dimension demonstrated excellent internal consistency, with an overall Cronbach's alpha coefficient of 0.910. The corrected item–total correlation coefficients ranged from 0.681 to 0.875, indicating that all four items were adequately associated with the total dimension score. The Cronbach's alpha coefficients if an item was deleted ranged from 0.856 to 0.923. Although deleting RF1 would slightly increase the coefficient from 0.910 to 0.923, the improvement was minimal and did not provide sufficient justification for removing the item. Therefore, all four Reinforcement items were retained. Nevertheless, the alpha coefficient above 0.90 should be interpreted with caution, as it may indicate a degree of similarity or overlap among the items. Further examination using a larger sample and factor-analytic procedures is therefore recommended to determine whether the items represent sufficiently distinct aspects of reinforcement.

Table 9
Reliability of Reinforcement

Variable	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected item–total correlation	Cronbach's alpha if item deleted	Overall Cronbach's alpha
RF1	12.26	4.539	0.681	0.923	0.910
RF2	12.26	4.100	0.812	0.879	
RF3	12.26	3.954	0.875	0.856	
RF4	12.14	4.077	0.824	0.874	

Overall Reliability of MQ-COSLE

Table 10 summarises the internal consistency results for MQ-COSLE. The overall Cronbach's alpha coefficient for the 16-item instrument was 0.965, indicating excellent internal consistency. Across the four dimensions, the coefficients ranged from 0.891 to 0.932. Interest and Perceived Value each recorded an alpha coefficient of 0.891, followed by Reinforcement at 0.910 and Self-Efficacy at 0.932. These results suggest that the items within each dimension measured their respective constructs consistently. Despite the high reliability coefficients, the overall alpha value of 0.965 warrants cautious interpretation. Coefficients exceeding 0.90 may indicate that certain items are highly similar or capture overlapping aspects of the same construct (Tavakol & Dennick, 2011). Thus, while the findings provide strong pilot study evidence of the instrument's internal consistency, potential item redundancy should be investigated further using a larger sample and factor-analytic techniques.

Table 10
Cronbach's Alpha Values for MQ-COSLE

Dimension	Cronbach's alpha	Interpretation
Interest (IN)	0.891	Good internal consistency
Perceived Value (PV)	0.891	Good internal consistency
Self-Efficacy (SE)	0.932	Very high internal consistency
Reinforcement (RF)	0.910	Very high internal consistency
Overall MQ-COSLE instrument (16 items)	0.965	Very high internal consistency. Possible item redundancy should be examined.

Discussion

The content validity findings provide pilot study support for the relevance and appropriateness of the 16 MQ-COSLE items for assessing Interest, Perceived Value, Self-Efficacy, and Reinforcement within the collaborative online social learning context. All items achieved an I-CVI of 1.00, while both the S-CVI/Ave and S-CVI/UA were also 1.00, indicating complete agreement among the three experts. These values exceeded the commonly recommended criteria for acceptable content validity. Nevertheless, the indices should not be interpreted as definitive evidence of overall instrument validity because content validity primarily concerns the relevance and representativeness of the items, rather than their underlying dimensional structure (Polit et al., 2007; Yusoff, 2019).

The quantitative findings were strengthened by the experts' qualitative feedback. Their review identified grammatical inaccuracies, ambiguous wording, and a double-barrelled Reinforcement item. Consequently, the demographic response options were refined, several statements were clarified, and the item referring simultaneously to praise from lecturers and classmates was divided into two separate items. This distinction was conceptually important because lecturer praise and peer praise may represent different sources of reinforcement. Thus, the expert review contributed not only to numerical agreement but also to improving the clarity, precision, and contextual relevance of MQ-COSLE. This illustrates that content validation should be treated as an iterative process in which quantitative ratings and qualitative judgements are considered together when refining an instrument.

The findings are broadly consistent with Krishna Pillai et al. (2025), who used expert review to evaluate a motivation questionnaire for programming learning supported by an augmented reality module. Both studies demonstrated that

expert evaluation can strengthen the suitability of motivation items for a specific technology-supported learning context. However, direct numerical comparison is limited because Krishna Pillai et al. used seven experts and percentage agreement, whereas the present study used three experts and calculated I-CVI, S-CVI/Ave, and S-CVI/UA. The studies also examined different instructional technologies. Therefore, the findings should be viewed as complementary evidence of the importance of contextual validation rather than as directly equivalent results.

Similarly, Govindasamy et al. (2024) demonstrated that content validation may lead to the retention, revision, or rejection of questionnaire items. Although no MQ-COSLE item was removed, several modifications were made in response to the experts' written comments. The difference between the two studies highlights that a high content validity index does not eliminate the need for item refinement. An item may be considered relevant while still requiring improvements in wording, clarity, or contextual suitability. Accordingly, decisions concerning item retention should not depend solely on numerical cut-off values.

Despite the complete expert agreement, the findings should be interpreted cautiously because the panel comprised only three experts. With a small panel, each expert's judgement has a substantial influence on the I-CVI; a single disagreement would reduce an item's I-CVI from 1.00 to 0.67. Although complete agreement supports the content relevance of the items, a small panel may not capture the range of perspectives that could emerge from a larger and more diverse group of experts. Furthermore, content validity does not establish whether Interest, Perceived Value, Self-Efficacy, and Reinforcement are empirically distinguishable. The findings should therefore be regarded as pilot study evidence of content validity rather than evidence of comprehensive construct validation.

The four MQ-COSLE dimensions demonstrated good to excellent internal consistency. Interest and Perceived Value each achieved a Cronbach's alpha coefficient of 0.891, while Reinforcement and Self-Efficacy recorded coefficients of 0.910 and 0.932, respectively. The corrected item–total correlations were also positive and sufficiently high, indicating that each item was meaningfully associated with the total score of its proposed dimension. Collectively, these findings suggest that the items within each dimension elicited consistent responses among the pilot participants. The findings can be compared with Khalifeh et al. (2020), who administered the original readiness instrument developed by Xiong et al. (2015) to 326 higher education students and reported a Cronbach's alpha coefficient of 0.90 for the 15-item Motivation for Collaborative Learning dimension. The coefficients obtained for MQ-COSLE were comparable to or higher than the value reported by Khalifeh et al., suggesting that the items remained internally consistent after their wording, administration timing, and learning context were modified. However, this similarity should not be interpreted as evidence that the two instruments measure motivation in precisely the same manner. Khalifeh et al. assessed students' readiness before computer-supported collaborative learning, whereas MQ-COSLE assessed motivation after students had participated in online collaborative learning activities using the M-COSHE e-module in a Facebook group.

Krishna Pillai et al. (2025) reported alpha coefficients ranging from 0.73 to 0.85 across four motivation dimensions and an overall coefficient of 0.80. Although the coefficients obtained for MQ-COSLE were higher, this does not necessarily indicate superior measurement quality. Cronbach's alpha is affected by the number of items, the degree of similarity among them, and the characteristics of the sample. It assesses the interrelatedness of items but does not independently establish validity or unidimensionality (Tavakol & Dennick, 2011). Therefore, differences in alpha coefficients across instruments should be interpreted in relation to their constructs, learning contexts, item structures, and participant populations rather than as direct indicators of comparative quality.

The findings reported by Fakhri et al. (2023) and Cook and Skrupky (2025) further illustrate the distinction between internal consistency and structural validity. Fakhri et al. supplemented reliability analysis with confirmatory factor analysis, whereas Cook and Skrupky found that acceptable reliability coefficients did not necessarily correspond to adequate model fit. Their subsequent analyses resulted in shorter and structurally improved versions of the instruments. These findings reinforce the principle that a set of items may produce consistent responses without necessarily representing the proposed factor structure. Exploratory and confirmatory factor analyses address the relationships among items and latent dimensions and therefore provide information that cannot be obtained from Cronbach's alpha alone (Fabrigar et al., 1999; Worthington & Whittaker, 2006).

The overall Cronbach's alpha coefficient of 0.965 for the 16 MQ-COSLE items consequently warrants careful interpretation. On the one hand, the coefficient indicates a high degree of interrelatedness among the items. On the other hand, alpha coefficients above 0.90 may signal item redundancy or conceptual overlap, particularly when several items use similar wording or refer repeatedly to the same learning experience (Tavakol & Dennick, 2011). In MQ-COSLE, the high overall coefficient may partly reflect repeated references to participation in the M-COSHE e-module and Facebook-group activities. It may also indicate overlap among Interest, Perceived Value, Self-Efficacy, and Reinforcement rather than the presence of a single underlying motivation dimension.

At the dimension level, deleting RF1 would have slightly increased the Reinforcement alpha coefficient from 0.910 to 0.923. However, the increase was small and did not provide sufficient statistical or conceptual justification for removing the item during the pilot stage. RF1 concerns grades as a source of reinforcement, which differs conceptually from praise and social recognition. Removing it solely to obtain a marginally higher alpha coefficient could narrow the construct coverage of the Reinforcement dimension. Item-retention decisions should therefore balance statistical results with the theoretical relevance and content represented by each item.

Overall, the results provide pilot study evidence of the internal consistency reliability of MQ-COSLE but do not confirm its dimensional structure. In particular, the overall coefficient of 0.965 should not be interpreted as evidence that MQ-COSLE measures a single general motivation construct. Similarly, the dimension-specific coefficients do not independently demonstrate that Interest, Perceived Value, Self-Efficacy, and Reinforcement are statistically distinct. The reliability findings should therefore be interpreted as one component of the broader validation process.

The four MQ-COSLE dimensions can be conceptually interpreted through Self-Determination Theory. Interest reflects intrinsic motivation because students may participate when they find collaborative learning activities enjoyable or inherently satisfying. Perceived Value is aligned with identified regulation because students participate after recognising the usefulness and personal importance of collaborative learning. Self-Efficacy is conceptually related to competence because it reflects students' confidence in their ability to complete tasks and contribute effectively to their groups. Reinforcement primarily represents externally regulated motivation through grades, praise, and recognition.
This interpretation is consistent with research indicating that motivation in online learning is influenced by students' experiences of autonomy, competence, and relatedness. Chen and Jang (2010) demonstrated the relevance of these psychological needs in explaining online learner motivation, while Chiu (2022) found that need support predicted engagement in online learning, with relatedness being especially important in socially separated learning environments. These findings support the use of SDT as a lens for understanding why interest, perceived value, confidence, and social reinforcement may influence participation in collaborative online learning.

Nevertheless, the correspondence between MQ-COSLE and SDT should not be treated as direct construct equivalence. Self-Efficacy is theoretically related to perceived competence but is not identical to the basic psychological need for competence. Similarly, praise and positive peer relationships may support competence and relatedness, but the Reinforcement dimension primarily assesses external or social outcomes associated with participation. Moreover, MQ-COSLE does not contain direct measures of autonomy, competence, or relatedness. SDT therefore provides a theoretical explanation for the four motivational dimensions rather than empirical evidence that the three basic psychological needs were satisfied.

Practical Implications of MQ-COSLE

MQ-COSLE may be used as a low-stakes evaluative instrument to examine students' motivational responses after participating in collaborative online learning activities supported by an e-module. Lecturers may review students' responses across the four proposed dimensions to identify areas that may require instructional attention. Lower Interest scores may suggest that the activities are insufficiently engaging, whereas lower Perceived Value scores may indicate that students do not clearly recognise the relevance or usefulness of the collaborative tasks. Lower Self-Efficacy scores may reflect limited confidence in completing the activities or contributing to group work, while lower Reinforcement scores may indicate insufficient feedback, recognition, encouragement, or social support. The findings may assist lecturers in refining the learning experience. For example, collaborative activities may be redesigned to enhance their relevance and engagement, instructions may be clarified, and additional guidance or scaffolding may be provided. Lecturers may also strengthen peer interaction and provide more timely and constructive feedback. MQ-COSLE may

be administered at different stages of an intervention to examine changes in students' motivational responses following improvements to the learning activities. However, such comparisons should be interpreted cautiously until the questionnaire's factor structure and measurement properties have been established more comprehensively.

Instructional designers may also use the questionnaire results to inform the review of collaborative online learning environments. Responses related to Interest and Perceived Value may guide improvements to the content, task authenticity, and relevance of the learning activities. Self-Efficacy responses may help identify areas in which students require additional examples, scaffolding, practice opportunities, or clearer task guidance. Reinforcement responses may inform the integration of lecturer feedback, peer recognition, progress acknowledgement, and opportunities for supportive group interaction. For researchers, MQ-COSLE offers a pilot study measure for examining motivation in learning environments that combine structured e-module content, online collaborative activities, and social interaction. It may support exploratory comparisons across learning approaches, participant groups, or stages of an intervention. Nevertheless, the present evidence is limited to content validity and internal consistency reliability. MQ-COSLE should therefore not yet be treated as a fully validated four-dimensional instrument without further examination of its factor structure and construct validity. At this stage, MQ-COSLE is most appropriately used for research and instructional improvement rather than diagnostic or high-stakes purposes. Individual or group scores should not be interpreted using fixed cut-off points, and the instrument should not be used to classify students as motivated or unmotivated. Its results should instead be considered alongside other evidence, such as participation records, students' feedback, observations, and learning outcomes.

Conclusion

This study adapted the Motivation for Collaborative Learning dimension developed by Xiong et al. (2015) to assess students' motivation after participating in online collaborative learning activities supported by the M-COSHE e-module and a Facebook group. The adapted instrument, named the Motivation Questionnaire for Collaborative Online Social Learning E-Module (MQ-COSLE), comprised 16 items across four proposed dimensions: Interest, Perceived Value, Self-Efficacy, and Reinforcement. The findings provide pilot study evidence supporting the content validity and internal consistency reliability of MQ-COSLE. All items achieved an I-CVI of 1.00, while both the S-CVI/Ave and S-CVI/UA were also 1.00, indicating complete agreement among the three experts regarding the relevance and clarity of the items. The four dimensions demonstrated good to excellent internal consistency, with Cronbach's alpha coefficients ranging from 0.891 to 0.932. The overall coefficient of 0.965 further indicated strong consistency among the 16 items. Nevertheless, this high value should be interpreted cautiously because it may reflect similarity or conceptual overlap among some items.

MQ-COSLE contributes to addressing a measurement gap by adapting an existing readiness-based instrument to evaluate students' motivation after experiencing a specific collaborative online social learning intervention. The questionnaire may assist lecturers and instructional designers in examining students' interest, perceived value, self-efficacy, and reinforcement and in identifying aspects of the learning experience that may require improvement. It may also serve as a pilot study research instrument in comparable learning environments. However, the findings should not be interpreted as evidence that the proposed four-dimensional structure has been fully established.

The present evidence is limited to content validity and internal consistency reliability. Therefore, the factor structure and construct validity of MQ-COSLE should be examined using a larger and more diverse sample. Any future version that replaces the term "Facebook group" with a broader platform-related term should also undergo renewed content validation to ensure that the revised items remain relevant, clear, and appropriate for the intended learning context. Until further validation is completed, MQ-COSLE should be used cautiously as a low-stakes instrument for research and instructional improvement rather than for diagnostic or high-stakes decision-making.

Limitations and Future Studies

Several limitations should be considered when interpreting the findings of this study. First, the pilot sample comprised 42 undergraduate students from a single Malaysian university. Although this sample was appropriate for a pilot study assessment, its small size and limited institutional context restrict the generalisability of the findings to other student

populations, academic disciplines, and higher education settings. Future studies should therefore involve larger and more diverse samples to provide stronger evidence regarding the stability and broader applicability of MQ-COSLE.

Second, the reliability assessment was limited to internal consistency using Cronbach's alpha. Although the findings indicated good to excellent reliability, Cronbach's alpha alone does not demonstrate the stability of the instrument over time or confirm its underlying structure. Additional reliability evidence, such as McDonald's omega and test–retest reliability, should therefore be examined. Composite reliability may also be assessed once the measurement model has been established.

Third, the overall Cronbach's alpha coefficient of 0.965 may indicate similarity or conceptual overlap among some items. The present pilot study did not examine inter-item correlations, dimensionality, or construct validity. Consequently, the findings cannot confirm whether the 16 items represent four empirically distinct dimensions or a broader general motivation construct. Future studies should examine the inter-item correlation matrix and evaluate the proposed four-dimensional measurement model using confirmatory factor analysis (CFA) with a sufficiently large and diverse sample. If the dimensional structure remains uncertain, exploratory factor analysis may first be conducted, followed by CFA using an independent sample. These analyses would provide stronger evidence of construct validity and help identify items with weak factor loadings, cross-loadings, or possible redundancy.

Finally, MQ-COSLE was evaluated within a specific learning context in which the M-COSHE e-module was integrated with a Facebook group. Therefore, the present validity and reliability evidence should not be generalised automatically to other online social learning platforms. Future studies should examine MQ-COSLE in other digital learning environments, such as Moodle, Google Classroom, or Microsoft Teams. Any substantial revision of platform-specific wording should be followed by renewed content validation, construct validation, and reliability assessment before the instrument is applied more broadly.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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