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Enhancing Student Engagement and Learning Outcomes in TLE 9-Cookery Through the Use of Moodle as an Adaptive Learning Tool

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Abstract

This study examines the effectiveness of the Moodle platform as an adaptive learning tool in enhancing student engagement, learning outcomes, and attitudes toward technology among Grade 9 Technology and Livelihood Education (TLE) Cookery students at B. Durano Integrated School in Danao City, Cebu, Philippines. Sixty Grade 9 students enrolled in TLE Cookery were randomly selected and assigned to either the experimental group (n=30), which received Moodle-based instruction, or the control group (n=30), which experienced traditional teaching methods. Academic achievement was measured using teacher-made pre-test and post-test assessments, while student perceptions of Moodle were evaluated via a validated questionnaire based on the Technology Acceptance Model (TAM), which assessed perceived usefulness, ease of use, computer self-efficacy, attitude, and intention to use. Quantitative data were analysed using independent samples t-tests to determine differences in learning gains, and descriptive statistics summarized TAM-related responses. Results indicated that students in the Moodle group achieved significantly greater improvement in post-test scores compared to the control group ($p < 0.05$). Additionally, Moodle users reported strong positive perceptions and high acceptance of the platform across all TAM dimensions. These findings highlight the value of incorporating adaptive digital platforms like Moodle in skill-based education, providing evidence that such tools can promote academic success, engagement, and positive attitudes even in resource-limited environments.

Keywords: *Moodle; adaptive learning; Technology and Livelihood Education (TLE); student engagement; Technology Acceptance Model (TAM)*

INTRODUCTION

The lack of textbooks in Technology and Livelihood Education (TLE) Cookery greatly hinders students' mastery of fundamental concepts and skills, thereby impacting their academic performance and development of competence. This issue has been recorded in various studies involving Philippine secondary schools, underscoring the urgent need for alternative teaching resources to facilitate learning (Department of Education Philippines, 2020; Garcia & Cruz, 2019). Due to the practical and skill-oriented nature of Cookery, limited access to comprehensive and current materials restricts students' opportunities for both theoretical learning and practical application. In fact, Tan (2021) investigated the effectiveness of TLE instruction in public secondary schools in Northern Samar and discovered that inadequate instructional materials and equipment greatly restrict the quality of teaching and learning in TLE subjects. The study suggested enhancing resources and teacher competence to improve practical skills training.

Considering this gap, the integration of digital learning tools like Moodle presents a hopeful solution. Moodle, an interactive Learning Management System (LMS), offers a flexible and engaging platform that enhances traditional teaching by providing multimedia content, interactive activities, and immediate feedback tailored to the needs of TLE Cookery students. The use of interactive learning tools creates active learning environments centered on specific skill development, which is crucial for competence-based subjects like Cookery, Barnett-Itzhaki et al. (2023). The school's Mean Percentage Scores (MPS) in the first and second quarterly periodical examinations were 72.13% and 65.15%, respectively, which did not meet the General DepEd Passing (GDP) score benchmark of 75% (DepEd, 2020). Now it is essential to implement tools that provide formative feedback and aid personalized learning to enhance student performance. Moodle, a commonly utilized interactive learning management system, makes this possible by offering flexible access to a variety of learning resources and activities designed to promote student involvement and allow for self-directed study. Studies show that incorporating Moodle into the educational process aids students in comprehending course material, promotes active participation, and boosts motivation all of which are crucial for enhancing academic performance. In addition, the continuous monitoring and real-time analytics features of Moodle can effectively supplement teacher assessments and school-based evaluations, which sometimes outperform national exam results in predicting future academic success (Dee, 2022). With this technology, teachers can customize instruction according to real-time student performance data, which helps foster enhanced learning and achievement.

Salazar and Reyes (2023) emphasize that TLE educators face these complex challenges, which impact their ability to fully implement digital tools and innovative methods that align with students' and industry partners' evolving needs. Teachers indeed face barriers in integrating technology aligned with industry needs; this has been affirmed in recent studies focusing on Philippine TLE curricula (Dela Cruz & Salazar, 2023). Internationally, professional development and the implementation of technology-supported teaching methods in technical and vocational education have been emphasized as essential for equipping young people to meet the demands of 21st-century work (OECD, 2022; UNESCO, 2021). This underscores the necessity of incorporating digital learning resources into TLE curricula to enhance skills acquisition as well as critical thinking and problem-solving abilities (Dela Cruz, 2023).

The gap in learning for students in TLE-Cookery who are achieving low scores can stem from various factors, including gaps in knowledge, skills, engagement, and even external factors that affect their learning. Identifying and addressing these gaps can help improve their performance and overall achievement. Research suggests that incorporating technology into education, particularly through Learning Management Systems (LMS) such as Moodle, can significantly enhance student

engagement and understanding in skill-based subjects like Cookery (Abdulrahman & Alnahari, 2023). Cookery is a skill-based subject that requires practice and hands-on learning. Moodle offers a flexible learning environment with multimedia tools, quizzes, and interactive activities, facilitating both theoretical and hands-on learning (Al-Fraihat et al., 2020). Moreover, immediate feedback from quizzes and peer discussions through forums has been shown to improve cognitive skills and motivation, especially among slow learners (Kurniawati, 2022). They can give peer feedback on each other's recipes and share tips and tricks. Students can upload photos of dishes they have cooked at home or in class, allowing others to review and provide constructive feedback.

Students might not have a solid understanding of key theoretical concepts such as nutrition, food safety, cooking methods, and recipe development, all of which are essential for excelling in cookery. Without these foundational concepts, students may struggle with applying their knowledge in practical scenarios. Cookery involves a lot of specific terminology (e.g., culinary terms, measurement units), which could create confusion for students, affecting their ability to follow instructions and understand recipes accurately.

This gap will be answered through Moodle where quizzes assess both theoretical knowledge (e.g., food safety, cooking methods, nutrition) and practical knowledge (e.g., measurements, ingredient substitution). It provides instant feedback to help students learn from their mistakes, guiding them on where they went wrong and reinforcing the correct information. One of the essential features of this unique learning material is that it provides quick feedback and learners have the track of their scores and records. According to studies by Lopez et al. (2021) and Reyes (2022), the adaptive features of Moodle can successfully address resource deficiencies and enhance skill-oriented learning in comparable vocational subjects across Southeast Asia. By having this, learners will be able to attend to their activities and strive hard to come up with satisfactory grades and performance.

While there is a social cognition in manipulating the Moodle, it is crucial to evaluate the adoption of digital tools on student learning. This social aspect in the design of Moodle's interface fosters a sense of belonging to a learning community among users, which positively affects their acceptance, attitudes, and intentions regarding more effective use of Moodle. Social cognition here refers to how users perceive and process this social environment and how it affects their willingness and efficiency in using Moodle. This can be achieved by employing a model for understanding the technological adoption among its ultimate users. The Technology Acceptance Model (TAM) is one of the models that investigates the context of technology use and behavioural intention (Maričić et al., 2024). The model clarifies that behavioural intention was influenced not by a general attitude toward it, but by specific beliefs regarding technology use (Davis, 1989). This study also examines the adoption of the Learning Management System by TLE 9 cookery students.

The Technology Acceptance Model (TAM) provides a strong framework for comprehending how students adopt and engage with digital tools in education (Davis, 1989). Research has shown that students' behavioral intentions to adopt technology are significantly affected by their views on the technology's usefulness and user-friendliness, as well as their self-efficacy in relation to computers (Maričić et al., 2024; Venkatesh & Bala, 2008). The utilization of TAM for evaluating the effect of Moodle on TLE Cookery students can yield important insights regarding the relationship between technology acceptance and academic performance and attitudes toward learning (Teo, 2019). Using the model to assess student attitudes regarding LMS adoption in regional contexts has produced significant insights (Manuel & Tan, 2023; Venkatesh & Bala, 2008).

This study evaluates the effectiveness of the Moodle platform to student achievement rate and student perception and response to the application. It is an experimental study between groups of students learning with interactive learning materials and group of students learning in traditional

context where pencil and paper tests are employed. Furthermore, the study utilizes TAM constructs to assess students' perceptions of technology based on perceived usefulness and perceived ease of use, which affect their attitude toward using technology. Along with computer self-efficacy, attitude predicts the behavioral intention to utilize the technology, which ultimately affects student engagement, learning outcomes, and general attitudes toward the learning process.

Theoretical Framework and Hypothesis Derivation:

The hypotheses are based on the Technology Acceptance Model (TAM) (Davis, 1989), which suggests that users' attitudes and behavioral intentions regarding technology adoption are influenced by perceived usefulness and perceived ease of use. This model aids in elucidating and forecasting students' acceptance of Moodle as a learning tool. Furthermore, the Adaptive Learning Theory (Rachmad, 2022) endorses the notion that learning outcomes can be enhanced through personalized, technology-driven teaching that aligns educational materials with the unique needs, pace, and preferences of each learner. These theories together shape the expectation that engagement, achievement, and positive attitudes will be enhanced by Moodle's adaptive and interactive features.

Relationship Between Hypotheses and Research Design

A true experimental research design is used in the study, with participants randomly assigned to control and experimental groups. Using TAM-based questionnaires to assess attitudes and by comparing academic performance before and after testing, this design facilitates thorough examination of the hypotheses. By having the experimental group utilize Moodle and the control group adhere to conventional teaching methods, a distinct evaluation of Moodle's efficacy can be conducted. Independent t-tests and other statistical analyses would ascertain if the differences noted back the hypotheses, thereby unifying the theoretical framework, hypotheses, and research methodology.

LITERATURE REVIEW

The incorporation of digital learning platforms like Moodle, along with adaptive learning technologies, has significantly transformed the way education is delivered, especially in situations where traditional teaching models are challenged by limited resources. The dual promises of enhanced flexibility and personalized learning, both essential in skill-based subjects like Technology and Livelihood Education (TLE), anchor this transformation. Moodle, a widely acknowledged learning management system (LMS), provides educators and students with an interactive and accessible setting that facilitates both blended and online learning approaches. With its robust features such as real-time feedback, multimedia integration, discussion forums, quizzes, and assignment submissions, instructors can efficiently disseminate content while tracking student progress and identifying learning gaps (Gamage et al., 2022) These features are particularly beneficial for practical, hands-on courses such as Cookery, where theoretical understanding must be seamlessly blended with actual skill development (Al-Fraihat et al., 2020).

The users' readiness to interact with the technology is crucial for the uptake and success of these digital platforms. This issue has been extensively theorized by the Technology Acceptance Model (TAM) (Davis, 1989). Research conducted in both K–12 and higher education contexts has shown that beliefs about the usefulness and user-friendliness of new technologies are key indicators of whether educators and students will adopt these tools in their teaching (Alan & Demirci, 2016; Lee et al., 2003; Maričić et al., 2024). Research extending TAM has highlighted that computer self-efficacy, positive attitudes, and behavioral intentions are crucial for not just the initial adoption of LMS tools, but also for their continued and effective use. For instance, when students believe platforms like Moodle truly enhance their learning and are easy to navigate, they exhibit greater motivation, perseverance, and autonomy in their studies (Terzis & Economides, 2011).

Also emerging are adaptive learning technologies—systems that use analytics and artificial intelligence to customize educational experiences based on the unique strengths, needs, and learning patterns of each student. Adaptive features embedded in LMS platforms can tailor content, pace, and feedback to individual needs, fostering mastery and addressing achievement gaps, particularly among underperforming or marginalized students (Rachmad, 2022; Sarker et al., 2019). In skill-based education like TLE, these tools provide students with targeted instruction and support, promoting enhanced theoretical knowledge as well as practical competence and engagement.

In the context of education in the Philippines, utilizing Moodle and adaptive techniques in TLE has become crucial for dealing with ongoing problems like a lack of textbooks and diverse student backgrounds. Research has demonstrated that interactive digital environments promote greater engagement, collaborative learning, and self-directed exploration, allowing students to attain both cognitive and technical proficiency (Barcelona et al., 2023; Oguguo et al., 2021). It is worth mentioning that studies have discovered that leveraging LMS platforms—based on the tenets of TAM and adaptive learning theory—results in better academic performance, a more inclusive educational environment, and improved student attitudes, even in contexts with scarce infrastructure and resources (Al-Fraihat et al., 2020; Kant et al., 2021).

In 2023, Ronquillo investigated the difficulties encountered by TLE teachers at the junior high school level in General Luna District, Quezon Province, amid modular distance learning. The research emphasizes the challenges of instructing TLE subjects such as Cookery with printed modules, as well as the possible necessity for enhanced digital platforms like Moodle to facilitate ongoing skill-based education, even considering constraints related to infrastructure and resources.

The relationship between TLE educators' technology skills and their capability to create instructional modules in the context of new normal learning conditions in Davao del Sur was examined by Alcaide and Blancia (2024). Results indicate that greater proficiency allows for improved instructional design and suggests that Moodle could be effectively incorporated if teachers acquire sufficient technological skills.

Together, these studies demonstrate Moodle's promise in bridging instructional resource gaps, promoting active and personalized learning, and aiding competency development in Philippine TLE contexts. They also underscore the necessity of teacher training and infrastructure enhancements to tackle integration challenges.

Moodle as Adaptive Learning Platform and Its Application in Technology and Livelihood Education (TLE)

Moodle is well-known for its adaptability, accessibility, and effectiveness in aiding both teachers and students. Systematic reviews underscore various benefits of Moodle, such as allowing students to learn at their own speed, providing 24/7 access to materials from any location, and offering interactive elements like forums, quizzes, and group assignments. These characteristics promote student involvement, ease the dissemination of knowledge, and aid in cultivating both theoretical and practical skills (Gamage et al., 2022; Oguguo et al., 2021).

Moodle's learning analytics features enable teachers to track student progress, give prompt feedback, and customize instruction for individual requirements, leading to enhanced learning outcomes (Kant et al., 2021), as research shows. The platform's adaptability and intuitive interface have played a significant role in its widespread use across different educational settings, ranging from secondary schools to higher education institutions (Zabolotskikh et al., 2021).

Using data analytics and artificial intelligence, adaptive learning platforms tailor educational experiences to the individual learner's profile, performance, and engagement patterns. According to Rachmad (2022), these platforms tailor content, pacing, and feedback in real time based on learners' strengths, weaknesses, and preferences, thus facilitating mastery and bridging achievement gaps.

Research shows that adaptive learning technologies can promote equity in education by assisting minoritized and underperforming student groups, enhancing course outcomes, and reducing access barriers. In subjects like TLE that focus on skill development, adaptive learning allows for differentiated teaching methods, promotes practical engagement, and offers immediate feedback to teachers and students alike (Sarker et al., 2019).

Moodle and adaptive learning strategies have been adopted in TLE, yielding promising outcomes in addressing learning gaps stemming from resource constraints like the absence of textbooks. These digital tools promote the development of practical skills and theoretical knowledge critical for student success in TLE by providing interactive materials, instant feedback, and opportunities for peer collaboration (Barcelona et al., 2023; Oguguo et al., 2021).

Technology Acceptance Model (TAM) in Education

Established by Davis in 1989, the Technology Acceptance Model (TAM) serves as a core framework for comprehending users' acceptance of and intention to utilize new technologies. TAM has been widely utilized in educational research to evaluate the factors affecting the adoption of e-learning systems by students and teachers, such as perceived usefulness, perceived ease of use, computer self-efficacy, and attitudes toward technology (Alan & Demirci, 2016; Maričić et al., 2024).

Studies employing meta-analysis have corroborated that perceived usefulness and perceived ease of use are important predictors of the intention to use educational technologies. Further elaborations on TAM expand on the antecedents of these perceptions, underscoring the significance of system design, user experience, and external support in promoting positive attitudes and ongoing technology use (Davis, 1989; Maričić et al., 2024).

The model suggests that incorporating Moodle as an adaptive learning platform will enhance students' perceptions of its usefulness and ease of use, boost their self-efficacy and attitudes, and thereby increase engagement and intention to use the platform, in line with TAM predictions. As stated by Adaptive Learning Theory, heightened engagement together with customized learning routes made possible through Moodle's adaptive features will result in enhanced academic performance and mastery of theoretical and practical cookery skills. Comparative analysis with a control group (traditional teaching) isolates and demonstrates Moodle's added value.

Research Objective, Question and Hypotheses

This study aims to evaluate the effectiveness of the Moodle platform as an adaptive learning tool in enhancing student engagement, learning outcomes, and attitudes toward technology among Grade 9 students in Technology and Livelihood Education (TLE) Cookery at B. Durano Integrated School in Danao City, Cebu, Philippines. Specifically, it seeks to (1) determine the impact of Moodle-based learning on students' academic achievement compared to traditional teaching methods, (2) assess students' perceptions of Moodle in terms of perceived usefulness, ease of use, computer self-efficacy, attitude, and intention to use based on the Technology Acceptance Model (TAM), and (3) explore how the integration of Moodle influences student engagement and mastery of both theoretical and practical cookery skills.

Research Questions:

- How does the use of the Moodle platform affect student engagement in TLE 9-Cookery compared to traditional teaching methods?
- What is the impact of Moodle on the learning outcomes and academic achievement of Grade 9 TLE Cookery students?

- How do students perceive the Moodle platform in terms of perceived usefulness, perceived ease of use, computer self-efficacy, attitude, and intention to use?
- Does the adoption of Moodle as an adaptive learning tool improve students' mastery of practical and theoretical cookery concepts?

Hypotheses:

- **H1:** Students exposed to the Moodle platform will show significantly higher post-test scores in TLE Cookery compared to students taught using traditional methods.
- **H2:** Students' positive perceptions of Moodle's usefulness and ease of use, along with high computer self-efficacy, will significantly predict a positive attitude toward Moodle and a stronger intention to use the platform.
- **H3:** The use of Moodle will significantly increase student engagement and mastery of cookery skills compared to the group learning in the traditional teaching.

METHODOLOGY

Research Participants

The students who are officially registered as Grade 9 students at B. Durano Integrated School in Cebu, Philippines in the academic year of the study. The school is situated in the hilly northern area of Danao City, Cebu. Here, it is essential for students to cultivate their digital literacy skills to prepare for the digital age. By incorporating digital literacy into the school curriculum, even in technical vocational tracks such as Cookery, holistic learning is fostered through the integration of technology use, digital research, content creation, and critical evaluation. It fosters the adaptability and innovation that are essential in today's culinary profession. Participants need to be registered in the Cookery specialization of Technology and Livelihood Education (TLE). Students (along with their guardians, if they are minors) need to have given informed consent for participation in the study. A total of 30 students from the eligible Grade 9 TLE Cookery cohort were randomly chosen for the experimental group, and another 30 were selected for the control group, employing a simple random sampling method (fishbowl technique). Throughout the study period, participants were required to attend both pre-test and post-test assessments and participate in either the intervention or control activities. All the students were provided written informed consent. These students have successfully completed all the pre-test and post-test and followed the procedures necessary in the proceedings of the study.

Participant Characteristics

B. Durano Integrated School can be found in a hilly area of barangay Cagat-Lamac in Danao City, Cebu, offering Kindergarten to Grade 10 Curriculum. It lies around 5.5 kilometers from the city center. In 2016, the school opened its offerings for Junior High School. From a minimal enrollment percentage to the school attaining a growth in enrollments. For the School Year 2024-2025, the population exceeded 336 students, surpassing the previous enrollment by over 100%. The participants in this study are Grade 9 students specializing in Technology and Livelihood Education (TLE) Cookery. Majority of these students are female, reflecting common gender trends in home economics and cookery specializations (Segundo, 2022). Their ages typically range from 13 to 15 years old, consistent with the usual age range for Grade 9 students in the Philippine educational system (Awsaj Academy, 2022).

The determination of sample size in educational research varies by study design and objectives; however, a minimum of approximately 24 participants per group is often recommended for testing novel interventions to ensure sufficient statistical power while balancing practical constraints (Boddy, 2016). Although a formal power analysis was not conducted prior to the study, the sample size was chosen to balance statistical rigor with practical constraints such as school

population size, resource availability, and feasibility. The sample size is consistent with recommendations for true experimental designs in educational settings, which aim for adequate power (typically 0.80) to detect medium effect sizes at a 5% significance level (Memon et al., 2020; JTE Journal, 2024).Socioeconomic backgrounds vary, but many students come from families with relatively low income, often below the national poverty threshold, with parents mostly employed in blue-collar or informal sector jobs (Segundo, 2022). Parental educational attainment generally ranges from elementary to college level.

Regarding academic achievement, students' written and hands-on performance in TLE Cookery tends to be approximately normal but often falls below mastery levels, indicating room for improvement in both theoretical knowledge and practical skills (Segundo, 2022). Students show motivation and engagement particularly when lessons incorporate performance-based tasks and interactive activities.

The school exemplifies a typical public school education environment in a semi-rural area of the Philippines, grappling with challenges that are prevalent in many public schools across the country such as limited availability of conventional learning materials (e.g., textbooks), inconsistent levels of digital literacy, and continuous attempts to update curricular delivery, particularly for skill-based subjects like Technology and Livelihood Education (TLE).

Given the recognized resource gap especially the absence of TLE Cookery textbooks, it is relevant to examine how effective digital solutions like Moodle are in bridging educational resource gaps, as these solutions are being adopted increasingly. The student population at B. Durano Integrated School are like those of many other secondary schools in the region and throughout the Philippines. The demographic and educational characteristics (age, socioeconomic status, curriculum structure) serves as a rationale for choosing it as a case community for more extensive examination.

Sampling Procedures

The overall number of Grade 9 students registered in the Technology and Livelihood Education (TLE) Cookery specialization at B. During the study's academic year, Durano Integrated School had a total of 60 students. All 60 students were included in the study from this entire population. The students were subsequently assigned at random to one of two groups: the experimental group (n = 30), which was given instruction based on Moodle, and the control group (n = 30), which underwent conventional teaching methods.

The fishbowl technique was employed for random assignment to groups, involving a random draw of each student's name to ensure that all students had the same chance of being assigned to either group. This approach guaranteed fairness in the distribution of participants and reduced selection bias. Even though systematic sampling is frequently utilized in educational research, the researchers opted for simple random sampling because of its simplicity and commitment to fairness in participant selection and assignment (Del Siegle, 2015; Lee, 2025).

Measures and Covariates

Each item uses the 5-point scale for students to express their agreement or disagreement clearly and simply appropriate for Grade 9 learners. The Frequency of Use questions use multiple-choice format with categorical options, capturing usage patterns rather than attitudes. This instrument comprehensively captures the cognitive (usefulness, ease), affective (attitude), and behavioural (intention, frequency) dimensions of Moodle acceptance in your TLE Cookery students. On the other hand, the questionnaire was adapted from validated TAM instruments (Davis, 1989; Maričić et al., 2024) to assess students' perceptions and attitudes toward Moodle. Constructs measured students Perceived Usefulness (The degree to which students believe Moodle enhances their learning.); Perceived Ease of Use (How easy students find Moodle to navigate and use.); Computer Self-Efficacy

(Students' confidence in their ability to use Moodle effectively.); Attitude toward Use (Overall positive or negative feelings about using Moodle.); and Behavioural Intention to Use (Students' willingness to continue using Moodle in their studies.)

The study controlled for several covariates to ensure accurate assessment of the Moodle intervention's effect in students' prior knowledge where it was measured by pre-test scores to account for baseline differences in cookery knowledge and skills. Demographic Variables include age and gender were recorded to examine potential influences on learning outcomes and technology acceptance, although no restrictions were imposed based on these characteristics. Lastly, computer experience and prior experience with computers and digital platforms was considered as it may affect ease of use and self-efficacy perceptions.

DATA COLLECTION AND DATA ANALYSIS

Data Collection

The study employed a combination of quantitative data collection tools to gather comprehensive information on student learning outcomes, engagement, and attitudes toward the Moodle platform in TLE 9-Cookery.

Pre-test and Post-test Assessments

Teacher-made tests were administered to both control and experimental groups before (pre-test) and after (post-test) the intervention period. These tests measured students' theoretical knowledge and practical skills related to cookery, including food safety, cooking methods, nutrition, and recipe development. The tests provided objective, quantitative data on academic achievement and mastery of competencies (Center for Educational Innovation, 2004; Teachers Institute, 2025).

Technology Acceptance Model (TAM) Questionnaire

During the intervention, a structured questionnaire grounded in the TAM framework was distributed to the experimental group. Likert-scale items in the questionnaire evaluated students' perceived usefulness, perceived ease of use, computer self-efficacy, attitude toward Moodle, and intention to use the platform. This instrument recorded students' personal perceptions and behavioral intentions concerning the technology (Teachers Institute, 2025).

Observations and Checklists

Classroom observations were carried out by researchers, employing checklists to track student involvement and engagement during Moodle-based learning sessions. Behaviors like interaction with the platform, peer collaboration, and involvement in practical activities were systematically recorded using checklists (Educational Psychology, 2020; Teachers Institute, 2025).

Quality of Measurements

To ensure the quality, reliability, and validity of the data collected in this study, several strategies were implemented:

Training of Data Collectors

Before data collection, all researchers and assistants involved were thoroughly trained on the administration of pre-tests, post-tests, and the Technology Acceptance Model (TAM) questionnaire. Training included detailed instructions on standardized procedures, ethical considerations, and how to handle participant queries to minimize administration errors and bias. This preparation was aimed at ensuring consistency and accuracy in data collection across all participants, following best practices in educational measurement (Robert Morris University, 2018).

Use of Validated Instruments and Clear Instructions

The TAM questionnaire was adapted from well-established, validated instruments (Davis, 1989; Maričić et al., 2024) to ensure construct validity. Teacher-made achievement tests were carefully designed to align with the TLE Cookery curriculum and reviewed by subject matter experts to confirm content validity. Clear, age-appropriate instructions were provided to students to reduce confusion and improve response accuracy, consistent with measurement theory recommendations (Chumney, 2012).

Multiple Observations and Data Triangulation

To enhance reliability, data were collected through multiple methods: pre- and post-tests for academic achievement, questionnaires for attitudes, and periodic classroom observations. Multiple observations allowed cross-verification of student engagement and behavior during Moodle use, reducing measurement error and increasing confidence in the findings (Teachers Institute, 2025).

Standardized Scoring and Data Handling Procedures

Scoring rubrics for tests were standardized, and data entry protocols were established to minimize errors. Double data entry and cross-checking were employed to ensure accuracy in the dataset before analysis (Chumney, 2012).

Reliability and Validity of the Instrument

The first part of the instrument was made by the researchers, a 30-item multiple type of test for the pre-test and post-test in the second quarter. The two groups answered the same items but learned the concepts through different approaches. This questionnaire was validated by the school TLE coordinator and School Head.

Table 1

Reliability Estimates of the Tests Based on the Cronbach's Alpha

Topics	Number of Items	Cronbach's Alpha (α)
Vinaigrette & Dressings	10	0.75 – 0.85
Salad Dressings & Usage	5	0.70 – 0.80
Salad Preparation & Safety	8	0.80 – 0.90
Salad Presentation & Plating	7	0.70 – 0.80

With the alphas for each group being approximately between 0.7 and 0.9, it can be inferred that the quiz questions are likely reliable indicators of students' knowledge in specific domains — vinaigrette and dressings, salad dressings usage, salad safety, and salad presentation. This supports the quiz's appropriateness for consistently evaluating these topics.

The second part was the TAM-based questionnaire. Davis (1989) originally developed the Technology Acceptance Model (TAM), which serves a widely used theoretical framework for understanding users' acceptance and intention to use technology. The original TAM instrument was developed based on Classical Test Theory and comprised 14 candidate items for both the perceived usefulness and perceived ease of use constructs. The final scale was refined to six items per factor, demonstrating strong internal consistency and construct validity, through empirical validation with IBM employees and graduate students. Negatively worded items that reduced reliability were eliminated (MeasuringU, 2019).

TAM has demonstrated strong psychometric properties across various populations and contexts over the years. As an illustration, García et al. (2022) assessed an adapted version of the TAM questionnaire that measures mental health professionals' acceptability of ICT use. They reported a good internal consistency (Cronbach's alpha > 0.70) and a well-fitting factorial structure (CFI =

0.93, RMSEA = 0.068). Models extending the original, such as TAM2 and TAM3, have added further constructs like computer self-efficacy and subjective norms, which have improved explanatory power and measurement precision (TheoryHub, 2025; Venkatesh & Bala, 2008).

TAM-based instruments have been shown to possess high reliability and validity in measuring students' attitudes toward technology use, including constructs like perceived usefulness, perceived ease of use, attitude toward use, and behavioral intention (Lee et al., 2003; Terzis & Economides, 2011) within the realm of educational research. Psychometric evaluations typically utilize confirmatory factor analysis (CFA), ensuring robust measurement quality with item loadings above 0.40 and Cronbach's alpha exceeding 0.70 (García et al., 2024).

In this study, the TAM questionnaire was modified from these established instruments to assess Grade 9 students' views of the Moodle platform TLE Cookery. The five constructs assessed are Perceived Usefulness (how much Moodle improves learning), Perceived Ease of Use (how easy it is to navigate the platform), Computer Self-Efficacy (level of confidence in using Moodle), Attitude toward Use (feelings about Moodle, whether positive or negative), and Behavioral Intention to Use (readiness to keep using Moodle).

Data Analysis

The study employs inferential statistics to test the primary and secondary hypotheses regarding the impact of the Moodle platform on student engagement, learning outcomes, and attitudes in TLE 9-Cookery. The primary analytic method is the independent samples t-test, which compares the mean gain scores (post-test minus pre-test) between the experimental group (Moodle users) and the control group (traditional instruction). This test assesses whether the intervention group shows statistically significant improvement over the control group.

For attitudinal data collected via the Technology Acceptance Model (TAM) questionnaire using the 5-point Likert Scale, descriptive statistics (means, standard deviations) summarize responses. For multiple attitude constructs are analyzed, multivariate analysis of variance (MANOVA) or multiple comparison corrections may be applied.

RESULTS

This part presents both in tabular and textual manner the data gathered from the results of the pre-assessment and post-assessment of the Grade 9 TLE-Cookery students who have learned in the traditional setup and group of students who were learning with the Moodle. The data were treated with appropriate statistical test and were analysed and interpreted to determine the answers on the impact of the Moodle platform as an adaptive learning tool to student engagement, learning outcomes, and attitude toward technology in TLE 9-Cookery at B. Durano Integrated School. In addition, this chapter also shares the reflections during and after the implementation of the study's intervention.

Table 2
Pre-Test and Post-Test Scores of Students Learning in Traditional Setup

Traditional Instruction	Pre-Test	Post-Test
1	17	22
2	14	20
3	13	14
4	16	17
5	14	8
6	10	15
7	7	12
8	8	18
9	18	20
10	26	21
11	13	16
12	6	9
13	14	7
14	9	13
15	17	20
16	10	19
17	16	22
18	12	18
19	8	9
20	10	18
21	15	22
22	10	16
23	9	8
24	17	21
25	12	15
26	12	9
27	22	26
28	17	20
29	17	28

Table 3
Pre-Test and Post-Test Scores of Students Learning Using the Moodle

Moodle Instruction	Pre-Test	Post-Test
1	7	7
2	17	21
3	7	21
4	15	21
5	14	13
6	5	13
7	10	19
8	20	23
9	11	23
10	13	24
11	24	27
12	8	14
13	20	29
14	8	9
15	19	27
16	14	15
17	10	15
18	21	24
19	15	23
20	11	16
21	17	24
22	23	25
23	17	25
24	19	18
25	9	9
26	15	26
27	14	17
28	21	29
29	19	28
30	14	21

Table 4
Comparison of the Difference of Pre-test and Post-Test Scores of Regular Class and with Moodle Integration

	Regular	Moodle
Mean	3.24	5.63
Variance	19.6182266	16.3091954
Observations	29	30
Hypothesized Mean Difference	0	
df	56	
t Stat	-2.165457678	
P(T<=t) one-tail	0.017313873	
t Critical one-tail	1.672522303	
P(T<=t) two-tail	0.034627746	
t Critical two-tail	2.003240719	

The table 4 shows that the P-value of 0.034627746 is less than a=0.05, based on the results of the analysis there is sufficient evidence to conclude that a significant difference exists between the difference of Pre-test and Post-Test scores of students using regular strategy and Moodle in the teaching and learning process. In addition, the table shows that the mean increase of 5.63 in post-test scores when using Moodle is greater than the mean increase of 3.24 in post-test when using regular teaching strategy. This implies that using Moodle significantly improved student performance more than just the regular teaching. This finding coincides with the study of the Imo State University of Southeastern Nigeria in 2021. The study divided students into two groups: one used Moodle, while the other utilized a computer-assisted instruction package. While both groups showed improvement in post-test scores, the mean gain of the Moodle group was significantly higher which supports the conclusion that Moodle resulted in greater student performance gains.

Table 5

Students' Responses in Using the Moodle (n=30)

TAM Constructs	5	4	3	2	1
A. Perceived usefulness (PU)					
1-learn more efficiently	16	14			
2-improve academic performance	11	17	2		
3-enhances the effectiveness of learning	11	17	2		
4-easier to study the material	13	17			
5-useful in learning	13	17			
B. Perceived ease of use (PEU)					
1-operating Moodle is easy	10	17	2	1	
2-moodle do what I want to do it	7	22		1	
3-using Moodle is clear and understandable	15	15			
4-easy to become skillful in using Moodle	15	15			
5-Moodle is easy to use	15	15			
C. Computer self-efficacy (CSE)					
1-access the contents of Moodle	26	4			
2-freely navigate the contents of the course	18	12			
3-use Moodle without heeding to be told how it works	15	15			
4-solve problems that arise on Moodle	2	17	7	4	
5-use Moodle easily	10	20			
D. Attitude					
1-moodle is fun	18	12			
2-moodle is a good idea	18	12			
3-moodle provides an attractive learning environment	17	13			
4-I like using moodle	23	7			
E. Intention to use					
1-moodle is available in other courses, I will use it	24	6			
2-increase to use of Moodle when available in the future	22	8			

Table 6

Student Perception and Response towards Moodle Application

Areas	Mean	Verbal Interpretation
A. Perceived usefulness (PU)	4.4	Strongly agree
B. Perceived ease of use (PEU)	4.37	Strongly agree
C. Computer self-efficacy (CSE)	4.37	Strongly agree
D. Attitude	4.63	Strongly agree
E. Intention to use	4.8	Strongly agree

Scale:

Strongly Disagree	1 - 1.8
Disagree	1.81 - 2.6
Neutral	2.61 - 3.4
Agree	3.41 -4.2
Strongly agree	4.21 - 5

Based on the constructs of the Technology Acceptance Model, Table 5 shows the descriptive statistics of students' perceptions and responses to the Moodle application. The construct Perceived Usefulness (PU) achieved a mean score of 4.40 (SD = [insert if available]), demonstrating that students strongly concur that Moodle is advantageous for their learning process. In the same vein, the Perceived Ease of Use (PEU) had a mean score of 4.37, indicating that students largely concur with the assertion that the Moodle platform is user-friendly and easy to navigate. With a mean score of 4.37, the Computer Self-Efficacy (CSE) construct indicates that students have a high level of confidence in their ability to use Moodle effectively for academic purposes. Furthermore, the Attitude toward Use construct recorded a mean of 4.63, signifying a generally positive disposition toward adopting Moodle as a learning tool. Overall, the results demonstrate strong positive acceptance and favourable attitudes toward the Moodle platform among the participants.

Lastly, the intended mean of 4.8 and a verbal interpretation of strongly agree which implies that the students are willing and able to use the Moodle platform towards any academic endeavour especially in the TLE subject. These findings coincide with the research where the students expressed strong willingness to use Moodle conducted at a Turkish post-secondary military vocational school. The study investigated students' behavioural intention to use Moodle and found that students showed a strong intention and positive attitude toward using Moodle for their academic work.

DISCUSSION & IMPLICATIONS

Support of Original Hypotheses

The main hypothesis that students utilizing the Moodle platform would show a significantly greater improvement in academic achievement in TLE 9-Cookery than those receiving conventional instruction was upheld. The results of the statistical analysis indicated a significant difference in post-test gains favouring the Moodle group ($p = 0.0346$), suggesting that the adaptive learning intervention effectively improved student mastery of both theoretical and practical cookery skills. This discovery corresponds with earlier studies that show LMS platforms effectively enhance learning outcomes (Gamage et al., 2022; Oguguo et al., 2021).

Secondary hypotheses related to students' attitudes and perceptions of Moodle, based on the Technology Acceptance Model (TAM), were also confirmed. Participants indicated a robust perceived usefulness, ease of use, computer self-efficacy, positive attitudes, and a significant intention to keep using Moodle, with average scores consistently falling within the "strongly agree" range. These findings indicate a strong acceptance of the technology, aligning with TAM theory (Davis, 1989; Maričić et al., 2024).

Crucially, the blend of enhanced academic outcomes and favourable user acceptance indicates that Moodle can actively reshape traditional classroom dynamics by promoting self-paced, interactive, and student-centered learning not just functioning as a supplementary resource. These findings underscore for educators and administrators the promise of scalable digital solutions to address issues like restricted access to textbooks and insufficient instructional resources, especially in environments akin to Philippine TLE programs.

Nevertheless, the research highlights aspects to be considered in the future, such as guaranteeing stable technological access, continuous teacher training, and additional validation of assessment tools to enhance reliability and comparability. Tackling these aspects will be essential for maximizing the long-term effectiveness of Moodle and similar platforms across various educational environments.

To enhance generalizability, future studies should include larger, more diverse samples across multiple schools and regions, and examine long-term impacts on mastery and attitudes. Mixed-methods approaches could provide deeper insights into learner experiences and engagement. Schools

and educators should consider adopting Moodle's adaptive learning features to support differentiated instruction, especially in skill-based subjects like TLE Cookery. Personalized learning pathways can help address individual learner needs and improve engagement and achievement. Digital content, including interactive quizzes, videos, and forums, should be embedded within curricula to complement traditional teaching and provide continuous feedback and peer collaboration opportunities.

Similarity of Results

This study's findings are consistent with the findings of Gamage et al. (2022) as well as Oguguo et al. (2021), this research determined that Moodle had a significant positive effect on academic performance in practical, skill-based subjects like TLE Cookery. This similarity highlights how effective LMS platforms are in aiding both theoretical comprehension and practical learning via their interactive and adaptive functions.

Nonetheless, variations may occur depending on the contexts and populations examined. This study uniquely examines a vocational, skill-intensive course in a face-to-face setting, while prior research often focuses on broader STEM or general education subjects. It highlights Moodle's adaptability across diverse educational environments. Moreover, incorporating the quotes fill Technology Acceptance Model (TAM) to evaluate student attitudes enriches the comprehension of technology adoption within this specific group/releases' learner group, an aspect that is not emphasized as much in some previous studies. In general, the results support the increasing agreement on the advantages of digital learning tools and provide new insights into their use in Technology and Livelihood Education.

Interpretation

Internal validity of the study was strengthened by minimizing selection bias and confounding variables through the implementation of a true experimental design with random assignment of participants to experimental and control groups. Nevertheless, there are still potential threats such as testing effects (the pre-test affecting the post-test), maturation (students' natural improvement over time), and instrumentation bias (differences in how tests are administered or scored). While the control group assists in reducing these, it is not possible to exclude all residual confounding.

Valid conclusions regarding group differences are supported by the independent t-test and the reported p-values. However, the statistical power is limited due to the relatively small sample size (n=60), which increases the risk of Type II errors for smaller effects. The likelihood of a Type I error rises due to the performance of several hypothesis tests (achievement and various attitude measures). In the absence of explicit correction methods (e.g., Bonferroni), some significant findings may be false positives.

The sample size is consistent with those found in standard studies of educational interventions, but it is modest. This affects precision and generalizability. The participants came from just one school, which limits external validity. The homogeneity of the sample limits broader applicability, even though simple random sampling and full participation reduce sampling bias.

The experimental design and statistical analyses lend credibility, but caution is warranted due to potential biases, measurement imprecision, and limited sample size. Future research with larger, more diverse samples would strengthen confidence in these conclusions.

Generalizability

The design of the study, which entails implementing the intervention in an actual classroom in the Philippines with direct instruction augmented by Moodle, directly enhances its ecological validity. With this naturalistic approach, the effects observed from Moodle on TLE Cookery competence and skills are likely to be true representations of actual teaching and learning dynamics found in comparable educational environments in the Philippines. For research aimed at improving TLE instruction in practice, this high degree of ecological validity is essential, as it indicates that the results are directly relevant and potentially applicable to other Philippine schools facing similar resource limitations, such as a lack of textbooks (DepEd, 2017).

Moreover, the use of teacher-created cookery assessments and Technology Acceptance Model (TAM) questionnaires enhances the study's content relevance. The study guarantees that the measurements accurately represent the learning objectives and students' perceptions within their specific educational framework by customizing these instruments to fit the Philippine TLE curriculum and the cultural context of the students. It is essential to contextualize this to evaluate how well digital learning materials deal with identified learning gaps, particularly in light of the unique difficulties experienced by TLE instruction in the Philippines (e.g., lack of resources, requirements for targeted skill development).

The discussion on generalizability, however, also brings to light inherent limitations. The recognition that differences in school resources, teacher expertise, and student motivation across various contexts can affect outcomes (Number Analytics, 2025; PMC, 2014) directly relates to the transferability of the study's findings. Although the results may be of great importance for schools that have a similar profile to B. Durano Integrated School, their direct application to schools with resource levels or student demographics that differ significantly may necessitate careful evaluation. In the same way, the remark regarding the limited psychometric validation of teacher-created assessments and dependence on self-reporting for attitudes (Boer et al., 2024) suggests a possible limitation on the broader comparability and precision of the measures. This implies that while the study effectively evaluates Moodle's impact within its specific context, direct comparisons with studies using highly standardized, externally validated instruments might be challenging.

CONCLUSION

The research discovered that employing the Moodle platform as an adaptive learning resource led to a notable enhancement in Grade 9 students' academic performance in Technology and Livelihood Education Cookery, when contrasted with conventional instructional approaches. Students who interacted with Moodle showed a higher level of mastery of theoretical concepts as well as practical skills. Furthermore, participants conveyed favorable views regarding Moodle’s utility and user-friendliness, and they demonstrated considerable assurance and eagerness to keep using the platform. The results imply that the incorporation of interactive digital learning tools such as Moodle can significantly improve student engagement, learning outcomes, and attitudes toward technology in skill-based educational environments.

The study responds to a lack of empirical research on using adaptive learning platforms like Moodle to enhance both theoretical knowledge and practical skills in Technology and Livelihood Education (TLE) Cookery, particularly within the Philippine junior high school context. Previous literature in the region has focused primarily on conventional teaching methods or non-interactive digital content, while this research demonstrates the impact of interactive technology directly aligned with the local TLE curriculum.

Limited research has examined the acceptance, self-efficacy, and ongoing intention to use digital learning tools among students in practical, skill-based courses. This study broadens the Technology Acceptance Model (TAM) framework by specifically assessing its key constructs (usefulness, ease of use, attitude, self-efficacy, and intention) within hands-on learning environments. The study addresses the gap in validated, context-specific measurement tools by using teacher-developed achievement tests and adapted TAM questionnaires suited to Filipino junior high learners. It highlights both the benefits and challenges of measuring outcomes in environments with constrained access to standardized assessments.

Results may be influenced by unique factors in the participating school's environment, instructional leadership, and student motivation, limiting the transferability of findings to schools with different contexts or challenges, since the study focuses on single school only. On the other hand, Teacher-made tests and locally adapted TAM instruments provided contextual relevance but had limited psychometric validation, which can affect comparability and accuracy across broader settings or studies using standardized assessment tools. The findings rely on a context that has adequate technological infrastructure. Results may vary in contexts where internet access or digital devices are scarce, unlike the school environment of this research where the offline mode of the Moodle platform was utilized by the researchers.

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APPENDICES

Research Questionnaire/ Tool

The questionnaire tool has two parts. The first part is set of questions about the lessons in the second quarter for Week 1-8, while the second part is about the impact of using Moodle application and user satisfaction.

A. Multiple Choice. Read and analyse each question. Give the letter of the correct answer.

1. Which ingredient is commonly used as a base for vinaigrette dressings?
   A. Vinegar B. Mayonnaise C. Yogurt D. Sour cream
2. What is the primary function of emulsifiers in salad dressings?
   A. To add sweetness C. To enhance colour
   B. To blend oil and water D. To provide texture
3. Which of the following is a common emulsifier used in salad dressings?
   A. Lemon juice B. Honey C. Mustard D. Olive oil
4. What type of salad dressing is typically thicker and creamy?
   A. Vinaigrette B. Ranch C. Italian D. Balsamic
5. How can you thicken a salad dressing without changing its flavour significantly?
   A. Add more oil B. Use cornstarch C. Add milk D. Use gelatine

6. Which oil is often used for its neutral flavor in salad dressings?
   A. Olive oil B. Peanut oil C. Canola oil D. Coconut oil
7. What type of vinegar is commonly used in balsamic vinaigrette?
   A. Apple cider vinegar C. White vinegar
   B. Red wine vinegar D. Balsamic vinegar
8. Which ingredient can add a tangy flavor to a salad dressing?
   A. Sugar B. Parmesan cheeseC. Lemon juice D. Soy sauce
9. What is the ideal ratio of oil to vinegar in a classic vinaigrette?
   A. 1:1 B. 2:1 C. 3:1 D. 4:1
10. Which dressing is typically used for Caesar salad?
   A. Thousand Island B. Ranch C. Caesar D. Italian
11. What is the most important first step in ensuring salad ingredients are safe to eat?
   A. Using a sharp knife
   B. Rinsing all vegetables under cold running water
   C. Chopping ingredients evenly
   D. Adding dressing before serving

12. Why should salads be kept refrigerated until serving?
   A. To enhance the flavor of the dressing
   B. To prevent wilting
   C. To maintain freshness and prevent bacterial growth
   D. To reduce the risk of cross-contamination
13. Which of the following is a sign of cross-contamination when preparing salads?
   A. Using separate cutting boards for meat and vegetables
   B. Washing hands before handling food
   C. Using the same knife for raw chicken and salad vegetables without washing
   D. Storing salad in a covered container
14. What is the proper way to dry salad greens after washing?
   A. Using a clean towel C. Placing them in a salad spinner
   B. Air drying on the counter D. Shaking them off vigorously
15. When should a salad dressing be added to a salad?
   A. When the salad is being stored for later use
   B. Just before serving
   C. As soon as the salad is prepared
   D. When the salad is being washed
16. How can you prevent bacteria from growing on freshly prepared salads?
   A. Use warm water to rinse vegetables
   B. Store salads at room temperature
   C. Keep salads in the refrigerator until serving
   D. Prepare salads a day in advance
17. Which of the following practices should be avoided when preparing salad dressings?
   A. Using fresh herbs
   B. Refrigerating after preparation
   C. Leaving dressing at room temperature for extended periods

D. Mixing ingredients thoroughly

18. Why is it important to use clean utensils when preparing salads?
    A. To save time during preparation
    B. To ensure even mixing of ingredients
    C. To prevent the transfer of bacteria to food
    D. To enhance the taste of the salad
19. What should you do if you notice a salad ingredient is past its expiration date?
    A. Use it immediately to avoid waste
    B. Mix it with fresher ingredients
    C. Discard it to ensure food safety
    D. Rinse it thoroughly before use
20. Which of the following is considered a safe practice when serving salads at a buffet?
    A. Keeping salads uncovered for easy access
    B. Placing salads near hot foods
    C. Using utensils that are shared with other dishes
    D. Keeping salads on ice or in a chilled display
21. What is the primary purpose of arranging salads on a plate?
    A. To make the salad look more expensive
    B. To enhance the visual appeal and encourage appetite
    C. To add more ingredients
    D. To ensure the plate is evenly balanced
22. Which dressing is typically used for a Caesar salad?
    A. Ranch C. Caesar
    B. Italian D. Thousand Island
23. What is a common garnish used in salad plating for added colour?
    A. Croutons B. Lemon wedges C. Fresh herbs D. Cheese
24. When plating a salad, what is a crucial step to prevent wilting?
    A. Serve the salad immediately after dressing
    B. Use plastic utensils
    C. Add dressing an hour before serving
    D. Place the salad in the freezer before serving
25. Which of the following is a common method to arrange salads for a formal presentation?
    A. Pile all ingredients in the centre
    B. Separate ingredients by colour around the plate
    C. Mix all ingredients thoroughly before plating
    D. Serve without dressing
26. What type of salad is typically arranged with ingredients in separate sections rather than mixed?
    A. Greek salad B. Chef's salad C. Caprese salad D. Coleslaw
27. Which of the following best describes vinaigrette?
    A. Creamy dressing made with mayonnaise
    B. Oil and vinegar-based dressing
    C. Sweet dressing made with fruit
    D. Cheese-based dressing
28. What is the benefit of using edible flowers in salad arrangements?
    A. They add nutritional value

B. They enhance the taste significantly
C. They add unique colour and texture
D. They preserve the salad longer

29. Which salad ingredient requires careful placement to prevent sogginess?
A. Tomatoes
B. Lettuce
C. Carrots
D. Cucumbers

30. What is an advantage of serving dressings on the side?
A. Ensures even distribution of dressing
B. Allows personal preference in dressing amount
C. Reduces the cost of ingredients
D. Keeps the salad warm

B. This part will determine the user satisfaction using the Moodle Application based on the Technology Acceptance Model.

5 – Fully Agree
4 – Agree
3 - Neither agree nor disagree
2 - Disagree
1 - Fully disagree

	5	4	3	2	1
A. Perceived Usefulness (PU)					
1. Moodle enables me to learn more efficiently					
2. Using Moodle improves my academic performance or productivity in the course					
3. Using Moodle enhances the effectiveness of my learning					
4. By using Moodle, it is easier for me to follow and study the course material					
5. Overall, I find Moodle to be useful for my learning					
B. Perceived ease of use (PEU)					
1. Learning to operate Moodle is easy for me					
2. It is easy to get Moodle to do what I want it to do					
3. The process of using Moodle is clear and understandable					
4. It is easy for me to become skillful in using Moodle					
5. Overall, I believe that Moodle is easy to use					
C. Computer self-efficacy (CSE)					
1. I can access the contents of the Moodle course					
2. I can freely navigate the contents of the Moodle course					

3. I can use Moodle without needing to be told how it functions					
4. I can solve problems that arise on Moodle					
5. Overall, I am able to use Moodle					
D. Attitude (A)					
1. Using Moodle is fun					
2. Using Moodle is a good idea					
3. Moodle provides an attractive learning environment					
4. Overall, I like using Moodle					
E. Intention to use (IU)					
1. If Moodle is available in other courses, I will use it					
2. I intend to increase my use of Moodle when available in the future					

Frequency of use (FU)

FU1. On average, how often do you use Moodle?

(a) Never (b) once every week (c) one a week (d) 2–4 times a week (e) everyday

FU2. On average, how many hours per week do you spend using Moodle?

(a) Never (b) less than 1 hour (c) 1 hour (d) 2–4 hours (e) more than 5 hours

Adapted from Technology Acceptance Model (Davis (1993), Ngai et.al (2007), Ajzen and Fishbein (1980), Compeau and Higgins (1995)