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Exploring Moodle Usage in Higher Education in the Post-pandemic Era: An Activity-theoretical Investigation of Systemic Contradictions

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Abstract. Despite Moodle's initial popularity as a learning management system, recent research has revealed a decline in its usage within higher education during the post-pandemic pedagogical landscape. Drawing upon activity theory as a theoretical framework, this qualitative study aims to explore teachers' perceptions regarding the discontinuation of Moodle use once the pandemic subsided. Data for this investigation was collected through a focus group discussion involving six university teachers. Using a thematic analysis, the findings shed light on several factors contributing to the decline, including ineffective rules and policies that impact teachers, as well as confusing task allocation. Apart from contributing to the existing literature on post-pandemic pedagogy, the study's outcomes indicated the need for well-defined polices addressing roles and responsibilities of people involved in Moodle use and addressing teachers' workload in higher education.

Keywords: activity theory; COVID-19; higher education; Moodle; post-pandemic era; teachers' perspectives

1. Background

In the wake of the COVID-19 pandemic, higher education institutions across the world have had to pivot rapidly to online learning, leading to a surge in the use of learning management systems (LMS), such as Moodle, Blackboard and Canvas (Crawford et al., 2020; Hodges et al., 2020). Learning management systems are considered effective web-based learning systems for administering and managing online courses, sharing study materials, tracking student activities, monitoring students' learning and participation, and evaluating their performance (Kant et al., 2021). Compared to other learning platforms, Moodle has become the most popular free, open-source and accessible learning platform among higher education institutions (Alqahtani, 2020; Mpungose, 2020). However, as soon as social distancing restrictions were lifted and as the world started moving towards

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a post-pandemic pedagogy, there was a decline in the usage of Moodle and other LMSs, despite their proven efficacy in supporting student learning (Chen et al., 2021; Lau, 2021).

Research concerning teachers' acceptance of using Moodle and their attitudes towards its use indicated that their prior experience, the ease of use of the platform and its usefulness were influential factors in their use of Moodle. However, some teachers were not satisfied with Moodle because of the potential for cheating and academic dishonesty among students (Taamneh et al., 2022). To further enhance teachers' practices and use of Moodle after the pandemic, additional training and support is required (Lockee, 2021). Furthermore, there is a need to develop effective online pedagogy, enhance learning platform capabilities, and explore the potential of new technologies such as virtual and augmented reality to enhance online learning experiences (Lockee, 2021; Taamneh et al., 2022). Thus, it is essential to address these challenges and develop strategies to improve the effectiveness and quality of online learning using Moodle.

While the adoption of Moodle was initially driven by factors such as ease of use, flexibility, and affordability (Smith et al., 2019), studies have reported declines in student engagement and satisfaction with online courses (McElroy, 2021, 2020; Mihai & Dragoș, 2021), disparities in access to digital infrastructure and technology (McElroy, 2021), and challenges faced by teachers in using Moodle. The challenges include technical difficulties, lack of support and training, concerns about the quality of online learning compared to traditional face-to-face instruction, overwhelming workload, and potential for cheating and academic dishonesty (Mohammadi et al., 2021; Pătrașcu & Grosseck, 2021; Tsai et al., 2020). It is essential to acknowledge the significant role played by the COVID-19 pandemic, which has presented a unique opportunity for studying the adoption process (Johnson et al., 2020). By examining the adoption process and its underlying factors, this research aims to contribute to a deeper understanding of technology adoption in higher education and its implications for post-pandemic pedagogy.

The post-pandemic era has witnessed a significant shift in pedagogy, with a heightened reliance on technology-enabled learning environments. Learning management systems have played a pivotal role in facilitating this transition, with research highlighting the importance of LMS adoption in post-pandemic pedagogy (Betts et al., 2020; Mihai & Dragoș, 2021). LMS platforms offer diverse features such as content management, collaboration tools, and assessment capabilities, which have supported the delivery of online and hybrid learning modalities. The adoption of LMS has not only provided educators with the means to deliver instruction remotely but has also opened opportunities for innovative teaching methods and personalized learning experiences. However, research indicated the declining usage of LMSs in certain educational contexts for several reasons. In addition to technical challenges and limited accessibility to technology, the desire to restore a sense of normalcy and return to traditional face-to-face instruction, as educators and students seek to regain the interpersonal and social elements of in-person learning experiences are some factors leading to this

decline (Chen et al., 2021; Lau, 2021). Hence, as institutions continue to navigate the post-pandemic landscape, understanding the factors that influence the successful adoption and effective utilization of LMS becomes crucial.

Local practices in Omani higher education endorse the adoption of learning management systems (LMS) which resulted in widespread utilisation of platforms such as Moodle and Blackboard. In acknowledging the imperative to uphold quality and efficacy in teaching and learning practices, the Oman Academic Accreditation Authority (OAAA) has established specific criteria for evaluating information and learning technology services within higher education institutions (Oman Academic Accreditation Authority, 2016). In the context of the present study, the higher education institution under investigation employs Moodle as its official LMS, regulated and supervised by the E-learning Implementation Policy and Moodle guide. Despite the growing utilisation of Moodle within the institution, it is noteworthy that the COVID-19 pandemic has played a significant role in further augmenting its adoption. Nevertheless, anecdotal evidence and personal experiences have revealed certain challenges associated with this increased reliance on Moodle. These challenges encompass an augmented workload for teachers, inadequacies in technological infrastructure, and the presence of chaotic course design and layout, all of which have collectively hindered the effective utilisation of Moodle and led to a decline in its use.

Therefore, this qualitative case study seeks to explore the reasons behind the decline in Moodle usage in higher education institutions from the viewpoint of teachers. To investigate this issue, it draws on activity theory (Engeström, 1999), a theoretical framework that provides a holistic understanding of human activity and its relationship to the broader social and cultural context (*additional discussion of the theory is provided in the Methodology section of this paper*). By examining the perceptions of teachers using this theoretical framework, this paper seeks to shed light on the complex interplay of factors that contribute to the decline in Moodle usage in a higher education institution in Oman. It sought to answer this research question: *What are the contradictions within the activity system of Moodle usage that have hindered teachers in a higher education institution in Oman from sustaining their use of Moodle in the post-pandemic pedagogy?*

The primary objective of this research is to conduct an in-depth examination of the adoption process of Moodle within higher education. It seeks to explore the underlying factors that influence the implementation of this learning management system and make significant contributions to advancing the current understanding of technology adoption in the higher education context. Additionally, this study aims to enrich the existing literature on the adoption of learning management systems in the realm of post-pandemic pedagogy.

The findings from this investigation hold noteworthy implications for the design and implementation of digital learning environments in higher education institutions. By identifying and analysing the inherent contradictions within the activity system associated with Moodle usage, this research intends to offer valuable insights that can guide the development of more effective and engaging

digital learning environments. These insights are crucial for fostering optimal student learning experiences in the post-pandemic era.

2. Literature Review

This literature review aims to address the challenges associated with post-pandemic pedagogy and provide a comprehensive summary and categorisation of recent studies examining teachers' perceptions of Moodle in higher education. The scope of this review is limited to research conducted during the COVID-19 pandemic (from 2020 onwards). This limitation was imposed to ensure alignment with the research question and the utilisation of activity theory to identify the barriers encountered by teachers in utilising Moodle within the context of post-pandemic pedagogy. The search for relevant research was conducted on the SCOPUS database. The search was performed using specific keywords, including "Moodle," "Blackboard," "LMS," "Learning Management System," "higher education," "perceptions," "challenges," "post-pandemic pedagogy," and "COVID-19." Screening of titles and abstracts was conducted to identify empirical and theoretical research that aligned with the focus of this study. It is important to note that certain studies were excluded due to their lack of relevance to teachers and higher education, while others were inaccessible as full-text papers.

2.1 Teachers' Perspectives in Using Moodle During the Pandemic

Several studies explored teachers' perceptions of the Moodle platform in different contexts. One recurring positive theme was the flexibility and convenience that Moodle provides for delivering online courses and facilitating communication and collaboration among students. Toquero (2020) found that Moodle's features for posting announcements, sharing resources, and grading assignments helped teachers to monitor student progress and provide feedback. Similarly, Alqurashi and Alhashmi (2021) reported that teachers in Saudi universities perceived Moodle as an effective tool for promoting interaction and engagement among students.

Moodle has also been found to be helpful in managing course content, facilitating student engagement and interaction, and providing feedback to students. For instance, Wang (2021) reported that university teachers in a Japanese university had a generally positive perception of Moodle's impact on their teaching practices. Additionally, Zamora-Antuñano et al. (2022) found that the majority of teachers in four public universities in Mexico had positive perceptions of Moodle and its features, including communication with students and assessment of learning outcomes.

Prior experience with Moodle was found to influence teachers' perceptions of the platform. Salas-Rueda et al. (2020) reported that teachers' perceptions of Moodle varied depending on their level of experience using the platform, with more experienced teachers having a more positive perception of Moodle's impact. The same finding regarding teachers' prior experience with using Moodle was reported by Uzunboylu et al. (2021) in Turkish universities. Finally, research during the pandemic showed that teachers perceived Moodle positively because of its ease of use for both teachers and students. Antuñano et al. (2022), Salas-

Rueda et al. (2020), and Taamneh et al. (2022) reported that teachers found Moodle helpful during the pandemic for its communication features and assessment tools.

2.2 Teachers' Challenges in Using Moodle During the Pandemic

However, despite its popularity as a learning management system, Moodle is not without challenges and concerns, as reported by teachers in the literature. One major challenge faced by teachers is technical issues. These technical issues include poor connectivity, slow loading times, and difficulties in uploading and downloading files. For example, a study by Kabakci Yurdakul and Inan (2020) found that teachers encountered technical difficulties with Moodle during the pandemic, which negatively affected their teaching and students' learning. Wang (2021) and Kant et al. (2021) also highlighted technical difficulties and limitations in customization of Moodle layout and navigating the platform settings. Likewise, Alqurashi (2020), Zamora-Antuñano et al. (2022) and Uzunboylu et al. (2021) reported teachers' facing technical difficulties, limited access to technology and limited access to digital resources. In their attempt to explore the challenges and opportunities in using Moodle in China, Gao et al. (2020) found several technical issues and difficulties in using the platform, such as poor connectivity, slow Internet speed, and the lack of training on how to use the platform effectively. Another issue was the lack of devices and poor technical infrastructure to use Moodle in higher education institutions (Khan & Ghani, 2020), and lack of integration with other educational technologies and platforms (Kant et al., 2021).

Another occurring theme in the literature is the increased workload and reduced interaction with students resulting from the sudden shift to online teaching, which led to higher levels of stress and anxiety among university teachers. Teachers have reported feeling overwhelmed by the amount of time required to develop and manage course content in Moodle, which has led to higher levels of stress and anxiety among university teachers (Alqurashi, 2020; Gao et al., 2020; Khan & Ghani, 2020; Wang, 2021). Additionally, research has identified challenges in Moodle adoption during the pandemic regarding student motivation and engagement. Despite teachers' efforts to implement student-centered pedagogies and collaborative learning, students' motivation and engagement remained minimal. The lack of interactivity and personalization in Moodle can lead to a passive learning experience for students (Kabakci Yurdakul & Inan, 2020; Alqurashi, 2020; Gao et al., 2020).

Scholars noted the limited ability of Moodle to support complex learning activities, such as project-based learning and group work. For instance, a study by Çalışkan and Yalın (2021) reported that teachers faced challenges in designing and implementing group activities on Moodle due to its limited functionality. Likewise, Khan and Ghani (2020) reported teachers' difficulties in ensuring that students participate actively and contribute to discussions when adopting student-centred teaching approaches. In a similar investigation, Kant et al. (2021) reported that teachers faced challenges in adapting to the new teaching and learning paradigm that the platform introduced, such as the need for greater self-directed learning and increased student autonomy. Finally, teachers also reported that they faced challenges in monitoring and assessing students' learning progress

and providing timely feedback to students in online learning environments (Kant et al., 2021). Teachers' challenges in providing timely and effective feedback to students was attributed to students' lack of face-to-face interaction (Khan & Ghani, 2020) and to teachers' increased workload (Alqurashi, 2020; Wang, 2021).

2.3 Factors Contributing to the Decline in Moodle Usage in Post-Pandemic Pedagogy

Post-pandemic pedagogy has witnessed significant changes and innovations, accelerated or brought about by the pandemic itself. These include the increased utilization of technology, hybrid and blended learning models, student-centered approaches, and a renewed focus on mental health and well-being (Ashfaquzzaman, 2020; Murphy, 2020). The present paper specifically focuses on the use of Moodle in the post-pandemic pedagogy, an area that remains relatively under-researched. Despite its popularity as an online teaching and learning tool during the pandemic, studies have reported a decline in its use and raised questions regarding its efficacy in the post-pandemic context.

Several factors have been identified as potential contributors to the declining use of Moodle. One explanation is the desire among educators and students to restore a sense of normalcy and return to traditional face-to-face instruction, as they seek to regain the interpersonal and social aspects inherent in in-person learning experiences (Bond et al., 2021; Lau, 2021). Additionally, concerns have been expressed regarding the potential negative impact of excessive reliance on technology on student well-being, such as increased screen time and reduced opportunities for social interaction (Chen et al., 2021; Lau, 2021).

Moreover, technical challenges and limited access to reliable internet connectivity and digital devices, particularly in underserved communities, pose obstacles to the effective implementation of learning management systems (LMS) like Moodle (Chen et al., 2021; Lau, 2021). The digital divide has become increasingly prominent during the pandemic, underscoring disparities in technology access and internet reliability among students, especially those from disadvantaged backgrounds (Chen et al., 2021).

Faculty training and development also emerge as significant challenges, as the rapid shift to remote and hybrid learning necessitated quick adaptation to new technologies and pedagogical approaches, including the effective use of Moodle and the professional design and layout of Moodle course pages (Aldemir & Doğan, 2021). The pandemic has disrupted traditional modes of student engagement, such as face-to-face interactions, extracurricular activities, and campus events, prompting higher education institutions to explore alternative avenues for fostering engagement and a sense of community through LMS (Ashfaquzzaman, 2020; Murphy, 2020). Furthermore, questions have been raised about the effectiveness of traditional assessment methods, such as exams and grades, leading institutions to consider alternative approaches like formative assessment, authentic assessment, and project-based assessment.

These aforementioned factors, combined with the fatigue experienced during prolonged online learning, have contributed to the declining use of LMS in the

post-pandemic pedagogical landscape. It is imperative for researchers and educators to address these challenges and explore strategies to enhance the effective integration of LMS like Moodle in the evolving educational landscape.
The literature elucidated the experiences and challenges faced by teachers in adopting Moodle both during the pandemic and in the post-pandemic pedagogical landscape. Drawing upon this existing body of literature, the present study seeks to contribute by comprehensively understanding the adoption of Moodle in the post-pandemic context among teachers in higher education. Specifically, the study aims to identify the contradictions in the activity system of Moodle use that impede teachers from effectively utilising Moodle in their instructional practices. By utilising activity theoretical underpinnings, the study builds upon the foundation provided by the literature, guiding its focus towards addressing the identified limitations and offering practical recommendations for policy to enhance the utilisation of Moodle in the post-pandemic educational milieu.

3. Theoretical Framework

This investigation employed Activity Theory (Engeström, 1999) as a theoretical framework because it is a useful approach for understanding complex relationships between various elements in a collective system and individual actions (Kaptelinin & Nardi, 2006). It is applicable in higher education research because it enables the identification of an individual's practices within a sophisticated systemic context that involves multiple related actions and operations and highlights different contradictions within the broader system (Bligh & Flood, 2017). It offers a contextual method for understanding human interactions using tools in a complex system (Hashim & Jones, 2007). In this paper, Moodle use is regarded as a complex activity in which different teachers are involved in practicing various operations within the main activity.

Engeström's Activity Systems Model (ASM) (Engeström, 2014) is a triangular representation of an activity that visually depicts the elements of the activity and their interrelationships, including subject, artifact, object, outcome(s), rules, community, and division of labour (see Figure 1). The ASM serves as the focus of analysis in research contexts that use the ASM. This model enables the identification of the elements within the activity under investigation, as well as the recognition of contradictions that arise either within or between these elements (Al-Ali, 2020; Murphy, 2022). There are four types of contradictions that can be observed within an activity system. Primary contradictions emerge within the elements of the activity system itself, while secondary contradictions arise between different elements of the same activity system. Tertiary contradictions occur between various versions of the same activity system, and quaternary contradictions exist between neighbouring activity systems (Engeström & Sannino, 2010).

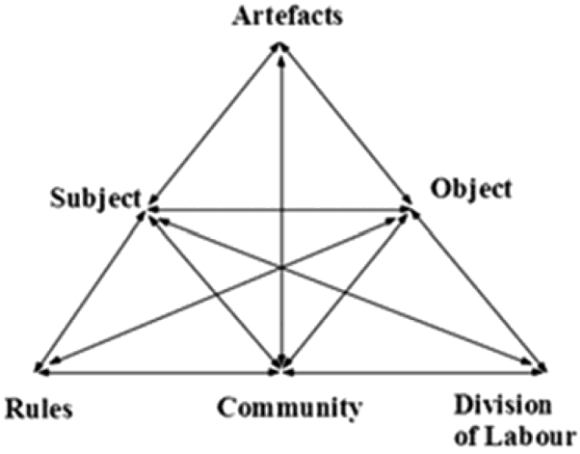

Figure 1: Engeström's Activity Systems Model (Engeström, 2014, p. 63)

In this study, the Activity Theory was utilised as a framework to guide the selection of case study methodology, which was deemed suitable for the research (Al-Ali, 2020). The Activity Theory provided a comprehensive perspective that captured the multidimensional nature of the activity and the contradictions within the system (Engeström, 2000). Moreover, the Activity Theory, along with the Activity System Model, informed the formulation of focus group discussion questions for data collection. These questions were designed to identify the elements of the system under investigation and uncover any contradictions. For data analysis, the study employed Activity Systems Analysis, which is a methodology that uses the Activity System Model as a guide to analyse complex learning environments (Engeström, 2000; Yamagata-Lynch, 2010). This approach facilitated the identification and description of the elements within the activity system of Moodle usage. The pre-defined vocabulary within the Activity System Model was used to accurately depict each element. Subsequently, the Activity Theory and the Activity System Model played a crucial role in reporting the findings from the focus group discussions and discussing their implications (Al-Ali, 2020; Yamagata-Lynch, 2010).

4. Methodology and Methods

4.1 Research design

To investigate complex and embedded educational phenomena (Moodle usage in higher education), a case study research methodology was adopted based on an interpretive epistemological paradigm (Creswell, 2018). It facilitated a thorough exploration of key aspects of the case and allowed for plausible interpretations within the specific contextual and localized bounded space and time (Tight, 2017). The case was bounded to a single higher education institution in Oman and focused on online teaching and learning practices in the post-pandemic era. By establishing specific boundaries of space and time around the case, it was possible to delve into the phenomenon within its authentic and real-life context. These boundaries allowed for a focused exploration of the case, ensuring that the investigation stayed within the natural parameters of the phenomenon being studied (Algozzine & Hancock, 2017). The teachers involved possessed

experience in using Moodle, having taught online for four academic semesters during the pandemic, with each semester lasting 15 weeks. This provided a rich and authentic backdrop for examining the case.

The case study methodology enabled an in-depth analysis of this specific case (Berg, 2001), while incorporating Activity Theory and Activity System Analysis provided a complementary approach for gaining a deeper understanding of the systemic elements and contradictions within the case. Activity Theory served as a valuable lens for analysing the activities and interactions constituting the phenomenon (Engeström, 2000, Bligh & Flood, 2017; Yamagata-Lynch, 2010).

4.2 Research site

The research was conducted in a higher education institution in Oman in which Moodle was the official learning platform for all students and teachers. Each course had a dedicated Moodle page. The Moodle administrator managed course pages, enrolment, technical issues, and provided support to teachers. Departments had e-learning coordinators overseeing Moodle use. The E-learning Implementation Policy and Moodle Guide (a guide for teachers developed by the institution) supported academic staff. The administrator held an annual Moodle workshop for teachers and provided training sessions.

The use of activity theory as a theoretical framework influenced the establishment of boundaries within the research site, restricting participation to teachers who have used Moodle and are willing to use Moodle. Additionally, it informed the time boundary of the study, encompassing the period of post-pandemic.

4.3 Participants

The population consisted of teachers with masters' and PhD degrees and a minimum of five years of teaching experience, all of whom had undergone training in Moodle. The teachers were from diverse cultural backgrounds. Convenient sampling techniques were employed to recruit the study sample (Creswell, 2018), based on the availability of teachers from the population. The final participants comprised six teachers who possessed over five years of teaching experience, demonstrating extensive familiarity with Moodle. Furthermore, they had actively engaged in online teaching during the pandemic and made efforts to continue using Moodle post-pandemic (see Table 1). The participants were teaching different specialisations in a higher education context.

Table 1: Participants demographic information

Participant	Specialisation	Teaching experience
Teacher A	Business studies	11 years
Teacher B	English Language Teaching	6 years
Teacher C	English Language Teaching	7 years
Teacher D	Information Technology	13 years
Teacher E	Mathematics	8 years
Teacher F	English Language Teaching	12 years

4.4 Data collection and analysis

A focus group discussion was conducted with six teachers who had experience teaching online during the COVID-19 pandemic and attempted to continue to use Moodle after the pandemic. This method was appropriate for retrieving personal attitudes, views, and beliefs (O. Nyumba et al., 2018) and allowing teachers to share and reflect on their experiences with each other (Dilshad & Latif, 2013). It ensured eliciting rich data through group members' interactions (Rabiee, 2004), which was sufficient to be exploited using ASM (Activity System Model). Additionally, it allowed participants to offer their insights and views concurrently (Hennink, 2013). The activity theory was used to develop the discussion questions to elicit information about the activity and its components. It also aided to formulate questions to identify any contradictions within the activity system.

The study adopted a deductive thematic analysis approach based on Braun and Clarke's (2006) six-step process: data familiarization, coding data, searching for themes, reviewing themes, defining and naming themes, and writing up. The ASM guided the iterative reading of the data and sketching of the activity system. A set of contradictions were identified in the model, which was used to code the data and later to name the themes. Four themes (contradictions in the activity system) were identified. The names of the themes have been constructed in relation to the ASM keywords.

4.5 Ethical considerations and issues of trustworthiness

Ethical approval was obtained from the Doctoral Programme in e-Research and Technology Enhanced Learning via the Module Convenor. Participants were informed about the study using an information sheet that outlined the research's purpose, questions, and rationale for their inclusion. They were informed that their participation was voluntary, and they were asked to sign a consent form to participate. To facilitate the focus group discussion, a guide was created containing some questions. To ensure the validity of the questions, they were reviewed by three academics.

To maintain the trustworthiness, respondent validation (Tracy, 2010) was employed. This involved sharing a draft of the main findings with the participants to check for accuracy and completeness. Additionally, to ensure the quality of the research, peer debriefing (Stahl & King, 2020; Tracy, 2010) was conducted by a colleague in the TEL programme (PhD programme in Technology Enhanced Learning) with knowledge of the context and methodology of the investigation. This individual provided feedback on the methodological considerations and results interpretations. Furthermore, a critical friend methodology was used to review and enhance the quality of this research.

5. Findings

5.1 The Elements Moodle Implementation Activity System

To study the implementation of online teaching and learning with the use of Moodle, the Activity System Model (Figure 2) was used to sketch the data, identify and outline the different components of the activity. The findings demonstrated that the participating teachers (the subjects) were actively engaged in the

implementation of online teaching and blended learning (the object). When questioned about their goals, all teachers reported utilising Moodle as the platform for implementing online teaching and blended learning, considering it as an appropriate tool. Teacher B stated, "*Moodle is the appropriate tool for managing online as well as blended learning*." The dataset indicated that the activity was governed by two key documents: the Moodle Guide and the E-learning Implementation Policy (the rules). According to the teachers, these documents provided the guidelines and regulations for conducting the activity and specified the roles and responsibilities of various stakeholders, including the course coordinator, e-learning coordinator, Moodle administrator, and the ETC: Educational Technologies Centre (the division of labour). Furthermore, in addition to these individuals, the activity encompassed a broader community that consisted of students, other teachers, parents, and policy makers. Most teachers identify their involvement in the activity as significant and contributed to its overall dynamics and outcomes.

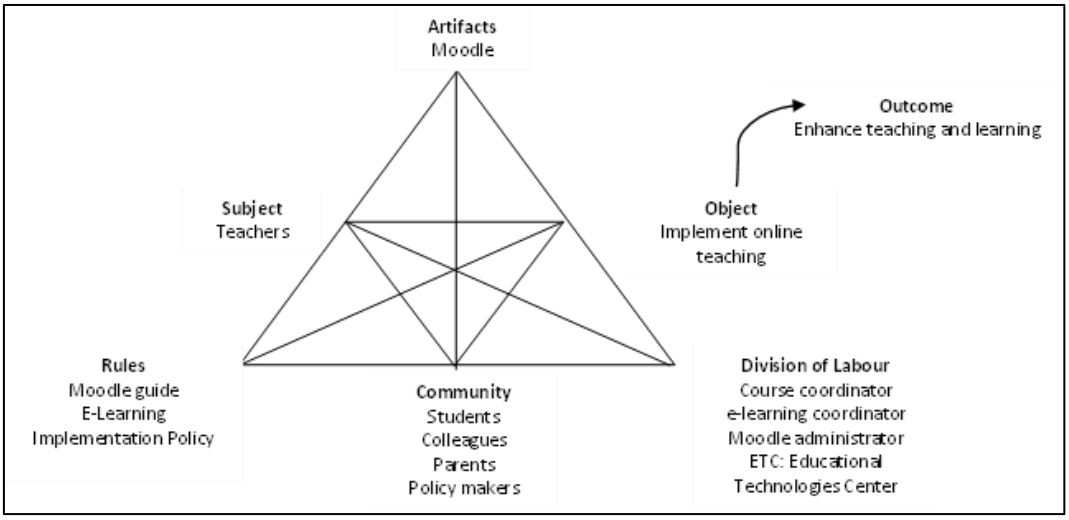

Figure 2: Moodle usage activity system

The findings indicated two types of contradictions: primary contradictions (contradictions within the elements of the system) and secondary contradictions (contradictions between elements of the system). Figure 3 represents the identified contradictions in the activity system. Following is a detailed discussion of the primary and secondary contradictions.

5.2 Primary Contradictions in the Activity System

5.2.1. Ineffective Rules and Policies

Based on the dataset, it became evident that there were some significant discrepancies within the rules in the system. All teachers agreed that the Moodle guide only provided general instructions on how to use the system from a technical perspective. Teacher B stated that the guide was very basic and only demonstrated how to create activities in Moodle. Teacher C said, "*the guide was text heavy*". She mentioned that watching a YouTube video would be more helpful than reading the guidelines. Similarly, Teacher E recommended that the guide be updated to include pedagogical tips on how to use each feature in the system.

Teacher E said, "*the guide can include a list of Moodle activities and a pedagogical explanation on how each activity can be used to enhance teaching and learning*." Even though the E-learning Implementation Policy outlined the roles and responsibilities of concerned people, it did not clearly state how each person should conduct his role. This caused a contradiction in the division of labour element in the activity system.

5.2.2. Confusing Tasks Allocation

The findings revealed that the responsibilities of implementing Moodle were not well-defined among the different parties involved, particularly between the course coordinator and the e-learning coordinator. This caused a primary contradiction within the rules element of the activity system (see Figure 3). The course coordinator was tasked with creating course materials and updating the Moodle page with assistance from the course teachers. However, Teacher A and Teacher F reported that the coordinator was also involved in enrolling and registering students on Moodle, a responsibility that falls under the jurisdiction of the e-learning coordinator and the Moodle administrator. Teacher A said, "*coordinators were overloaded with admin tasks related to Moodle such as registering/enrolling students which left them with less time for course development and redesign*". It is possible that the e-learning coordinator's involvement in other duties, in addition to their teaching load, could have contributed to this confusion. Furthermore, the large number of students in each department may have required the course teachers and coordinator to perform some of the e-learning coordinator's tasks. Teacher C said, "*sometimes if the course coordinator and teachers help in registering and enrolling students in Moodle, then teachers won't be able to use the system from the first week of classes*."

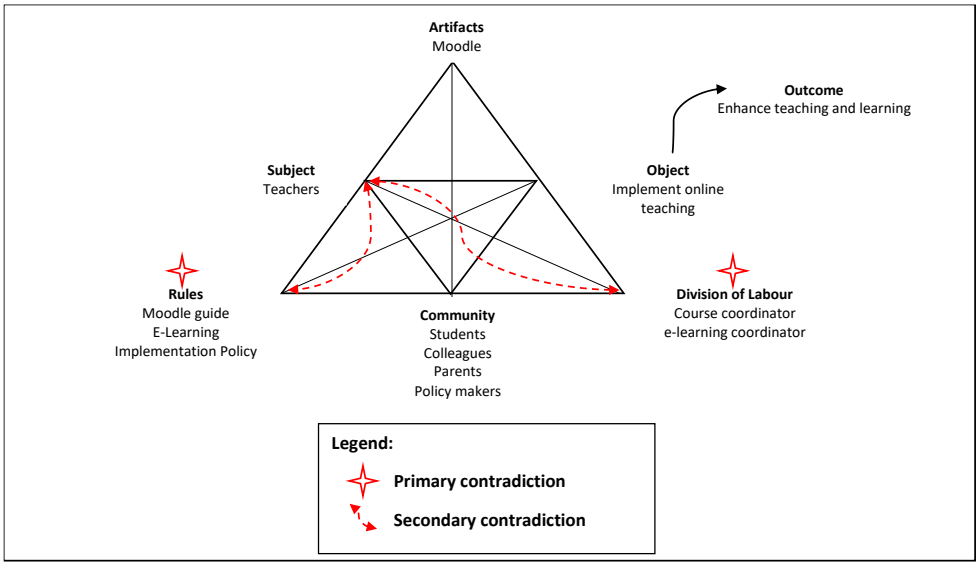

Figure 3: Identified contradictions in the Moodle usage activity

5.3. Secondary Contradictions in the Activity System

5.3.1. Challenges Faced by Teachers Due to Ambiguous Division of Labour

The results revealed that teachers faced several challenges due to an ambiguous division of labour. This posed a secondary contradiction in the activity system between the division of labour and the subject (see Figure 3). One of the major challenges was an increased workload because of unclear roles and responsibilities. They were also taking the roles of the course coordinator regarding the design and update of the materials, and the roles of the e-learning coordinator in enrolling students in Moodle. Teacher C said, "*In addition to designing content for teaching in Moodle, we had a lot of other administrative tasks caused by the unsodden shift to online teaching and learning*." Teachers found it difficult to manage their workload effectively, as they were unsure of what tasks they were responsible for and what tasks were assigned to other members (course coordinator and e-learning coordinator). Additionally, the lack of clear division of labour made it difficult for teachers to keep updating their courses in a timely manner. Teacher A said, "*it wasn't clear who should be responsible for redesigning the materials in Moodle and who should be responsible for grouping students in Moodle*." Teachers were unsure of what materials they were responsible for updating, which led to inconsistencies in course content. This was caused because the course coordinator had teaching load and was busy with his/her own students. Another challenge that teachers faced was an inability to track student enrolment effectively. Without a clear understanding of their roles and responsibilities, teachers found it difficult to monitor student enrolment accurately, leading to confusion and errors in student records. Also, the teachers reported that it was difficult to keep the practice consistent because of lack of communication between the people involved in the system.

5.3.2. Consequences of Ineffective Rules and Policies for Teachers

The results of the study indicated that the unclarity of rules and policies placed pressure on teachers to seek out online resources to learn how to create activities in Moodle. This indicated another secondary contradiction in the activity system between the rules and the subject (see Figure 3). Many teachers reported spending a significant amount of time trying out different activities in Moodle to determine which ones would be most effective for their students. Teacher C said, "*I spent the first weeks of the semester exploring different activities in Moodle. I reflected on my experience and then found two activities, 'quiz' and 'lesson' to be very appropriate for my class*." Additionally, teachers reported struggling with some tasks in Moodle that were deemed necessary but did not have the necessary training or knowledge to use them properly. Teacher B said, "*I had to sit with the Moodle administrator and some of my colleagues to train me on how to perform some tasks in Moodle, as they were not highlighted clearly in the training sessions*."

6. Discussion

The findings indicated a primary contradiction in the rules of the Moodle activity system as the Moodle guide and E-learning Implementation Policy did not provide enough information and tips for teachers to effectively use Moodle. As a result, many teachers stopped using Moodle altogether. This aligns with previous research that policies related to digital literacy are crucial to ensure that teachers and students have the necessary skills to use online learning platforms effectively

(Al Neyadi et al., 2021; Muirhead & Juwah, 2020). During the pandemic, institutions had to adapt/establish polices on digital literacy which explained their successful implementation of learning platforms. For example, the United Arab Emirates implemented policies aimed at enhancing digital literacy skills among teachers to support the adoption of online learning (Al Neyadi et al., 2021). However, these polices may also pose challenges, such as concerns regarding academic integrity and student privacy (Kebritchi et al., 2017). Therefore, policies aimed at addressing these concerns are essential for teachers to continue their use of these online platforms for online assessment. They need to be adaptable and flexible to meet the need of teachers in the post-pandemic era (Dabbagh & Kitsantas, 2012; Poellhuber et al., 2017). Dabbagh and Kitsantas (2012) believe that traditional policies (the existing one in the context of this investigation), which are often rigid and inflexible, can be a barrier to innovation and change in higher education. Also, they should be developed in collaboration with faculty, staff, and students to ensure that they are relevant and effective (Muirhead & Juwah, 2020).

The issue of unclear roles and responsibilities between the course coordinator and e-learning coordinator was identified as another primary contradiction, which resulted in confusion and hindered the smooth functioning of Moodle implementation. Previous investigations have reported that such clashes of responsibilities can have negative impacts on teachers and students, causing stress and burden for all parties involved (Al-Fraihat et al., 2021; Kizilcec et al., 2021; Oliveira et al., 2022). This aligns with previous investigations that Moodle use declined due to teachers' overload (Bond et al., 2021). It is important to note that task allocation to staff responsible for Moodle and online teaching and learning needs to be systematic and clear to avoid burden and stress that may discourage teachers from using Moodle.

The findings revealed a secondary contradiction between the division of labour and the teachers. When individuals responsible for specific tasks did not carry them out effectively, teachers had to take on additional responsibilities beyond their teaching and administrative duties. This led to higher stress and burnout levels and teachers felt frustrated and overwhelmed. Previous research indicated that this might disrupt online teaching and learning (Aydin & Tasci, 2020; Kizilcec et al., 2021; Oliveira et al., 2022) The second secondary contradiction was between the rules and the teachers. Due to unclear guidelines, teachers had to invest time and effort to develop effective strategies to use Moodle in their teaching. This also aligned with Chen et al., (2021) and Lau (2021) who associated the decline of Moodle use with teachers' overload.

7. Conclusion

The results revealed two primary contradictions in the rules and the division of labour of the system and secondary contradictions between division of labour and subjects and the rules and the subjects that led to the decline in Moodle usage. These issues included ineffective rules and policies and confusing task allocation.

This research endeavour makes significant contributions to the literature on post-pandemic pedagogy and the utilization of Moodle. It underscores the importance

of teacher training and support as well as adaptable policies. Moreover, it reveals contradictions within the activity system of Moodle usage that impact local policies and practices. Consequently, there is a pressing need for well-defined policies that clearly outline the roles and responsibilities of those involved in the implementation of Moodle, ensuring a comprehensive understanding of expectations. Additionally, addressing teachers' workload is crucial to enable effective course preparation and administration within Moodle. Furthermore, this investigation contributes to theoretical advancements by highlighting the significance of activity theory in identifying contradictions within systems, thereby fostering organizational change and development. Understanding and resolving these contradictions can aid organisations in adapting and enhancing their utilisation of educational technology.

It is important to acknowledge the limitations of this study, including the small sample size and potential sampling bias. The study was also constrained by time limitations and restricted data collection methods, preventing an examination of neighbouring activity systems related to Moodle use. Future research efforts may benefit from employing interventionist research methodologies, such as Design-Based Research (Brown & Campione, 1996) or the Change Laboratory (Virkkunen & Newnham, 2013), to address the decline in Moodle usage in the post-pandemic era. Additionally, it is recommended that future investigations utilizing the same theoretical framework incorporate a variety of data collection methods, such as stakeholder interviews and analysis of policy documents, to gather comprehensive and nuanced data, enabling a deeper understanding of the phenomenon under study.

8. References

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