Psychological perspectives on online transactional collaborative learning: A qualitative analysis of lecturers' and undergraduates' experiences in higher education

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Abstract
This study explores how lecturers and undergraduates perceive, experience, and navigate psychological engagement, motivation, and cognitive load online Transactional Collaborative Learning (TCL), highlighting its benefits, challenges, and psychological impact on student learning experiences in higher education. The study used Focus Group Discussion (FGD) as a qualitative research method that facilitates in-depth exploration of participants' experiences, perceptions, and attitudes regarding a particular phenomenon. The participants in this research were ten lecturers and twenty-four undergraduate students selected purposively. The study focuses on how the online TCL environment affects psychological variables related to teaching and learning. From the results of the thematic analysis, four final themes were obtained, including 1) learning models and strategies in online TCL; 2) effective learning models in online TCL; 3) factors influencing the success of online TCL; 4) psychological impacts of online TCL. Findings show that flexible content delivery, interactive discussions, and quizzes enhance student engagement, knowledge retention, and digital literacy. However, challenges such as technological limitations and the lack of guidance and support from lecturers hinder the success of online TCL. While this approach fosters motivation, self-confidence, and adaptability, cognitive load remains a concern. Strengthening digital infrastructure and interactive teaching strategies is key to optimizing online TCL. The implication of the study is further discussed.

INTRODUCTION

The rise of online Transactional Collaborative Learning (TCL) in higher education has highlighted the need to integrate pedagogical, cognitive, and socio-emotional perspectives to address student engagement, motivation, and cognitive load among both students and lecturers. Recent research has highlighted that students experience cognitive overload when engaging in online collaborative learning environments, mainly due to the complexities of navigating multiple digital platforms and maintaining sustained engagement (Yang et al., 2024). Studies indicate that effective online collaboration is often hindered by a lack of social presence, motivation, and psychological engagement, negatively affecting student learning outcomes (Saputra et al., 2022). Furthermore, Borg et al. (2021) suggest that individual personality traits, such as extraversion and agreeableness, significantly influence students' perceptions and effectiveness in online collaborative learning.

Currently, the higher education landscape is experiencing a significant shift, with lecturers experiencing a considerable transformation where traditional teaching methods are evolving rapidly due to the integration

of digital technologies. As a result, they must adapt to new learning environments by enhancing their competencies in the technical implementation of online learning. This includes developing the ability to use learning management systems, digital collaboration tools, and interactive media to facilitate engaging and effective online education. Navigating these tools effectively is becoming essential for lecturers, regardless of their field. While lecturers are not expected to have an engineering-level understanding of technology, basic digital literacy is crucial for facilitating successful online learning.

However, internet accessibility and technological constraints remain to be the main critical challenges in implementing online learning, particularly in rural areas, developing countries, and among economically disadvantaged students. Francisco et al. (2024) revealed that university students with poor internet access struggle significantly in online distance learning, leading to difficulties accessing lectures, participating in discussions, and submitting assignments. Similarly, research on Nigerian higher education institutions has shown that unreliable internet connectivity and frequent power outages are significant barriers to the effective implementation of e-learning (Akaeze & Akaeze, 2024). In the United States, a study showed that low-income and first-generation college students faced severe disadvantages due to their reliance on smartphones and limited internet access, exacerbating educational inequalities (Banerjee, 2022). The stress and frustration caused by technical difficulties can lead to disengagement and declining academic performance. Zilka and colleagues (2021) noted that students with limited internet access experienced heightened stress, lower self-efficacy, and reduced motivation, which negatively impacted their ability to complete coursework. Moreover, lecturers with insufficient knowledge of online tools can disrupt teaching engagement, further reducing student participation (Magd & Jonathan, 2023).

Discomfort with webcam use during synchronous online learning has been shown to negatively affect students' engagement and participation (Bedenlier et al., 2020). Recent studies have identified key reasons behind this reluctance, including self-consciousness, distractions, and technological issues. For instance, Farid et al. (2022) reported that 83% of students kept their webcams off due to concerns about personal appearance, background distractions, and privacy issues. Likewise, Yeung et al. (2022) argue that while lecturers believe webcams enhance students' social presence, students often perceive them as a source of anxiety rather than a tool for engagement. In addition, the lack of social support in online learning environments has been found to contribute to several adverse psychological effects, including boredom, uncertainty, anxiety, stress, and decreased motivation. Huda and Imro'ah (2021) highlight that the absence of direct interaction with peers and instructors can lead to feelings of isolation, reducing students' overall engagement and academic performance.

Despite the challenges, online learning has also generated positive impacts, such as fostering trust, appreciation, optimism, and adaptability among students. Roselan et al. (2024) reported that online learning enhances students' collaboration and development of self-directed learning skills, leading to increased confidence and adaptability in digital education environments. Furthermore, Anam et al. (2023) highlight that students who engage in structured online learning environments report a higher appreciation for flexible learning methods and self-paced study options, contributing to a more positive educational experience. Along similar lines, Huddar et al. (2023) pointed out that students appreciated the accessibility of online learning,

which improved their motivation and engagement when supported by well-designed digital platforms. Xu et al. (2013) state that online learning was an important learning strategy for adult learners to increase access to higher education. Moreover, the effectiveness of online learning is determined by several factors, including the students' and lecturers' self-confidence, attitudes, confidence in using technology, learning strategies used, ability to provide monitoring, evaluation of learning outcomes, and students' motivation (Hungsuchon et al., 2022). Xiao et al. (2021) add that teacher expertise, platform quality, and social interaction are the factors that influence online learning satisfaction.

Transactional Distance Theory (TDT) provides a foundational framework for understanding the psychological and structural barriers in online learning environments. Building upon this framework, recent studies emphasize that a multidimensional approach, incorporating cognitive and socio-emotional learning theories, is essential for optimizing student engagement and interaction (Abuhassna et al., 2023). Within this context, transactional distance, the perceived psychological and communication gap between learners and instructors, plays an essential role in shaping online collaborative learning experiences (Abuhassna et al., 2023). Similarly, Kasch et al. (2023) applied TDT in an interdisciplinary online learning setting and found that minimizing transactional distance fosters community and engagement, which are essential for effective online collaboration. Experiencing online learning can also increase cognitive load, as excessive information at the time of online learning may negatively impact learning efficiency (Fabian et al., 2022). Nevertheless, a well-structured online learning system would reduce cognitive overload and enhance student engagement, particularly when students possess sufficient resources, such as digital skills and online study strategies (Sedlak et al., 2022).

The effectiveness of online collaborative learning depends not only on cognitive engagement, but also on socio-emotional learning that influence motivation, trust, and social presence. Saputra et al. (2022) state that collaborative learning environments substantially improve emotional and behavioral engagement, thereby highlighting the importance of peer interaction and psychological safety in online settings. Furthermore, Avsec et al. (2022) noted that transactional online learning influences self-efficacy and motivation, emphasizing the need for structured feedback and peer support mechanisms to maintain engagement.

The shift to online learning has transformed the educational landscape, particularly in higher education, where Transactional Collaborative Learning (TCL) plays a crucial role in fostering student engagement and knowledge construction. Nonetheless, the effectiveness of online TCL remains a contested issue with differing perspectives between lecturers and undergraduates. While educators may perceive online collaborative learning as an opportunity for flexibility, knowledge co-construction, and digital literacy enhancement, students may experience challenges related to participation, technological limitations, and cognitive overload. These contrasting viewpoints indicate a gap in understanding how online TCL functions in practice and whether it meets the expectations and needs of both stakeholders. This condition presents a challenge for universities to create a learning environment that involves more transactional processes between students and lecturers, as well as students and students. Transactional relationships in learning can emerge between the reflective ability of students and the shared collaborative environment of the educational setting, through the

identification of responsibility and control and the development of critical thinking and independent learning models (Garrison & Archer, 2000). In transactional relationships, interaction often occurs through sharing learning experiences or acquired knowledge. Lecturers provide a stimulus that encourage active thinking and facilitate discussions to understand the student-centered independent learning process thoroughly. Collaboration is one of the keys in implementing transactional relationships, especially between students in learning. As a result, transactional knowledge and collaborative learning methods have become an option. Collaborative learning involves students working together to solve problems, complete tasks, or produce a product (Armiati & Sastramihardja, 2007).

The positive impact of collaborative learning includes increasing students' confidence, work performance, social skills, and knowledge in developing learning materials (Law et al., 2017; Fokomogbon & Bolaji, 2017). Hungsuchon et al. (2022) mention that learning objectives enable universities increase the effectiveness of online learning by motivating students to participate in classes and develop appropriate learning strategies for them. This research aims to explore these contested perspectives, providing deeper insights into the pedagogical, technological, and social dimensions of online TCL in higher education. The findings will help inform policy decisions, instructional design improvements, and pedagogical strategies that align with the realities of both lecturers and students.

To address the gaps identified in previous studies, this research explores how lecturers and undergraduates perceive, experience, and navigate psychological engagement, motivation, and cognitive load in online Transactional Collaborative Learning (TCL) within higher education. The study focuses on how online TCL environment affects psychological variables related to teaching and learning. Accordingly, the present study addresses the following research questions:

1. What are the benefits and challenges of implementing online Transactional Collaborative Learning (TCL) in higher education?
2. How does online TCL impact students' psychological engagement, motivation, and cognitive load in higher education?

METHOD

The qualitative research design explores the students' and lecturers' perspectives and experiences regarding online transactional collaborative learning. Focus Group Discussion (FGD) will be used as a qualitative research method that facilitates in-depth exploration of participants' experiences, perceptions, and attitudes regarding a particular phenomenon. This method is beneficial for understanding collective viewpoints, group dynamics, and the negotiation of meaning within social interactions (Krueger & Casey, 2015).

The sample uses a purposive sampling approach to ensure participants are chosen based on specific characteristics relevant to the research objectives (Creswell & Poth, 2018). Participants include ten lecturers and twenty-four university students, all of whom meet predefined inclusion criteria: 1) active engagement in academic activities, (2) prior experience with offline learning, (3) participation in at least one course that

applies online TCL, and (4) willingness to voluntarily participate in the study. Once a preliminary list of eligible participants is established, the investigator explains the purpose of the research, participation requirements, and ethical considerations, such as confidentiality and voluntary participation. Subsequently, formal consent is obtained from each participant.

The primary data collection instrument was a semi-structured Focus Group Discussion (FGD) guide, which was developed by the research team based on the study objectives and relevant literature in educational psychology, specifically within the higher education context. The guide included open-ended questions addressing four key areas: 1) learning models and strategies in online TCL, 2) perceptions of effective learning practices, 3) factors influencing the success of online TCL, 4) psychological impacts, including motivation, engagement, and cognitive load. This guide allowed for consistency across the data collection process while maintaining flexibility to explore emerging themes and participant insights.

The data collection employed face-to-face (with lecturers) and online (with students) Focus Group Discussion (FGD). All the participants came from the Faculty of Psychology at one state university in Central Java, Semarang. The involvement in the research was voluntary, and all participants gave their consent. For students, participants were grouped into sessions of eight individuals to facilitate interactive discussion. Each FGD lasted approximately 60 to 90 minutes. The FGD was facilitated by the lead researcher, who guided the discussion via the focus group-guided questions. It was audio-taped and transcribed verbatim by an assistant researcher who had previously been briefed. Ethical approval was obtained from the Human Research Ethics Committee of the first author's institution (286/EA/KEPK-FKM/2021), in accordance with the Declaration of Helsinki for research involving human subjects.

Since the aim was to understand students' and lecturers' perspectives, thematic analysis was deemed the most appropriate method for data analysis. Thematic analysis is a method of identifying, analyzing, and interpreting patterns of meaning in the form of themes in qualitative data (Clarke & Braun, 2017). This approach enables researchers to find "answers to research questions" purely based on data. Braun and Clarke (2006) described the steps to carry out the thematic analysis, including: (1) becoming familiar with the data by transcription, repeated reading of data, and noting initial ideas, (2) generating initial codes by systematically identifying features of interest across the data set and compiling data relevant to each code, (3) searching for themes by grouping the codes into potential themes, then collecting all relevant data for each potential theme, (4) reviewing the themes by checking their coherence to the code extract (Level 1) and the entire data set (Level 2), and further generating thematic 'maps' of the analysis, (5) defining and naming the themes by analysis in order to refine the specifications of each theme and the whole story, then producing a clear definition and name for each theme, and (6) generating a report by selecting a clear and exciting sample extract, analyzing the final part of the selected extract, linking the analysis back to the research questions and literature, and presenting a scientific analysis report.

RESULT AND DISCUSSION

Participants in this research were comprised of ten lecturers and twenty-four students who were selected purposively based on the following criteria: 1) active engagement in academic activities, (2) prior experience with offline learning, (3) participation in at least one course that applies online TCL, and (4) willingness to participate in the study voluntarily. Table 1 shows the demographic of the participants.

Table 1. Demographics of FGD participants

			Number	**%**
Lecturer	Gender	Male	2	25
		Female	8	75
	Age	25-35	4	40
		36-45	2	20
		46-55	2	20
		56-65	2	20
Student	Gender	Male	4	16.7
		Female	20	83.3
	Age	18	11	45.8
		19	9	47.6
		20	4	16.7

The research participants consisted of two groups: teachers and learners. The lecturer sample (N = 10) included two males (25%) and eight females (75%) aged between 25 and 65 years. Specifically, 40% (n = 4) were between 25 and 35 years of age, while 20% (n = 2) were in each subsequent age group: 36–45 years, 46–55 years, and 56-65 years.

The student sample (N = 24) consisted of 4 males (16.7%) and 20 females (83.3%) aged between 18 and 20. The largest subgroup was made up of 45.8% (n = 11) of students who were 18 years old, 47.6% (n = 9) who were 19 years old, and 16.7% (n = 4) who were 20 years old.

Thematic analysis was applied in this research since it explores themes that capture the narratives available in the account of data sets (Dawadi, 2020). The results of the thematic analysis found four final themes, including 1) Learning models and strategies in online TCL, 2) Effective learning models in online TCL, 3) Factors influencing the success of online TCL, 4) Psychological impacts of online TCL.

The benefits of implementing online TCL in higher education

Flexible content delivery

Findings indicate that the method of online TCL incorporates a range of learning models and teaching strategies to enhance student engagement and interaction. One common strategy in online TCL is flexible content delivery, where students can choose their preferred presentation mode. As one student participant explained, *"... we are free to choose whether to present using PowerPoint (PPT) or video."* (K4, SA, 30-31). Additionally, another student described, *"From what I observed among my peers, those who presented using PPT engaged in discussions through group chats or Google Meet. Meanwhile, those who created videos worked individually on their parts and later combined them into a single presentation."* (K4, AS, 58-61). Fredricks et al. (2004) emphasizes that allowing students to explore their preferred presentation mode could enhance engagement and cognitive processing. Another critical strategy employed in online TCL is the incorporation of reflection-based assignments, which encourage deeper cognitive engagement. One participant

noted, *"There were also assignments and reflections. For the reflection task, in one of my courses, I was required to create an infographic video, which had to be in video format."* (K3, H, 72-74). Reflection assignments are widely regarded as effective in promoting critical thinking and knowledge retention, particularly in self-paced online learning environments (Zhu et al., 2020).

Activated student-lecturer collaborative learning

In further support of these benefits, Theme 2 highlights the effectiveness of TCL in online contexts, affirming its role in fostering proper collaboration between lecturers and students. The collaboration starts when lecturer-led explanations are followed by students engaged in structured exercises. A student participant stated, *"The lecturer primarily provides explanations, followed by instructions for us to engage in practical exercises. Personally, I find this approach more effective."* (K1, HB, 117-120). Another student strengthened this point of view, *"The lecturer explains the material, and after the presentation is completed, I find this method to be highly effective."* (K4, SA, 170-171). When lecturers applied a structured approach that facilitates direct interaction with students, the effectiveness of online collaborative learning is greatly enhanced. As one student noted, *"The most effective learning activity, in my opinion, is when the lecturer explains the material during a synchronous session on Zoom."* (K4, AM, 118-120). It promotes real-time engagement, enhances conceptual clarity, and reduces cognitive load (Yang et al., 2024). Students also identified interactive quizzes as an effective way to reinforce learning and ensure engagement during online presentations. One student participant shared, *"To ensure that my classmates were paying attention during our presentations, we conducted quizzes. This helped us assess whether they understood the material and were actively listening."* (K3, H, 207-211). Enders et al. (2021) stated that using quizzes as an active learning strategy would improve student knowledge retention, provide formative assessment opportunities, as well as promote active participation in online discussions.

Enhance collaboration and digital literacy.

Group discussions also emerged as another highly effective strategy in online TCL, along with the ability to develop new digital literacy skills. A student emphasized, *"Group discussions help us get to know each other better, build stronger connections, and understand the course materials more effectively. Sometimes, we arrange additional virtual meetings to engage in discussions actively. I also developed new skills regarding interesting online material and programs that supported this matter."* (K3, H, 225-227). In addition, discussion sessions at the end of presentations provided further clarification and more profound learning opportunities. One participant explained, *"During presentations, there is usually a discussion session at the end where students can ask questions. I find this useful because if I do not fully understand something, I can ask for further clarification or inquire about topics not covered in the presentation."* (K4, AAG, 139-142). Research shows that students who collaborate in small groups actively build knowledge as a team, making the learning process more dynamic and meaningful (Han et al., 2021).

On top of that, webinars and guest lectures were identified as a key instructional strategy in online TCL. As a student described, *"The learning activities were conducted through webinars or similar online sessions."* (K4, AM, 35-36). Another student noted the collaborative aspect of these sessions: *"There were guest lecturers, including both external faculty members outside the university and internal faculty members from the university, creating a collaborative experience."* (K4, AM, 45-46). These approaches align with the co-teaching model of collaborative learning, which has been shown to enhance content diversity and provide interdisciplinary perspectives (Kurni & Saritha, 2021).

The challenges of implementing online TCL in higher education

Technological infrastructure

Technological infrastructure plays an integral role in the successful implementation of online TCL. A student highlighted the need for technology infrastructure improvement, *"So, maybe this is something that also needs to be improved in the technology."* (K1, AG, 830). Reliable internet connectivity was also identified as a key determinant of learning effectiveness. One participant explained, *"In an entirely online situation like this, the internet signal seems to be a key factor in the success of learning."* (K4, AM, 477-478). This finding accentuates that technological barriers, including connectivity issues and inadequate digital tools, can hinder engagement in online learning (Magd & Jonathan, 2023). A well-structured digital infrastructure and instructor familiarity with online platforms are essential for minimizing disruptions and ensuring seamless participation (Magd & Jonathan, 2023).

Lack of lecturer guidance

Apart from the previous issue, a major challenge in applying online TCL is that students often need to adapt to learning without direct support from their lecturers. A student participant explained, *"We must adapt to learning material without direct guidance from the lecturer."* (K2, DS, 62-63). Additionally, some students noted that the focus on the presentation of online material led to unintended consequences for in-person participants. One student pointed out, *"But because the lecturer was focused on the computer, those who were there in person did not get much attention."* (K1, AG, 824-826). It is consistent with research that indicates students are more engaged when supported by lectures that provide guidance and real-world connections (Dunaway, 2011).

Factors influencing the implementation of online TCL

Lecturer engagement strategies significantly influence the effectiveness of online TCL. A student highlighted the importance of interactive feedback as such, *"For example, after a presentation, the lecturer provides input and feedback, and then we also have consultations. The lecturer tends to give opinions that align with our current student experiences. This makes us more interested in listening and makes it easier to understand the material."* (K1, HB, 248-252). To reinforce this point, incorporating active discussion techniques further augments student participation, as one student noted, *"Opening a dialogue. Then, during the Q&A session after each presentation, the lecturer also responds and asks follow-up questions to the*

presenter." (K1, DP, 263-265). These results demonstrate that lecturer feedback and interactive discussions enhance student motivation and deepen conceptual understanding (Gan et al., 2021). Research suggests that a two-way instructional approach promotes knowledge retention and meaningful learning, characterized by students' active engagement with the material rather than passive reception of information (Han et al., 2021).

Building upon this, student motivation has also become another dire factor in influencing online TCL. A student highlighted the role of intrinsic motivation, explaining, *"The next factor is more about intrinsic motivation."* (K2, PT, 427-428). Another participant shared how teaching methods influence learning engagement, stating, *"Maybe it helps with focus. If the learning media is engaging and the lecturer's explanation is interesting, it can capture my attention even more. Then it feels more enjoyable, and it also feels fresher when doing assignments."* (K2, PT, 762-764). Correspondingly, the level of trust placed in the lecturer was identified as a motivating factor. One student said, *"One factor is trust in the person providing us with information... So first, the lecturer has a significant influence. Then, the way interaction happens in class matters—if it is one-way communication, it feels like we are just being spoon-fed the material, which does not seem effective."* (K2, PT, 415-421).

Deci and Ryan (2017) stated that students with higher intrinsic motivation and positive perceptions of their instructors tend to achieve greater engagement and academic success in online learning environments. Additionally, studies suggest that encouraging student autonomy, offering interactive learning materials, and establishing a supportive learning environment can elevate motivation and participation in online TCL (Fabian et al., 2022).

Psychological impact of online TCL on students' psychological engagement, motivation, and cognitive load

Increased motivation and focus

Many students reported higher motivation when exposed to interactive learning materials and dynamic instruction. One student noted, *"So, in the courses that I enjoy—whether because of the learning media or the lecturer—I feel excited… I can focus naturally, Ma'am."* (K2, HS, 687-693). Another participant emphasized how engaging course materials is severely influential to their learning experience, stating, *"Maybe I can focus better if the learning media is engaging and the lecturer's explanation is interesting. It captures Ayu's attention more deeply, makes her feel happy, and helps her feel refreshed when working on assignments."* (K2, PT, 762-764). Interactive online learning has been found to enhance student motivation and cognitive focus (Deci & Ryan, 2017). Enjoyable learning experiences cultivates intrinsic motivation, which promotes sustained academic engagement (Schunk & DiBenedetto, 2021).

Development of self-confidence

Participation in online TCL was also found to help students' self-confidence, particularly in expressing their ideas and contributing to discussions. One student shared, *"My self-confidence has improved; I feel more confident in expressing my opinions, answering the lecturer's questions during discussions, or responding*

when the lecturer presents the material." (K2, DS, 734-737). This suggests that the collaborative nature of online learning encourages students to actively engage and develop a stronger sense of self-assurance in academic settings (Zhao et al., 2021).

Adaptability and responsibility

Online TCL also contributes to the development of students' adaptability and sense of responsibility. One participant reflected on how collaborative learning encouraged problem-solving, stating, *"From there, we can find solutions— 'What should we do?' I also think it makes us more responsible."* (K1, LS, 441-443). Another student explained how facing academic challenges contributed to a growth mindset, sharing, *"Sometimes, when an assignment is difficult, there are many tasks, or the deadline is tight, I still feel motivated because I enjoy the course and want to keep improving my learning in the future."* (K2, PA, 712-715). These perspectives align with Hung et al. (2008), who state that collaborative learning environments promote adaptability by challenging students to find solutions and work through academic difficulties.

Teamwork and collaboration

Several students addressed how online TCL strengthened their teamwork skills and improved their collaboration ability in group settings. One participant explained, *"It also improves teamwork, especially in group projects. If someone does not contribute, it slows down the completion of papers and presentations. That is how I see it."* (K4, AAG, 409-412). Another student emphasized the importance of self-directed learning within collaborative settings, *"... Sometimes, I develop my PowerPoint and research papers independently using Scholar and other sources."* (K4, SA, 431-432). This further endorses the idea that online collaborative learning boosts group dynamics by upholding interdependence and shared responsibility (Garrison & Arbaugh, 2007).

Emotional well-being

A supportive and emotionally secure learning environment reassures students to actively participate in their education, engage in meaningful learning experiences, and develop a sense of belonging. When students are emotionally supported and psychologically safe, they tend to be experience greater learning satisfaction, build stronger connections with peers, and interact more openly with lecturers. One participant acknowledged that a relaxed classroom atmosphere contributed to both student and lecturer comfort, *"One of the advantages is that the class atmosphere can be fun, meaning it is not tense. It feels comfortable for both students and lecturers, creating a sense of being in a safe zone"* (K3, DA, 512-515). Zhu et al. (2020) suggest that students who perceive their learning environment as psychologically safe are inclined to engage more actively in discussions and collaborate effectively with peers.

Cognitive challenges

Online TCL also presented cognitive challenges for the students, particularly in reading comprehension and processing lecture content. More often than not, students struggle with understanding course materials and

this leads to misinterpretations, difficulties grasping key concepts, and additional cognitive burdens, particularly during assessments. These challenges demonstrate the complexities of cognitive load in online learning, where the absence of in-person interaction and immediate clarification further exacerbates students' difficulties in comprehension and knowledge retention. Difficulties in reading comprehension generally lead to misinterpretation and confusion, *"The second point, um, I realized that they have difficulty reading, so their reading is disorganized. Even when instructed to read, on the day of the assessment, they do not understand what they have read or sometimes misinterpret the content."* (K1, AD, 284-287). Janssen and Kirschner (2020) further support this point, finding that students in online learning environments often experience cognitive overload when processing large amounts of text independently, without interactive discussions or lecturer guidance. When students lack structured reading strategies and guidance, their ability to extract meaning from course materials diminishes, ultimately affecting their academic performance.

In addition, students also experience cognitive strain during online lectures, mainly due to the dense nature of the content and the time constraints associated with online delivery. One lecturer expressed, *"Even when given lectures by their professors, I feel that, despite receiving online lectures, they also perceive the material differently. It seems heavy, and there is much to comprehend quickly, especially since the delivery is online."* (K1, AD, 362-364). Such an observation aligns with cognitive load theory, which posits that online learning requires students to self-regulate their cognitive processing without the benefit of real-time instructor intervention, thereby increasing the difficulty of processing complex information (Zhang et al., 2022). Furthermore, the absence of non-verbal cues and immediate clarification in online lectures contributes to students' perception of increased cognitive effort and decreased comprehension (Lan et al., 2019).

Implication of the Study

This study underscores the importance of educational practice and policy in higher education, particularly accenting the need for institutions to offer psychological scaffolding through training in digital communication, coping mechanisms, and time management to mitigate cognitive overload and promote self-regulated learning. Integrating psychological elements such as resilience training into digital learning strategies can support both students and lectures. Correspondingly, pedagogies learning strategies for the lectures can be upgraded by incorporating interactive tools on multimedia elements.

Limitations and further direction

This research acknowledges certain limitations, which in turn open avenues for further investigation. First, the determinants of successful transactional collaborative learning may be affected by other factors not revealed in this research, such as emotional aspects, which warrant further exploration by future studies. Second, the students and lecturers involved were from the Faculty of Psychology. Therefore, the subsequent researchers may conduct additional research in other faculties, such as social humanities and science, and then compare the result to this research. Third, as this research serves as an initial exploration, future studies could employ cross-sectional and longitudinal designs by incorporating psychological constructs to ensure the

effectiveness of the transactional collaborative learning model in higher education will provide a comprehensive approach. Finally, this research may serve as a foundation for further theoretical studies on the transactional collaborative learning model, particularly by involving variables according to the results of this study.

CONCLUSION

This research explores how lecturers and undergraduate students perceive and experience psychological engagement, motivation, and cognitive load in online Transactional Collaborative Learning (TCL). Findings indicate that flexible content delivery, interactive discussions, knowledge retention, and digital literacy greatly exert influence on students' motivation, self-confidence, and adaptability. However, technological limitations, inadequate faculty guidance, and excessive cognitive load present ongoing challenges. By placing psychological variables at the core of the analysis, this study advances the current understanding of online collaborative learning beyond technological and pedagogical dimensions. To optimize online TCL, universities must strengthen digital infrastructure, provide training for instructors in interactive methods, and design activities that balance innovation with cognitive management. Future research should test strategies to reduce cognitive load, integrate psychological theory with collaborative learning frameworks, and use longitudinal or mixed methods approaches to track learning outcomes over time.

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