



INITIATING E-ACTIVITIES: APPLYING THE SITUATED LEARNING IN A CLASS WITH TRANSITION

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Abstract

With the rapid integration of digital platforms in education, understanding the shift from traditional to electronic modes of teaching and learning has become crucial for adapting to contemporary educational demands. This study explored the transition from traditional classroom teaching to e-teaching and e-learning, termed e-activities, for enhancing the quality of education in Taiwan, focusing on identifying emerging learning phenomena and addressing related challenges. Thirty-five participants, including the teacher and undergraduate students, in a 36-hour 'Graphic Design with Creative Narratives' course. Using an action-research approach with Lave and Wenger's Situated Learning: Legitimate Peripheral Participation (SL: LPP), the alignments highlighted utilizing triangulation methods to identify emerging phenomena, addressing the implications of failed alignments and delayed changes in student performance, and finally emphasizing facilitate transparency in situated resources. It discovered that 1) rebounding the rate of submission and attendance, 2) building a sense of security, and 3) exceeding the learning outcome were the key emerging phenomena and alignments that could be made amid the transition. This study identified key learning challenges in e-learning transitions, emphasized transparent educational resources, and offered adaptive strategies to enhance engagement and outcomes, aligning with SDG-4 goals and highlighting the need for ongoing exploration of e-activities methods.

Keywords: e-learning, action research, situated learning, legitimate peripheral participation

Introduction

Sustainable Development Goal 4 (SDG-4) aims to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all (United Nations, 2015). This goal is a central part of the broader United Nations 2030 Agenda for Sustainable Development, adopted in 2015. SDG-4 recognizes that quality education is not only about increasing school enrolment but also about ensuring that students acquire meaningful knowledge and skills that prepare them to contribute effectively to society. Thus, improving learning outcomes involves designing education systems that focus not only on equal access but also on enhancing the quality of education and ensuring positive learning outcomes for all students (Sayed & Moriarty, 2020; UNESCO, 2020).

Contemporarily, establishing e-learning and e-teaching activities, known as e-activities, via various digital platforms has led to significant progress in modern education (Collins & Halverson, 2010; Maeroff, 2003). Studies have identified that learner-centered innovations bring both positive and negative outcomes for teachers and students (Chang & Lee, 2016; Hadjithoma & Karagiorgi, 2009; Liao et al., 2022; Olszewski & Crompton, 2020; Tuma, 2021;

Vanderlinde & van Braak, 2010). This shift in educational approaches is consistent with the broader agenda of improving learning outcomes as promoted by Sustainable Development Goal 4 (SDG-4), which seeks to ensure that learning environments—whether digital or physical—are equipped to deliver high-quality education and foster lifelong learning (OECD, 2019).

SDG-4, part of the broader United Nations 2030 Agenda for Sustainable Development, emphasizes the importance of quality education that goes beyond merely increasing access to schools. It advocates for systems that provide meaningful learning experiences and impart essential skills for contributing to society (United Nations, 2015; UNESCO, 2020). Central to this is the goal of improving learning outcomes, ensuring that educational systems are designed not just for equality but also to enhance the quality of education and the outcomes achieved (Sayed & Moriarty, 2020). For example, e-learning enhances learners' cognitive performance and fosters opportunities to develop interdisciplinary communication skills. However, due to the uncertainties associated with managing and supporting students in online environments, e-activities might induce unmet in teachers and students regarding engagement and course management (Almazova et al., 2020; Alqahtani & Rajkhan, 2020; Durante, 2024; Lamanauskas & Pribeanu, 2023; Yueh, 2000).

Research Problem and Focus

In Taiwan, the seed of e-activities has been planted by the National Information Infrastructure (NII), which aimed to integrate information technology (IT) into teaching activities since 1994. For instance, firstly, IT would be integrated with other disciplines thoroughly, and it could be part of the curriculum, instructional materials, and teaching activities (Chan, 2022). Secondly, IT would play an essential tool in both teaching and learning, akin to the chalk and blackboard in a teacher's hand (Ünlüer, 2024). Finally, the focus of IT integration in teaching should be on teaching and learning itself rather than on the technology (Collins & Halverson, 2010). However, until the Covid-19 pandemic in May 2021, most of the teaching and learning activities were designed to fit in classroom settings. Taiwan has encountered a massive rapid growth of e-activities in the curriculums using instructional materials regardless of the levels of schools (Ministry of Education, 2021).

This wave of sudden shift has posed significant challenges for teachers and students who were used to learning in classroom settings. Although e-learning and e-teaching activities have offered many advantages, numerous researchers have identified some issues that emerged when implementing the new design online (Almazova et al., 2020; Alqahtani & Rajkhan, 2020; Mseleku, 2020). For instance, inadequate hardware and software that both teachers and students encountered, lack of digital proficiency of non-IT specialists, the translating barriers from the in-person materials into online formats, the evaluations of the teaching quality and assessments, etc. However, there are questions about whether e-activities can really meet teachers' and students' preferences (Chien, 2021; Rau et al., 2021). Although numerous studies have examined trends in educational research related to e-teaching and e-learning (Ministry of Education, 2024; Nikou & Economides, 2018; Valverde-Berrocoso et al., 2024), few of them have explored the collaborative processes and dynamic interplay between teachers and students in e-activities. Wang and Tsai's (2022) study addressed the alignment in e-activities that might occur between teachers and students in responding to the emerging learning phenomena. It claimed that learning is a daily activity and process of making senses towards stakeholders through negotiating and co-constructing "meanings" between teachers and students (Wang & Tsai, 2022).

Research Aim and Research Questions

To be more precise, how does e-learning initiate? Lave and Wenger's (1991) theory of *Situated Learning: Legitimate Peripheral Participation* (SL: LPP) explained the learning patterns that emerge in teaching scenarios as educators apply the designed curriculum. By utilizing theoretical sensitivity through learning theories for analysis and interpretation, educators could gain more understanding into the emergent phenomena (e.g., low participation rates or poor submission rates for assignments). Lave and Wenger addressed that learning could initiate when learners learned the last skills first, namely *reversing production steps* (Lave & Wenger, 1991, p. 72), and when making structured resources transparent to learners, namely, *structuring resources transparency* (Lave & Wenger, 1991, pp. 91-101). These key concepts could be used to realign existing curriculum mechanisms, materials, or activities, helping learners return to the intended outcomes envisioned by the instructional designers (Marcum, 2006).

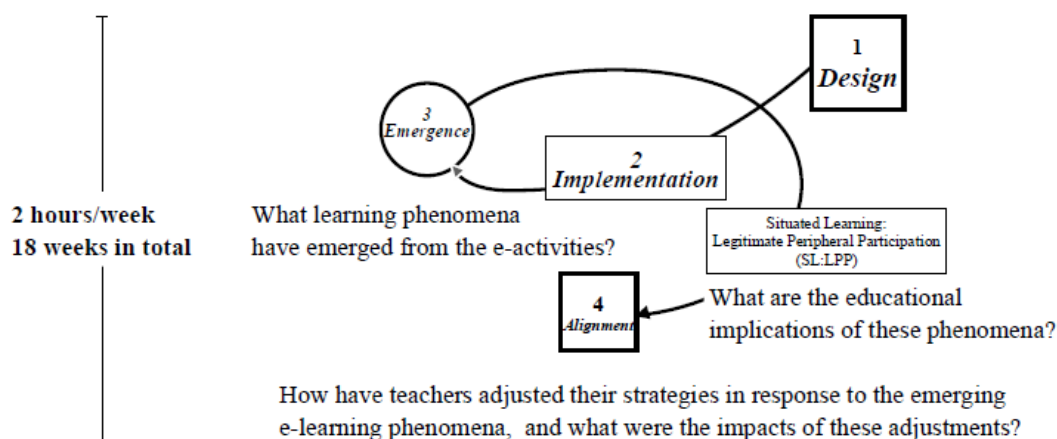
Thus, the theory of the SL: LPP would be taken as part of the theoretical framework for exploring the dynamic interplay between the adaptation of e-teaching strategies and the evolving e-learning trajectories of students. Action strategies could be formulated, implemented, and evaluated by continuously identifying and analyzing the challenges and difficulties encountered in e-teaching and e-learning (Huang, 2018; Liao, et al., 2022; Wang & Tsai, 2022). Combining Wang and Tsai's (2022) action-research approach, *Design, Implementation, Emergence, and Alignment* (Wang & Tsai, 2022) and Lave and Wenger's SL: LPP, this study adopted these theories and study results as the theoretical framework in this study (Figure 1) to depict the challenges of e-teaching emerged in the e-learning environment; while on the other hand, it aimed to explore how educators realign their strategies or assist learners in overcoming their e-learning challenges (Lave & Wenger, 1991), such as 1) *gaining understanding: what are the emerging learning phenomena* (Marcum, 2006) and *their implications?* 2) *alignments: how did the teacher align with these phenomena and impact learning?*

Research Methodology

General Background

This study followed the framework in a 36-hour elective course, *Graphic Design with Creative Narratives*, during the spring semester of the 2020/2021 academic year (Figure 1). The course's learning objectives were for the students to understand the targeted group's unmet needs and to develop their abilities to communicate with graphic design, for example, selecting the appropriate materials and then composing and laying out the content for the clients. The course was delivered two hours a week, and the students would complete individually the weekly worksheets for 16 weeks. The teacher gave each individual feedback according to their weekly assignment. The final presentation of the design would be displayed and explained on the designated Facebook group page, which only obtained limited access to the students and the teacher in the course. The action-research approach (Lewin, 1947) and the participation observation technique (Lindeman, 1924), and the Grounded Theory (Charmaz, 2001; Corbin & Strauss, 2015; Glaser & Strauss, 1999) as the analytical method were conducted during the educational activities, with reflections on emerging learning phenomena and subsequent adjustments made to relevant strategies and activities.

Figure 1
The Conceptual Framework of the Methodology



Research Participants

There were 35 participants, thirteen males and 22 females, in the elective course “*Graphic Design with Creative Narratives*” from February to June in 2021. The participants included one teacher, aged 44, from the Center of General Education; two third-year undergraduate students, aged 20; and the remaining participants, aged 18 and 19, who were first-year students. Among the students, seven were from medicine, two from dentistry, five from pharmacy, five from public health, seven from medical laboratory science and biotechnology, three from health care administration, and five from nutrition and health science. All undergraduate students enrolled at a medical university in northern Taiwan from the summer semester of the 2014/2015 to the 2020/2021 academic year were eligible to opt into this course. The study adhered to ethical standards by ensuring that students' participation in the research component was entirely optional and did not influence their grades or impact their rights within the course. This action-research approach allowed for iterative course improvements based on student feedback, respecting both student autonomy and academic integrity throughout the study.

Instrument and Procedures

Four instruments were designed to collect the dynamic interplay between the adaptation of teaching strategies and the evolving e-learning trajectories of students: 1) Weekly worksheet: it was based on Lave and Wenger's (1991) theory of *Situated Learning-Legitimate Peripheral Participation* to help the teacher track students' e-learning activities and annotation weekly (Lave & Wenger, 1991); 2) a Facebook group page platform and Facebook Messenger were created for communicating and collecting participants' e-activities to make the alignment in e-activities asynchronously, such as giving tasks, explanations, key points, and online exhibitions; 3) I'm@TMU platform was the education management system (EMS) tailored by the Taipei Medical University which allows teachers to upload the learning materials and students to turn in the assignment. It also provided primary statistical data for teachers to perform classroom management online and offline, such as assignment-submitting and student-responding rates; lastly, 4) Google Meet was as the synchronous platform providing real-time responses, explanations to student questions, and live demonstrations during remote sessions.

The procedure in this study was embedded in the 36-hour course, *Graphic Design with Creative Narratives*, and it applied Wang and Tsai's (2022) action research approach,

Design, Implementation, Emergence, and Alignment (Wang & Tsai, 2022). Table 1 illustrates the original design of the in-person instructional method and supplementary e-activities. The initial 18 hours introduced students to the concept of creative narratives and promoted self-expression through graphic design. Each in-person session consisted of a 20-minute lecture followed by an 80-minute practical exercise, with students submitting their worksheets on the I'm@TMU platform by 23:30 on each class day. Due to the Covid-19 pandemic, the course rapidly transitioned to a fully synchronous format, conducted via the Google Meet platform for the remaining 18 hours. Final project presentations, initially planned for in-person delivery, were adapted to an online exhibition through a designated Facebook group (Table 1).

Table 1

The Original Design of In-Person Approach and e-Activities in the 36-hour Course in 2021

Week	Task (2 hours/ week)	In-Person	e-activities
1-10	- Understanding the course and grading instructions - Discussing on curriculum design and operation, communication and critical thinking (making subjective and objective statements) - Inspecting the difference between native and expert. - Learning how graphics work and analyzing it. - Introduction to graphic design concepts and skills, and skill operation - Finding examples of graphic design, readings and analyses - Deconstructing, collecting, and reconstructing practices - Exploring potential research synergies.	20-minute lecture 80-minute course exercise	Weekly worksheet submitting via I'm@TMU (by 23:30 on each course day)
11-18	- Learning about creative narrative - Learning the notion and principle of creative narratives - Learning the methods of creative narrative - Selecting a topic on creative narrative and exploring it - Discussing and conducting critical thinking on the selective topic (making subjective and objective statements) - Developing the creative narrative work on the selected topic - Developing and critical thinking the creative narrative work on the selected topic - Exhibition on the Facebook group page	None (due to Covid-19)	- Synchronous approach via Google Meet - Weekly worksheet submitting via I'm@TMU (by 23:30 on each course day) - Exhibition via Facebook group page

Data Analysis

Using an action-research approach and the participatory observation technique, this study enabled the researchers to gain deeper insights into emerging learning phenomena through firsthand, long-term engagement as participant-observers (Lindeman, 1924). In this study, the teacher, as the researcher, not only engaged in designing the activities in the in-person class but also the e-activities in the synchronous and asynchronous sessions. The one-hour weekly sessions provided a structured schedule to apply the action-research approach iteratively (Lewin, 1947), where the teacher observed students' behaviors, interactions, and practices in

real time, reflected on these observations, and made necessary adjustments for the following week. This cyclical process allowed for continuous refinement of methods and responsiveness to the evolving dynamics within the learning environment. These approaches probed to employ a diverse range of data sources in analysis to explore the emerging learning phenomenon and alignments taken in the transition from in-person classes to e-activities.

By immersing themselves in course activities, researchers collected rich, context-specific data that enhanced their understanding of learning dynamics and supported responsive course improvements. The data would be deidentified and analyzed using the qualitative technique and conceptualized into categories. Following the recommendations of Lincoln and Guba (1985), steps were taken to ensure the credibility and validity of the research. The data sources were categorized into three main dimensions: 1) the teacher's reflective journals: the teacher played the role of the course designer and deliverer. The course design, preparation, delivery, and classroom observations were included; 2) students' worksheets and final projects via the e-learning; 3) the e-teaching logs in the platforms: logs from the I'm @TMU platform, posts on the Facebook group page, discussion via Facebook Messenger, and video recordings from Google Meet. The variety of data sources indicates a "polyphonic" comprehension of the process of e-activities.

Research Results

1) Rebounding the Rate of Submission and Attendance

Emergent Phenomena

A sharp drop in the weekly worksheet submission rate occurred when transitioning from in-person activities to e-teaching and e-learning (Figure 2). Before Week 10, the submission rate was consistently 100%. Both the submission rate for weekly worksheets and student attendance consistently met the expected benchmarks, resulting in no immediate need for instructional adjustments, as no significant learning phenomena emerged. However, a marked decline in both worksheet submissions and attendance was observed, signaling the emergence of a learning phenomenon related to decreased participation. Specifically, the worksheet submission rate dropped significantly to between 38-43%, and attendance in the synchronous e-learning sessions via Google Meet decreased sharply from 94% in Week 10 to 42% in Week 11. On the other hand, the attendance rate suddenly dropped in the synchronous e-learning session on Google Meet from 94% in Week 10 to 42% in Week 11.

Gaining Understanding

A gap between teacher's assumptions and student's learning issues was identified. There was a significant difference between the assumptions made by educators and learners regarding the ease of remote teaching. In this course, the teacher intended to convert the in-person teaching to e-teaching in Week 10 after the midterm exam in Week 9. The episode LD05_FBM2021 illustrated the emerging gap below.

Student 5: Teacher, I'm sorry to disturb you over the weekend, but many students have seen the announcement about the meeting, and everyone is quite anxious. Some students really can't use Google Meet due to poor internet connections at home, and they're worried about how the unstable connection might affect you and the other students.

Teacher: Oh, are you saying that some students are having trouble connecting to the internet smoothly?

Student 5: Yes, that's right. It's just a few students, though. Most students have understood the instructions you provided on the platform very clearly. However, the system is set to close at 9:50, and for those tasks that take a bit more time, it's not that they're avoiding Google Meet. Rather, they're rushing to complete and upload their assignments before the system shuts down at 9:50.

Teacher: Hmm, I appreciate you telling me this.

(LD05_FBM2021)

Alignments

The alignments toward the low submission and attendance rates were made, respectively (Table 2). An exploration into the causes of the decline was initiated in Week 12. Despite attempts to encourage student participation through targeted messaging in Week 13, these efforts yielded minimal improvement, necessitating continued investigation into the underlying factors contributing to low engagement. The e-teaching approach was also adjusted by providing more detailed guidance on the worksheets and extending the submission deadline to 23:59 on the weekend of Week 14. The alignment 14-1 and 15-2 adopted the theory of the SL: LPP (Lave & Wenger, 1991) to convert the synchronous sessions on Google Meet to the asynchronous approach on the Facebook group page and Facebook Messenger. It allowed students to revisit and refine the e-learning activities repetitively to meet the needs of the weekly worksheet and final project (Liao, et al., 2022).

Outcomes

By Week 12, the submission rate began to rebound. Starting with Week 15, a marked improvement in attendance was observed. The iteration of the work refinement occurred through the alignment of converting the synchronous sessions on Google Meet to the asynchronous approach (Figure 3). It freed the students from the fixed spatial and temporal scales in the preliminary e-activities (Tables 1 & 2). These alignments influenced student's learning. It opened additional learning opportunities (Lave & Wenger, 1991) for students to develop iterative reflection. As a result, one of the students created a 100-page learning portfolio documenting their learning process. The students also displayed academic integrity in their graphic design work, adhering to proper citation practices in their creative narratives.

Figure 2
Rebounding the Rate of Submission and Attendance

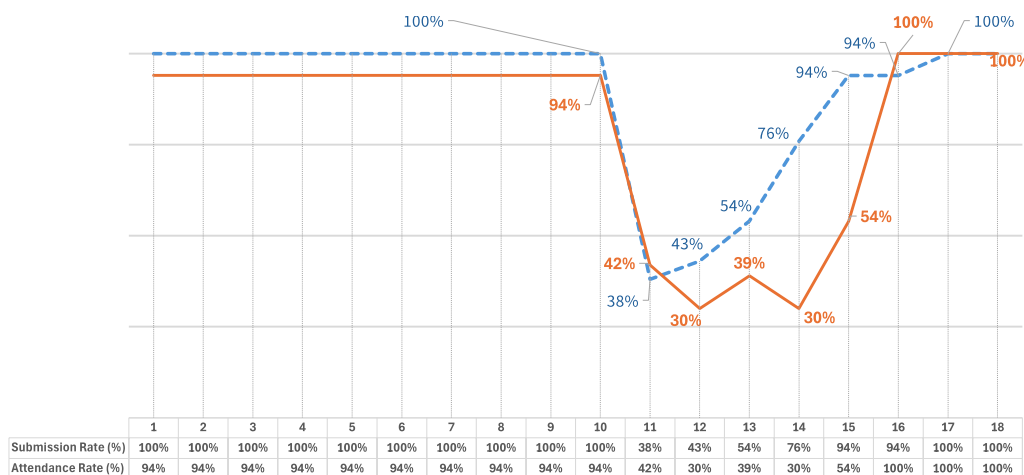


Figure 3
The Iteration of Students' Work Refinement (100 pages)

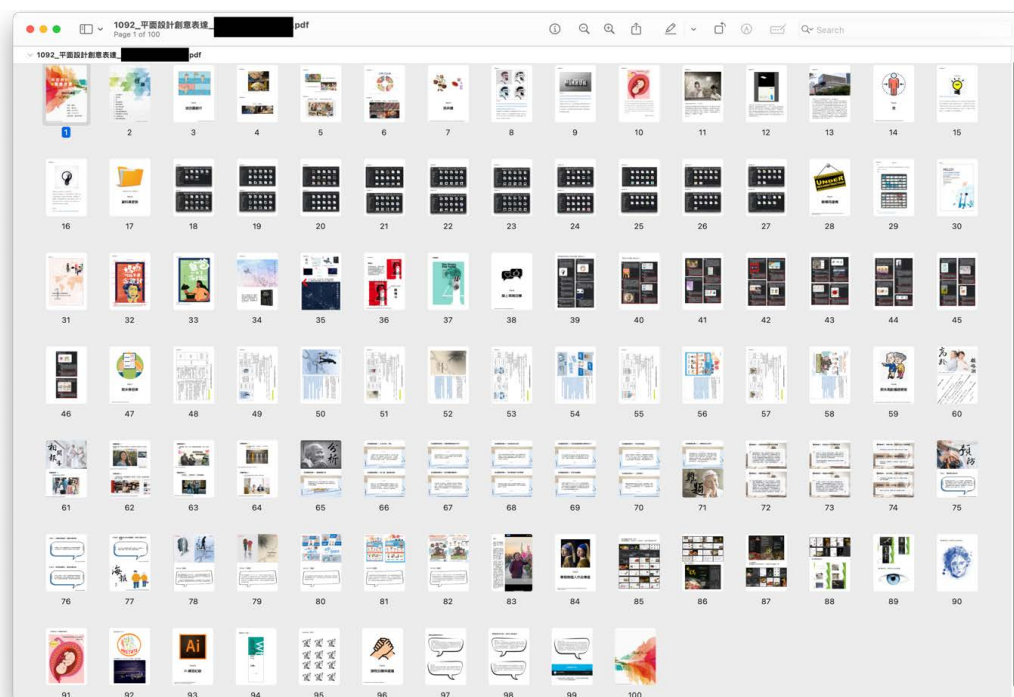


Table 2*The Action-Research Approach: Making Alignments upon the Decreasing Submission and Attendance*

Week	Emergence		Alignment
	Submission Rate (%)	Attendance Rate (%)	
10	100	94	None
11	38	42	N/A, but aware of the emerging learning phenomena
12	43	30	N/A, but aware of the emerging learning phenomena. 12-1 Exploring the phenomena
13	54	39	13-1 Encouraging participation up 13-2 Exploring the phenomena
14	76	30	14-1 Change of the e-learning approach: 14-1a: Students are allowed to learn via asynchronous approach (using I'm @TMU+ Facebook Messenger) if having questions about the assignment. 14-2 Change of the e-teaching approach: 14-2a: Teacher gave a more detailed instruction on the worksheet. 14-2b: Extending the submitting deadline: 23:59 by the 14 th weekend.
15	94	54	15-1 The alignments 14-1a, 14-2a and 14-2b remained . 15-2 Giving an indicating video based on the 14 th worksheet to help students refine the 15 th worksheet.
16~18	-	-	Remaining the alignments

2) Building a Sense of Security

Emergent Phenomena

It found no significant difference in the students raising questions between the in-person and synchronous approach. The students would reach out and respond more to the one-to-one conversation in the in-person class, whereas there were fewer signs of reaching out or responses given by the students in the synchronous sessions.

Gaining Understanding

A sense of security might be one of the contributing causes to the non-significant differences in student engagement during the transition from the in-person to the real-time e-activities. The students might be less willing to participate in online activities due to the perceived lack of privacy and increased visibility compared to in-person settings. In the in-person learning settings, students might feel more comfortable due to personal interactions with the teacher, such as one-on-one or small group discussions. This sense of security appeared to be diminished in synchronous online settings where students must raise their hand and ask questions in front of the entire group. In contrast, many students became anxious about being the focus or worried that their questions would seem too basic, which could hinder engagement.

"In face-to-face classes, the teacher would always come down after explaining something and ask us if we had any questions. But in online meetings, it's harder to ask privately, so most of the time, I have to raise my hand and ask in front of everyone. I often hesitate because it's nerve-wracking to be the center of attention." (S202106101092L)

Alignments

The teacher and students were allowed to conduct further communications via the Facebook Messenger (Table 2, Alignment 14-1a). The e-learning approach was revised to allow students to engage asynchronously through the I'm @TMU platform and Facebook Messenger. It enabled them to seek assistance with assignments at their own pace.

Outcomes

By Weeks 16 and 17, a marked improvement was observed, it generated *new practices* in students' learning inside or outside of the assignments due to increasing a sense of security (Lave & Wenger, 1991). As a result, out of 34 students, twenty-three proactively utilized what they learned in other modules. According to Lave and Wenger's theory, it addressed "*the social relations of apprentices within a community change through their direct involvement in activities; in the process, the apprentices' understanding, and knowledgeable skills develop* (Lave & Wenger, 1991, p. 94)".

"My ability to give immediate responses still needs improvement. When the teacher presents a question or task, I often need a sample or template to guide me before I can start working on a design or issue. It takes me more time to clarify my thoughts, which means I have less time to execute my ideas compared to those who can give feedback right away. In this course, the teacher provided plenty of time to complete assignments, which allowed me to do my best. However, in the future—whether in job interviews or in the workplace—there won't be examples to guide me, nor will there be as much time to think things through."

(S202106101092G)

".....The image at the top is from my parasitology report, while the one below is from my general chemistry report. Whenever I create these kinds of professional reports, I think about presenting them not just to my teachers but also to family, friends, classmates, and even future students. So, beyond delving into the content, I also try various ways to make the reports more engaging....."

(GM9_FB2021)

"The parasitology report was done this semester, while the chemistry one was from last semester. Yes, I did use the techniques you mentioned. The structure, layout, and even the way I write my reports are influenced by scientific papers and journals I've read. I deconstruct them, understand them, and then rebuild my own reports using my own language and ideas....."

(GM10_FB2021)

3) Exceeding the Learning Outcome

Emergent Phenomena

The teacher also found the students no longer meet the previous requirements of the assignment. For example, the students had neglected to address the steps and actions they took when exploring the relevant issues or research reports since Week 11.

Gaining Understanding

The insufficiency of educational guidance and hands-on practice in e-activities can create significant barriers to mastery of what the students learned and perform align with what the teacher expected. In in-person learning settings, learners typically benefit from clear, direct instruction followed by immediate, hands-on practice under the guidance of an instructor. The in-person approach allows immediate feedback, clarification, and tailored support based on the learners' needs. However, in this study, when transitioning to online platforms, such as real-time platforms and educational management systems, many students' works indicated that instructional guidelines were either too vague or not tailored enough to support independent learning. It could also result in decreased confidence and competency, particularly in healthcare, which relies heavily on practical, skill-based context.

Alignments

Mseleku's (2020) emphasis on supporting educators in delivering e-teaching, this study also focused on enhancing the transparency of educational materials for learners as reflected in alignments 14-2 and 15-2 (Table 2). These alignments made the structured e-activities more visible to students during the transition to e-learning. Without adequate educational information or practice opportunities, the students struggled to connect theoretical knowledge with practical application. It could also negatively affect both engagement and learning outcomes. The alignments provided virtual demonstrations for enhancing the assignment quality, and overall student engagement was strategized. Educational information and demonstration were produced and implemented in Week 14 (Figure 4). These alignments remained in effect during Week 15, accompanied by the provision of additional educational material aimed at helping students refine their Week 15 worksheet submissions (Figure 5).

Outcome

Through the theory of the SL: LPP, the teacher refined the weekly worksheets and provided additional recorded illustrations to assist students facing challenges with their assignments. The findings indicated the alignments to both the e-learning and e-teaching strategies were found to be effective in addressing the emerging learning phenomenon, successfully realigning student performance in the midst of the transition from offline to online. The alignment, *the visual illustration* with text, presented the roadmap of the learning process in the course. From an easy task to a challenge would be understood by the learners. For example, students could allocate where they are in learning from Week 2 and expect the next challenges in the following weeks.

"Throughout this semester, I was able to significantly improve my presentation and layout skills through various exercises. Starting with simple memes and moving on to more complex deconstruction and reconstruction tasks, I gained a deeper understanding of the field. Initially, I only knew how to use PowerPoint's basic design functions, but now I've learned to make use of templates, icons, and other features to elevate my designs. I've also been able to immediately apply these new skills to presentations in other classes." (S202106101092L)

However, educators must recognize that not every adjustment or alignment will yield the desired results. In some cases, a failed alignment can itself give rise to a new learning phenomenon. For example, in alignment 13-1 (Table 2), despite the teacher's efforts to verbally encourage participation, no improvement was observed in either submission or attendance rates. It wasn't until the subsequent adjustments, alignments 14-1 and 14-2, that noticeable changes

in student attendance and engagement were achieved. This highlights the necessity of ongoing reflection and adaptation in response to emerging learning phenomena during the transition to online learning. These findings contribute to the broader discourse on the challenges of e-learning and e-teaching, aligning with and extending conversations concluded in Alqahtani and Rajkhan's study (Alqahtani & Rajkhan, 2020).

Figure 4

Teacher Produced and Provided Additional Educational Information on the I'm@ TMU Platform

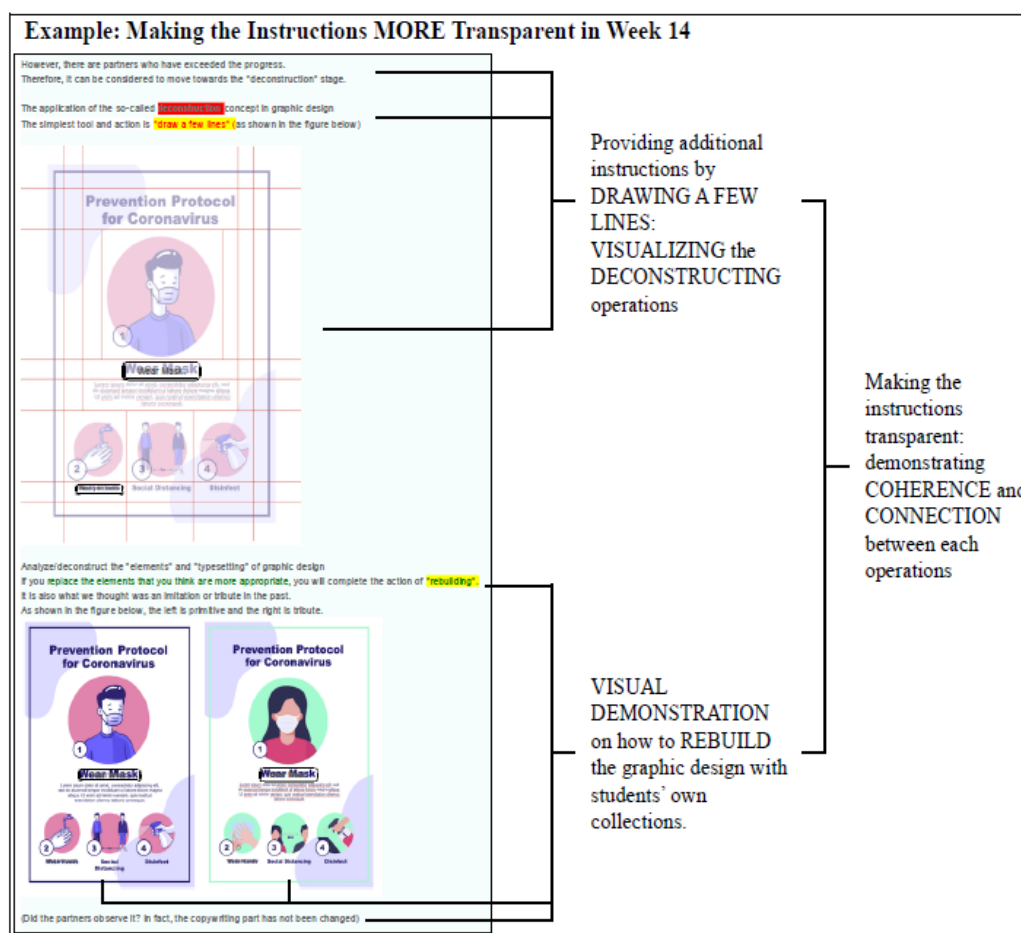
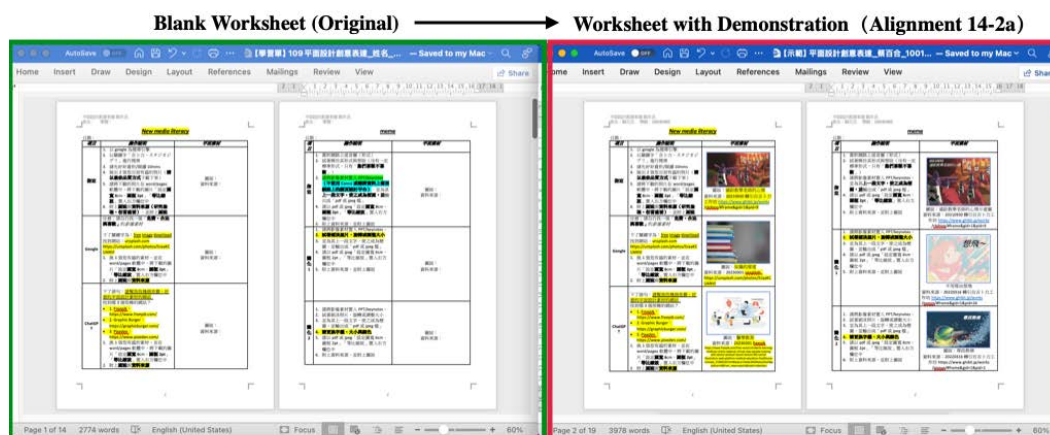


Figure 5*Demonstrations and Examples in the Weekly Worksheet (Alignment 14-2a)*

Discussion

This study highlighted several critical barriers encountered during the transition from offline to online learning, notably a decline in assignment submission and attendance rates observed in Week 12. To understand the underlying causes, employing a triangulation approach (Guba, 1981) proved effective. By integrating multiple perspectives—student interviews, educator discussions, and reviews of relevant literature and policies—specific challenges students faced in e-learning activities were identified. This comprehensive analysis underscored the importance of employing diverse methods to unpack complex learning phenomena during such transitions.

One significant finding was the iterative refinement of teaching strategies, particularly the alignment of synchronous sessions on Google Meet to an asynchronous format on platforms like Facebook group pages and Messenger. This adjustment freed students from fixed spatial and temporal constraints, aligning with Lave and Wenger's (1991) theory of Situated Learning: Legitimate Peripheral Participation (SL: LPP). This shift opened *new learning opportunities*, enabling students to engage in iterative reflection, revisit course content, and refine their e-learning activities. Such flexibility catered to the demands of weekly worksheets and the final project (Liao et al., 2022). Additionally, the asynchronous format fostered *new practices*, with 23 out of 34 students applying their learning in other modules, consistent with Lave and Wenger's emphasis on how social participation within a community fosters understanding and skills development.

Moreover, a remarkable example of student engagement was the creation of a 100-page learning portfolio, demonstrating academic integrity and adherence to proper citation practices. It raised an intriguing question: "Does *this represent the development of a new 'identity'?*" as Wenger's Communities of Practice (1998) proposed. While this study could not confirm the emergence of social relationships within the transition due to time constraints, future research could explore this potential identity transformation in greater depth. The findings also emphasized the critical role of continual monitoring and flexibility in e-teaching strategies. Not all adjustments yielded immediate positive outcomes; for instance, verbal encouragement failed to increase participation.

However, subsequent alignments, such as making educational materials more transparent, proved successful. The iterative process reinforced the necessity for educators to adopt a dynamic, reflective approach, aligning with action-research methodologies. This approach not only supported educators in navigating e-teaching challenges but also ensures the continual

enhancement of education quality and learning outcomes, echoing the goals of SDG-4 (Sayed & Moriarty, 2020). This study also extended Mseleku's (2020) focus on educator support by emphasizing the transparency of instructional materials. Alignments 14-2 and 15-2 (Table 2) improved the visibility of structured e-activities, aiding students in locating their position within the learning roadmap and anticipating future challenges. Recorded illustrations further supported students struggling with assignments, demonstrating how a clear progression from simpler tasks to more complex challenges can significantly enhance learning. This strategy might serve as a valuable model for educators encountering similar challenges.

Therefore, the action-research process demonstrated its efficacy in identifying emerging learning phenomena and implementing reflective alignments. By adapting SL: LPP in e-teaching practices to the realities of e-learning environments, educators could foster student engagement, support skill mastery, and create a more substantial e-learning ecosystem. These findings provided a foundation for future research and practical strategies to improve the quality of education in an increasingly digital landscape.

Conclusions and Implications

The results of this action-research study successfully underscored the complex dynamics involved in transitioning from offline to e-learning and e-teaching environments. By adhering to the action-research approach and Situated Learning: Legitimate Peripheral Participation (SL: LPP), the study identified key emerging learning phenomena and made iterative adjustments to instructional strategies in response to these challenges, such as 1) *identifying the emerging learning phenomena*: a gap between teacher's assumptions and student's learning issues, the insufficiency of instructional guidelines and hands-on practice in e-activities, a sense of security might be one of the contributing causes to students' engagement in both in-person and e-activities environment and delayed changes, and 2) *facilitating transparency in the structured resources amid the transition*: the iteration of the work refinement and the visual illustration of the learning roadmap.

These findings are consistent with the goals of Sustainable Development Goal 4 (SDG-4), which aims to ensure inclusive, equitable, and high-quality education for all, with an emphasis on facilitating equitable access to resources and fostering educators' and learners' lifelong learning. Improving learning outcomes aligns with the study's goal of enhancing student engagement and academic performance through adaptive e-teaching methods (United Nations, 2015; UNESCO, 2020; Sayed & Moriarty, 2020). This is particularly relevant in digital learning environments where challenges such as low engagement and difficulties in course management can affect the quality of education. For instance, it has been found that transparency and accessibility of instructional resources were critical in e-learning contexts, particularly when students were asked to navigate asynchronous e-activities. The incorporation of structured resources that students could revisit as needed contributed to improved learning outcomes, as seen in the case of self-regulated learning and enhanced academic integrity in project completion. These alignments not only supported educators in delivering e-teaching but also extended the focus for learners by highlighting the importance of transparent learning design.

This study contributed to the broader discourse on e-activities by demonstrating how emergent learning phenomena could shape both educational strategies and student's learning outcomes. It suggested the challenges of e-learning while offering practical insights into how educators can effectively respond to shifts in student engagement and learning performance during transitions between learning modalities. The implications of these findings highlighted the need for continued exploration into the relationship between e-teaching alignments and student responses, particularly in the evolving landscape of e-activities.

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Declaration of Interest

The authors declare no competing interest.

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