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Educating in an Era of Continuous Change

Bridging design and practice: Teacher and learning designer perceptions on cognitive engagement in online learning

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This study investigates university teachers' and learning designers' perceptions of students' cognitive engagement in online learning. Using qualitative data, five key behavioural indicators were identified: active participation, application of knowledge, preparation, collaboration, and high-quality contributions. Teachers emphasised real-time engagement through digital tools and classroom interactions, while learning designers highlighted the role of instructional scaffolding and teacher preparedness in supporting deeper learning. Collaborative learning was a shared focus, with peer interaction seen as a driver of critical thinking and reflection. A notable divergence in emphasis emerged: teachers prioritised observable behaviours, whereas designers focused on pedagogical design. This suggests a need for better alignment between teaching practice and instructional design to enhance engagement. The findings highlight the interplay between student agency and structured learning environments, offering insights into optimising online education for sustained cognitive effort and meaningful learning.

Keywords: University teacher; Learning designer; Cognitive engagement; Online learning; Higher education

Introduction

The global higher education landscape has experienced a profound transformation in the wake of the COVID-19 pandemic, with online learning emerging as a central mode of instructional delivery. Rapid advancements in digital technologies, including GenAI, have significantly accelerated this shift, which has enabled more inclusive, flexible, and personalised learning experiences. These developments have not only reshaped traditional pedagogical paradigms but also prompted a re-evaluation of how student engagement is fostered in virtual learning environments. Student engagement, particularly cognitive engagement, is widely recognised as a critical factor influencing academic success. Meyer (2014) posits that engagement is positively associated with student satisfaction, persistence, and academic performance, especially in online contexts. To optimise learning outcomes in such environments, promoting cognitive engagement through the intentional design of structured and scaffolded learning experiences is essential. These are typically facilitated through learning management systems (LMS) and virtual classrooms, which support students in actively processing information, constructing knowledge, and applying concepts in meaningful ways.

This pedagogical evolution has concurrently intensified the demand for learning designers, who play a pivotal role in supporting academic staff through pedagogical consultation and the development of effective online learning environments. At the same time, there is an increasing imperative to build the capacity of university teachers to adopt and implement evidence-based online teaching strategies. As institutions continue to adapt to this evolving context, collaboration between learning designers and academic staff is becoming increasingly vital to ensuring the delivery of high-quality, engaging, and pedagogically sound online education (Richardson & Newby, 2006). Despite the growing emphasis on collaboration, limited research has examined whether learning designers and university teachers share aligned understandings of cognitive engagement in online learning. This pilot study seeks to address this gap by exploring how these two stakeholder groups conceptualise and interpret student cognitive engagement within online learning environments. The findings aim to inform collaborative practices in the design and implementation of online learning activities and pedagogical strategies that effectively promote cognitive engagement.

Cognitive engagement in online learning

Cognitive engagement has been widely recognised as a critical dimension of student engagement, particularly in online learning environments. Fredricks et al. (2019) conceptualise cognitive engagement as the degree of students' psychological investment in learning and the effort they exert to comprehend and master academic content. This form of engagement is characterised by self-regulation and the strategic use of learning approaches. Cognitively engaged learners are inclined to go beyond task requirements, reframe information in their own words, employ deep learning strategies, and seek out intellectually challenging tasks. In the context of online education, cognitive engagement refers to the mental effort and commitment learners dedicate to understanding and internalising content (Martin & Borup, 2022). It also involves integrating motivational, metacognitive and affective strategies throughout the learning process (Chen & Pedersen, 2012; Richardson & Newby, 2006). These processes are closely associated with the quality and frequency of interactions within the online environment, including learner-to-teacher, learner-to-learner, and learner-to-content interactions, which are shaped by the affordances of digital platforms.

Empirical studies have further illuminated the dynamic nature of cognitive engagement in online settings. Guo et al. (2023) observed that students' cognitive engagement increased as they transitioned from surface-level to deeper peer interactions. Similarly, Zhou and Ye (2024) found that learners who demonstrated high levels of cognitive engagement frequently elaborated on their perspectives and shifted between expressing and refining their ideas during collaborative online group work. These behaviours were associated with the development of critical thinking and collaborative competencies. Moreover, recent research highlights the importance of learner autonomy and learning design in fostering cognitive engagement. For instance, Martin and Borup (2022) report that allowing students to choose how they respond in asynchronous discussions can enhance engagement, particularly when teachers provide explicit prompts that encourage reflection and abstract thinking. Collectively, these findings suggest that strategies aimed at enhancing cognitive engagement in online learning should prioritise meaningful interaction, clear communication and collaborative opportunities that promote deep thinking and problem-solving.

Given the centrality of cognitive engagement to effective online learning, it is essential to understand how key stakeholders involved in course design and delivery conceptualise and interpret this construct. University teachers and learning designers play complementary roles in shaping online learning environments, yet their perceptions of cognitive engagement may differ in meaningful ways.

Method

This pilot study aims to explore how university teachers and learning designers conceptualise and interpret student cognitive engagement within online learning environments. The objective is to generate insights that can inform the design and implementation of online learning activities and pedagogical practices that effectively promote such engagement.

A total of sixteen university teachers and ten learning designers from two Australian universities participated in this study. Demographic details of the participants are presented in Table 1. Two methods of data collection were used for practical reasons: university teachers completed online open-ended questionnaires, as their involvement formed part of a larger ongoing study and only interim data were available at the time of writing. Learning designers, on the other hand, took part in semi-structured interviews, which were conducted as a separate, completed component of the research. Participants were asked to respond to three sets of questions concerning students' cognitive engagement during three types of interactions as defined by Moore (1989): learner-teacher, learner-learner, and learner-content interactions. These interaction types have been widely recognised in the literature as critical to fostering student engagement in online learning contexts (Bolliger & Martin, 2018; Kennedy, 2004). The online open-ended questionnaire required approximately 20 to 30 minutes to complete, while the semi-structured interview sessions with learning designers lasted between 25 and 30 minutes. Thematic analysis, as outlined by Braun and Clarke (2012), was employed to analyse the qualitative data obtained from both the questionnaire responses and interview transcripts. Two coders independently read and re-read the data to generate initial codes and subsequently identify potential themes. To ensure

reliability, the coders initially analysed 75% of the transcripts with a 50% overlap. Discrepancies in coding were discussed collaboratively until a full consensus was reached. Following this, the coders proceeded to analyse the remaining transcripts and refine the thematic structure.

The research questions (RQ) are:

1. In what ways do university teachers perceive and identify students' cognitive engagement during learner-learner, learner-teacher, and learner-content interactions in online learning environments?
2. In what ways do university learning designers perceive and identify students' cognitive engagement during learner-learner, learner-teacher, and learner-content interactions in online learning environments?

Table 1

University teachers' and learning designers' demographic information

	University teachers (n = 16)	**Learning designers (n = 10)**
Sex		
Male	8	3
Female	8	7
Online teaching experience		
1 to 5 years	5	
6 to 10 years	6	
More than 11 years	7	
Learning design experience		
1 to 5 years		6
6 to 10 years		1
More than 11 years		3
Discipline areas		
Business	4	3
Law	3	2
Engineering	5	0
Science	2	1
Health	2	4

Preliminary findings

RQ1: University teachers' perceptions of student cognitive engagement in online learning

To address Research Question 1 (RQ1), the initial findings revealed that university teachers identified five key behaviours as indicative of students' cognitive engagement in online learning environments: active participation, application of knowledge, adequate preparation, collaborative interactions, and the production of high-quality contributions. Additionally, teachers reinforced the importance of well-structured and scaffolded learning materials and activities in supporting these behaviours (see Figure 1).

Among these indicators, active participation was the most frequently cited marker of cognitive engagement, particularly during virtual classroom sessions. Teachers pointed to the use of digital tools and students' visible presence as evidence of engagement. For example, one teacher noted: 'Cameras on is a good indication of likely engagement. Then, there are those students who use online tools to indicate their engagement, e.g., chat and reactions, using the whiteboard'. Another added: 'They engage in chat, whiteboard activities, showing emojis, stay after during question time even if no questions. They listen to others'. These observations suggest that both verbal and non-verbal forms of interaction are perceived as reflective of attentiveness and active involvement.

Application of knowledge was also highlighted as a key indicator, particularly when students extended their understanding beyond the provided content or applied concepts to real-world contexts. One teacher remarked: 'They articulate their reasoning, share problem-solving strategies, and justify their answers', emphasising the role of critical thinking and reflective dialogue. Closely related to this was student preparation, which teachers described as timely access to course materials and active engagement in preparatory activities. As one teacher explained: 'Students will access the online material at the correct time

during the term and participate in interactive online learning activities to be fully prepared for the class'. These behaviours collectively reflect the mental effort, motivation, and strategic learning approaches characteristic of cognitive engagement.

Collaborative interaction was another prominent theme. Teachers described cognitively engaged students as those who build upon and critically respond to their peers' contributions. One teacher noted: 'They connect their responses to peers' contributions, expanding or refining the discussion', while another observed: 'They show willingness to reconsider their views based on peer input or new information'. Such behaviours not only demonstrate engagement but also enhance the quality of student contributions, which was frequently cited as a distinct indicator. As one teacher stated: 'They support their points with data, readings, or real-world examples'. Interestingly, only a small number of teachers explicitly identified well-designed instructional structures as a factor that facilitates cognitive engagement. This suggests that while individual student behaviours are often foregrounded in teachers' perceptions, the role of pedagogical design may be under-recognised despite its potential to scaffold and support deeper learning processes.

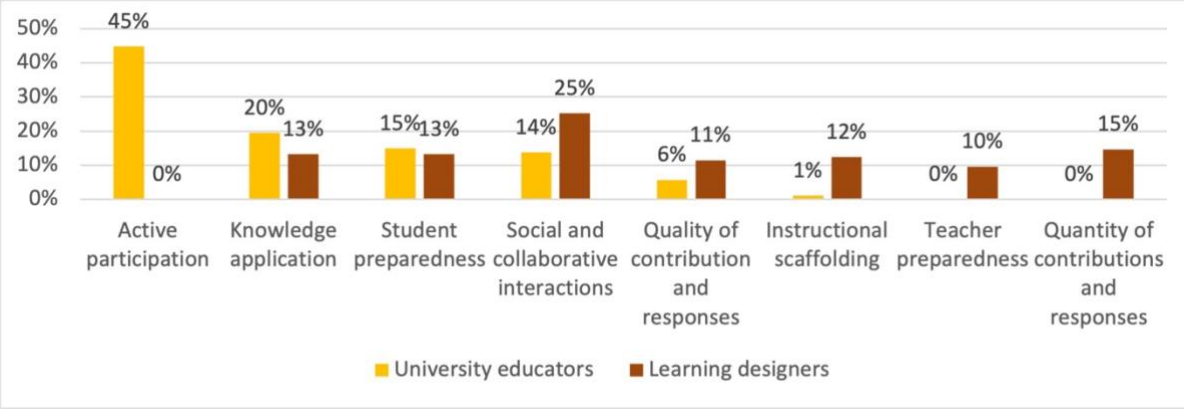

Figure 1. The proportion of excerpts associated with each theme representing university teachers' and learning designers' perceptions of cognitive engagement in online learning.

RQ2: Learning designers' perceptions of student cognitive engagement in online learning

To address Research Question 2 (RQ2), the study identified several indicators through which learning designers perceived students' cognitive engagement in online learning environments. These indicators included knowledge application, student preparedness, social and collaborative interactions, the quality and quantity of student responses, instructional scaffolding, and teacher preparedness (see Figure 1).

Collaborative interactions were consistently highlighted by learning designers as a key mechanism for deepening cognitive engagement. One designer noted: 'There is peer review so they could peer review each other's work and give a critique of what the other person has written and give their feedback, and that would be a sign of cognitive engagement'. Another designer supported this perspective, elaborating that: 'if putting students in groups and encouraging that discussion to get the constructive feedback from the peer, they would make an effort to give informed feedback. So while supporting their peers they are learning about their problem, and at the same time can share what they have discovered about their individual problems as well'.

In addition to collaboration, student preparedness emerged as a critical factor. Designers noted that cognitively engaged students typically come to class well-prepared and are able to apply their knowledge in both asynchronous and synchronous learning contexts. One designer remarked, "They will engage if they are prepared and have the necessary knowledge to participate in discussions; without that knowledge, there is an inability to engage." Another added that students' application of learning is evident through their performance in assessments and classroom activities.

The quality and quantity of student responses were also cited as important indicators. One designer observed that the depth of students' summaries can reveal their level of understanding, stating: 'You can see through

the quality of their summaries whether a student truly understands the article'. Another emphasised the importance of tracking these metrics as a means of evaluating engagement.

Finally, instructional design and teacher preparedness were identified as essential components in promoting cognitive engagement. Scenario-based learning was identified as particularly effective in stimulating cognitive processes. Furthermore, designers highlighted the importance of preparatory activities, such as pre-workshop tasks and discussion board engagement, which help students build foundational knowledge and foster interaction before formal sessions begin.

Discussion and conclusion

Findings from both university teachers and learning designers reveal a shared view of cognitive engagement as a multifaceted construct, marked by observable student behaviours and supported by pedagogical design. Common indicators of cognitive engagement included active participation, knowledge application, preparation, collaboration, and high-quality contributions. Teachers emphasised real-time engagement through digital tools and synchronous interactions, while learning designers highlighted asynchronous engagement and the importance of instructional scaffolding and scenario-based activities. Both groups recognised collaborative learning as central to fostering cognitive engagement, with peer interaction seen as a catalyst for critical thinking. However, a clear divergence emerged in which teachers focused on student-driven behaviours, while designers stressed the role of instructional design and teacher preparedness. This suggests a need for closer alignment between teaching practice and learning design to better support cognitive engagement in online environments. In our future studies, we intend to explore how university students perceive cognitive engagement during online learning, as well as the correlations between the perceptions of university teachers, students and learning designers.

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