

Flipped Classroom Approach and Motivation in the Acquisition of Practical Skills

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Abstract

This study examined the impact of flipped classrooms approach to learners' motivation as well as the acquisition of practical skills in the electrical installation and maintenance subject. Specifically, this study used the descriptive correlational research design with questionnaire as the basic data gathering tool. Furthermore, descriptive statistics were utilized to treat the data while Pearson-r correlation was employed to answer the study's inferential questions and the effects among variables. The study revealed that learners can become more engaged, motivated, and capable of developing practical skills by employing a flipped classroom approach. In addition, the results further showed that learning process was improved with the use of this approach. Statistical tests proved the significant relationship between flipped classroom approach to motivation but not in the acquisition of practical skills. The results imply the potential benefit of flipped classroom in addressing student motivation in any subject.

Keywords: *flipped classroom, motivation, practical skills, electrical installation and maintenance*

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1. Introduction

According to the Philippine Statistics Authority (PSA), one out of every four employed Filipinos is a laborer or unskilled worker. In fact, in the January 2017 report, the PSA revealed that elementary jobs accounted about 25.4 percent of the total employed population. This means that 9.99 million of the country's 39.34 million workers are laborers and unskilled workers (Ordinario, 2017). With the implementation of K to 12 Curriculum, it was hoped that after senior high school, learners would be competent in joining the workforce - making college education optional. However, according to the research conducted by the Philippine Institute for Development Studies (PIDS) in 2018, Senior High School graduates faced challenges integrating into the labor market, with 22 of 26 companies surveyed thinking that they lack adequate preparedness for employment.

This problem was further exacerbated by the onset of pandemic and the subsequent migration from face-to-face classes to blended learning. According to World Bank's annual global report, the Philippines got a 91% learning poverty rate and a 90% learning deprivation rate, which is the highest percentage in Asia. In fact, one secondary school in the country obtained a Mean Percentage Score (MPS) of Technology and Livelihood Education (TLE) performance grade of 87% from 2019-2020 to 61.33% in 2021. While the Technology and Livelihoods Education (TLE) aims to enhance students' knowledge, skills, values, and attitudes to prepare them for employment through variety of activities related to Home Economics, Entrepreneurship, Agriculture Arts, and Industrial Arts, values and attitudes formation that will assist learners in entering the workforce should be prioritized (Jacolbia, 2016).

Technical or practical skills, as one of the learning abilities important in developing 21st-century learners, can assist students in working more efficiently and effectively, boosting confidence, developing problem solvers, and becoming productive learners. In the technical and vocational education and training (TVET), students are exposed to practical and hands-on tasks; occasionally interchanging studying and training. Through this method, students can connect their academic theory to their professional experience (Proske et al., 2014). For example, employing strategies and creating jobs in the electrical installation industry, skill acquisition in electrical installation and maintenance works promote students' self-assurance and independence.

According to studies, the most common approach of skills development among students is flipped classroom (Hidalgo & Callo, 2023; Li & Li, 2022; Öztürk & Çakıroğlu, 2021). The flipped or inverted classroom is a modern and well-liked teaching approach in which tasks typically completed in the classroom (such as topic presentations) are completed at home and tasks often associated with homework are completed in the classroom (Akçayır & Akçayır, 2018). It is a well-known teaching method that alternates the amount of time teachers spend teaching in class and the amount of time students spend practicing outside of class (Lai & Hwang, 2016). In a flipped classroom approach, students arrive at class already equipped with similar knowledge that is ready for application. This procedure encourages participation in activities that support active learning. Additionally, students' motivation levels rise when they actively participate in class activities (Naciri et al., 2022). Understanding the significance of motivation in an educational setting is crucial since motivation can result in a variety of behaviors. For learning to be substantial and successful, learning motivation is a crucial prerequisite. This is the power of learning with motivation, and it enables learners to gather and process knowledge, process it actively, and apply it effectively through practical skills (Yilmaz et al., 2017).

The flipped classroom enables students to read articles and view videos at home before collaborating with their classmates on projects during the school day. All of these improve communication and trust amongst people as well as collaborative skills. The instructor can work one-on-one with the student who needs extra assistance during class time (Shi-Chun et al., 2014). Using video and other pre-recorded media gives students control over their education because they may pause, rewind, and fast-forward as needed. The ability to retake courses may be helpful for those for whom English is a second language. Additionally, collaborative learning projects can promote student social interaction, teamwork, and cultural diversity, making it simpler for them to support one another's learning and for people with varying ability levels to work together.

Since this flipped classroom approach connects with and communicates to this generation of learners through video and on-line technology, evidence suggests that there is enhanced student-teacher connection, rapid and relevant feedback, and improved student engagement. Students will be able to learn at their own pace, according to enthusiasts of the flipped classroom. Content becomes more meaningful when students practice and apply what

they've learned in the classroom (Smith, 2015). In turn, motivation is also activated since flipped classroom approach is utilized varied methods to stimulate learners' interest.

With the positive outcomes of previous studies on the flipped classroom approach, this study determined the impact of flipped classroom approach and the learners' motivation to the acquisition of practical skills in the electrical installation and maintenance subject of Grade 10 students. It proves or disproves the following hypotheses:

1. There is no significant relationship between the use of flipped classroom approach and motivation in terms of self-efficacy, active learning strategies, performance goal, achievement goal and learning environment stimulation.
2. There is no significant relationship between the utilization of flipped classroom approach and the acquisition of practical skills in electrical installation and maintenance.

2. Literature Review

People's roles in society have been changing in tandem with fast advances in the realm of information technology. As knowledge has become more widely available, educational environments must become more relevant and instructional technology must be used more effectively (Turan & Göktaş, 2018). According to studies, teachers should be well-educated in this skill and use technology in a professional manner. In addition, ICT training should include more practical applications and integrated instruction (Akarawang et al., 2015). The utilization of ICT in teaching is well-integrated in the flipped classroom approach. It is a teaching method that varies from typical lectures in that it switches the locations and times of assignments and lectures, as well as allowing students to learn more actively and cooperatively (Abeysekera & Dawson, 2015). The purpose of a flipped classroom approach is for students to study independently at their own leisure while receiving appropriate support materials for out-of-class instruction, and then return to class (in-class) to participate in group activities supervised by the teacher and “*after class sessions, students may need to reflect on their practice or complete assignments given during class time*” (Triantafyllou, 2015). The flipped (or inverted) classroom approach (Abeysekera & Dawson, 2015) is one of the most recent advances in teaching and is also a kind of active learning. As a result, active learning encompasses a variety of instructional strategies in which students are encouraged to do more than just listen — they are encouraged to read, write, discuss, and engage in higher-order thinking.

Several studies showed that flipped classroom addresses students' motivation (Xiu & Thompson, 2020; Campillo-Ferrer & Miralles-Martínez, 2021; Jong, 2023; Ferriz-Valero et al., 2022). Motivation is a meta term that encompasses several related ideas such as engagement, perseverance, curiosity, self-efficacy, and self-concept and it also encompasses a wide range of academic perspectives such as expectancy-value or intrinsic-extrinsic constructs, as well as numerous associated theories (Irvine, 2018). Learning environment stimulation includes teaching methods, classroom activities, student-teacher interactions, and interactions between students (Albalate et al., 2018). The flipped classroom's impact on students' motivation and performance has been documented in numerous researches across various contexts. Some claim that it has a favorable impact on students' dynamism (Naciri et al., 2022). Flipped classroom course content may be more effective in capturing learners' attention (Proske et al., 2014) that can enhance development of practical skills. Hence, this is necessary for the training students in the world of work (Promise, 2017; Jou & Wang, 2013). The primary goal of education is to meet students' learning needs so that they can achieve their full potential. The flipped classroom is one of the teaching approaches that has been found to be effective in enhancing student performance and addressing their educational needs. This can be utilized to boost motivation in the teaching and learning process, as well as in the acquisition of practical skills.

3. Methodology

3.1. Research Design

This study used the descriptive correlational research design with the questionnaire as the basic data gathering tool since it aimed to determine the significant relationship of flipped classroom approach to motivation and to the acquisition of practical skills. Correlational research was used to establish relationships between variables and to anticipate future events based on the current condition. Measurement of two or more important variables, as well as an assessment of the relationship between variables, were displayed in the descriptive correlational approach. It served as a guide in identifying, determining, describing, and analyzing the effectiveness of the flipped classroom approach and its relationship to motivation in terms of self-efficacy, active learning strategies, performance goal, achievement goal, learning environment stimulation, as well as the acquisition of practical skills among electrical installation and maintenance grade 10 students.

3.2. Participants of the Study

The participants of the study were the Grade 10 students of an integrated high school in the Philippines. Specifically, it included all learners of electrical installation and maintenance subject with a total population of 75 students. However, only 60 students in total had been selected since 15 of them from one of the batches were utilized for evaluating the reliability of the questionnaire.

3.3. Research Instruments

The research instruments used were survey questionnaire on the perceived effects in the utilization of flipped classroom approach and students' motivation towards acquisition of practical skills, and rubric rating scales or tool designed to measure the learners' performance of acquired practical skills. The pilot test was conducted to one of the batches composed of 15 learners who were not included in the study in order to evaluate its reliability. It reported an excellent coefficient for reliability index of $\alpha=0.935$.

3.4. Data Analysis

The respondents' perceptions on the effectiveness of flipped classroom approach were evaluated using descriptive statistics such as mean and standard deviation. The respondents' perceptions of motivation in terms of self-efficacy, active learning strategies, performance goal, achievement goal, learning environment stimulation, as well as the acquisition of practical skills, was determined using the same statistical methodologies and the relationship between the variables was tested using Pearson Product-Moment Correlation (Pearson r).

4. Result and Discussion

The study applied flipped classroom approach in the teaching of electrical installation and maintenance. After two weeks of integrating the approach to the teaching and learning, the survey was conducted in order to measure the students' acceptance of the approach using different indicators such as out-of-class, in-class and after-class.

Table 1

Students' Perception on the Effectiveness of Flipped Classroom Approach

Flipped Classroom Approach	Mean	Std. Deviation	Verbal Interpretation
Out-of-Class	4.15	0.47	Effective
In-Class	4.15	0.47	Effective
After-Class	4.15	0.47	Effective
Overall	4.15	0.38	Effective

Legend: 4.50-5.00 Highly Effective; 3.50-4.49 Effective; 2.50-3.49 Moderately Effective; 1.50-2.49 Somewhat Effective; 1.00-1.49 Not Effective

Results reveal that all of them were rated a mean of 4.15, with a standard deviation of 0.47, interpreted as “effective”. Cimermanova (2015) notes that flipping the classroom with well-prepared learning materials in advance transforms the classroom into an education laboratory where students arrive well-prepared and completely engaged in class activities. Results of the study showed that out-of-class phase promote flexibility, differentiation, active learning, teacher-student interaction, and student engagement. Furthermore, in-class activities give students the chance to collaborate with their peers, engage in active learning, and receive feedback and encouragement from their teacher. Furthermore, after-class activities give students the chance to reflect on what they have learned, review important ideas, and put their knowledge and skills into new applications and apply it to their daily living.

In terms of out-of-class phase, the students assessed several indicators such as instruction (Appendix A) and preparation (Appendix B). The instruction ($\tilde{x} = 4.25, \sigma = 0.52$) was assessed “well evident” confirming instruction as a vital component of out-of-class learning while preparation ($\tilde{x} = 4.15, \sigma = 0.47$) was also assessed “well evident”. Overall, the findings imply that the students see the use of lectures on video and learning activity sheets in the flipped classroom approach favorably and believe that these strategies effectively support their learning. This is similar to the findings of Talbert (2017), Cimermanova (2015) and Kim et al. (2022).

The in-class phase was assessed through class discussion (Appendix C), group activities (Appendix D) and feedback (Appendix E). In general, in-class phase was rated well-managed with class discussion ($\tilde{x} = 4.06, \sigma = 0.52$), group activities ($\tilde{x} = 4.33, \sigma = 0.51$) and group discussion ($\tilde{x} = 4.15, \sigma = 0.47$). These are similar to the studies of Bergmann and Sams (2016), Cheng et al. (2019) and Xu and Shi (2018). The in-class phase is highlighted by application of group activities and feedback mechanisms. The students believe that group activities during the in-class phase of the flipped learning approach are advantageous for their learning process, development of practical skills, and collaborative learning through collaboration and communication, group activities, immediate feedback and social support.

The after-class phase was assessed in terms of assignment completion (Appendix F) and extension of learning (Appendix G) with both of them rated “well evident” ($\tilde{x} = 4.28, \sigma = 0.43; \tilde{x} = 4.15, \sigma = 0.47$). Overall, the findings imply that assignments are valued by students and play a significant part in the flipped classroom strategy. These concur with the findings of Triantafyllou (2015).

Table 2
Students' Level of Motivation

Motivation	Mean	Std. Deviation	Verbal Interpretation
Self-Efficacy	4.09	0.44	Motivated
Active Learning Strategies	4.18	0.48	Motivated
Performance Goal	4.13	0.38	Motivated
Achievement Goal	4.49	0.45	Motivated
Learning Environment Stimulation	4.30	0.42	Motivated
Overall	4.24	0.43	Motivated

Legend: 4.50-5.00 Highly Motivated; 3.50-4.49 Motivated; 2.50-3.49 Moderately Motivated; 1.50-2.49 Somewhat Motivated; 1.00-1.49 Not Motivated

The respondents' level of motivation in terms of self-efficacy, active learning strategies, performance goal, achievement goal and learning environment stimulation are summarized in Table 2. All indicators were marked "motivated" as evident to their mean scores ($\tilde{x} = 4.09$, $\sigma = 0.44$) for self-efficacy, ($\tilde{x} = 4.18$, $\sigma = 0.48$) for active learning strategies, ($\tilde{x} = 4.13$, $\sigma = 0.38$) for performance goal, ($\tilde{x} = 4.49$, $\sigma = 0.45$) for achievement goal, and ($\tilde{x} = 4.30$, $\sigma = 0.42$) for learning environment stimulation. In general, their level of motivation is scored ($\tilde{x} = 4.24$, $\sigma = 0.43$), interpreted as "motivated" as well. These findings concur to the studies of Albalate et al. (2018), Alhadi and Nanda Eka Saputra (2017), Naciri et al. (2022) and Proske et al. (2014).

In terms of self-efficacy, it denotes that it is students' determination or belief to do things they cannot and want to have experience in it (Albalate et al., 2018). In the context of education, it is a crucial element of motivation because individuals who have high levels of self-efficacy are more likely to participate in the independent learning that is necessary for the flipped classroom's out-of-class phase and to take advantage of the in-class opportunities for collaboration and feedback.

In terms of active learning strategies, students are really motivated in learning as evidenced by them being able to understand new concepts even when in conflict with previous understanding, connect new concepts to previous experiences, being able to find relevant resources that will help them further understand the lesson, capable of discussing to the teacher clarifications of understanding and attempts to make connections among concepts learned during the process. Accordingly, Albalate et al. (2018) suggest active learning strategies that students get knowledge by studying and understanding things they do not know through participation, teamwork, and interaction with peers and the subject matter.

In terms of performance goal, students participate in learning activities to get a good grade ($\tilde{x} = 4.68, \sigma = 0.54$). While they assert getting good grades as their main goal, they as well, are motivated to perform better than others, participate for others think they are smart, gain teachers' attention and showcase their capabilities. A student's level of motivation for learning can be significantly affected by performance goals (Albalate et al., 2018). The results showed numerous ways performance goals affect motivation such as direction, challenge, and feedback. It's crucial to remember that performance goals should be matched with other various types of goals, such as achievement goals, which concentrate on acquiring knowledge as well as skills. It might result in a limited level of grades or competitiveness rather than a wider focus on learning and growth when performance goals are prioritized over achievement goals.

In terms of goal achievement, students feel most fulfilled when they attain a good score in a performance ($\tilde{x} = 4.72, \sigma = 0.64$). In general, students are quite motivated to be able to achieve certain goals which are focused on getting good grades, feeling fulfillment upon solving difficult problems, being able to demonstrate their skills, being accepted of their ideas and perform better than other learners. This is congruent with Albalate et al. (2018) that students are actively engaged in their academic endeavors; they are achieving their goals. As a result, their major goals are learning and task mastery for themselves. Overall, achievement goals provide students with an understanding of direction and purpose, boost their perseverance and effort, strengthen their sense of self-efficacy, encourage a growth mindset, and promote a proficiency orientation. Higher levels of motivation, engagement, and eventually academic success, can result from all of these components.

In terms of learning environment stimulation, students participate because the content is exciting and changeable ($\tilde{x} = 4.63, \sigma = 0.55$). The individual behavior appears to be driven by a range of elements that support an effective and interesting learning process. They are more likely to participate when the lesson is engaging and flexible, the teacher employs a range of teaching techniques, all students take part in discussions, and the learning task is challenging. These variables imply that the person's motivations are a sense of involvement, challenge, and meaningful learning. Learning environment stimulation includes teaching methods, classroom activities, student-teacher interactions, and interactions between students (Albalate et al., 2018).

Table 3*Students' Practical Skills Performance in Electrical Installation and Maintenance*

Score	Scale	Frequency	Percentage	Verbal Interpretation
Interpretation of Wiring Diagram				
Below 75	1	0	0	Beginning
75 - 79	2	4	6.7	Developing
80 - 87	3	20	33.3	Competent
88 - 94	4	21	35	Highly Competent
95 - 100	5	15	25	Advanced
Correct Installation of Electrical Circuit				
Below 75	1	0	0	Beginning
75 - 79	2	2	3.3	Developing
80 - 87	3	14	23.3	Competent
88 - 94	4	22	36.7	Highly Competent
95 - 100	5	22	36.7	Advanced
Testing of Electrical Wiring Installation				
Below 75	1	0	0	Beginning
75 - 79	2	1	1.7	Developing
80 - 87	3	12	20	Competent
88 - 94	4	21	35	Highly Competent
95 - 100	5	26	43.3	Advanced
Compliance with Safety Regulation				
Below 75	1	0	0	Beginning
75 - 79	2	1	1.7	Developing
80 - 87	3	12	20	Competent
88 - 94	4	21	35	Highly Competent
95 - 100	5	26	43.3	Advanced
Competence with Tools and Effective Use of Materials				
Below 75	1	0	0	Beginning
75 - 79	2	2	3.3	Developing
80 - 87	3	14	23.3	Competent
88 - 94	4	22	36.7	Highly Competent
95 - 100	5	22	36.7	Advanced

In the administration of flipped classroom approach, students' practical skills performance was rated using their wiring diagram output. The results summarized in table 3 showed that fifteen out of 60 students (25%) have scored 95-100 points thus marked "advanced". Majority, which is 21 students (35%) scored 88-94 points in the activity and marked as highly competent while (33.3%) or 20 of the students have scored 80-87 thus, identified "competent". On the least, only 4 students (6.7%) out of the 60 respondents were rated 75-79 thus marked developing. Results show that at least, more than half of the respondents are already competent and skilled in electrical installation and maintenance as shown by their wiring diagram outputs.

Understanding wiring diagrams is crucial for students working on electrical installation and maintenance projects because it enables them to fully understand how electrical systems are built and wired. By giving a visual picture of the parts' interconnections and the structure of the electrical system, students are better able to identify problems, set up installations, and carry out maintenance and repairs. Overall, learning practical skills in electrical installation and maintenance requires the ability to understand wiring diagrams. Even students can troubleshoot, plan, install, and maintain electrical systems more effectively and efficiently if they are aware of how electrical systems are built and wired.

In terms of correct installation of electric circuit, same proportion of the respondents are marked “advanced” and “highly competent” as 22 students or 36.7% were recognized for each level. Fourteen students (23.3%) are identified to be “competent” while only two students (3.3%) are “developing”. Results show that more than half of the respondents are already highly competent and advanced in terms of correct installation of electrical circuit as one practical skill needed in the subject. Overall, since it provides safety, compliance, efficiency, durability, and cost-effectiveness, proper electrical circuit installation is crucial to learning practical skills in electrical installation and maintenance.

In terms of testing of electrical wiring installation, twenty-six out of 60 students (43.3%) were identified to be “advanced” in testing electrical wiring. Twenty-one students (35%) are “highly competent” as they were marked 88-94 points in their performance. Twenty percent (20%) which is equivalent to 12 students were marked 80-87 points thus “competent”. Only one student (1.7%) was given score 75-79 thus identified to be “developing”. In addition, results show that almost all students are already skilled in electrical wiring installation. Furthermore, testing electrical wiring installation proves essential for acquiring practical skills in electrical installation and maintenance since it ensures customer satisfaction, safety, compliance, efficiency, and correction of errors.

In terms of compliance with safety regulation, 26 students (43.3%) were given scores 95-100 thus marked “advanced”. Twenty-one students (35%) are already “highly competent” as they were given scores 88-94. Twelve students (20%) were marked “competent”. Lastly only 1 student or (1.7%) was identified to be “developing”. This means that majority of the students are rated practically skilled in terms of compliance with safety regulation. Overall, adhering to safety regulations is vital to learning how to install and maintain electrical systems

because it assures public and individual safety, legal compliance, professionalism, adherence to industry standards, and efficient risk management.

In terms of competence with tools and effective use of materials, 22 students (36.7%) identified respondents for both “advanced” and “highly competent” levels. Fourteen students (23.3%) were marked 80-87 thus identified to be “competent”. On the other hand, only 2 students (3.3%) are considered “developing” as they were given scores of 75-79. Similarly, almost all respondents were practically competent with tools and effective in the use of materials in their electrical installation and maintenance class.

Tool proficiency guarantees that the student can handle and use numerous tools and equipment needed for electrical installation and maintenance. This involves choosing the appropriate tools for the task at hand, using them safely, and utilizing them efficiently to produce the intended results. The possibility of accidents, injuries, or damage to the tools or equipment is decreased by tool proficiency. Moreover, efficient material utilization is vital since it guarantees that the student can select the appropriate supplies for the task and employ them effectively. This includes being aware of the strengths and weaknesses of various materials as well as their particular features. Utilizing materials efficiently lowers installation and maintenance costs, guarantees durability, and raises the overall standard of the finished product. The results of the study agree with the conclusion of Promise (2017) that a student's future success as an electrician or a member of the electrical industry depends greatly on their ability to use tools and materials effectively.

Table 4

Relationship Between Students' Use of Flipped Classroom and their Motivation

Variables	Self-Efficacy	Active Learning Strategies	Performance Goal	Achievement Goal	Learning Environment Stimulation
Instruction	.377**	.512**	.240	.041	.314*
Preparation	.476**	.468**	.160	-.002	.374**
Class Discussion	.584**	.434**	.130	.076	.279*
Group activities	.019	.287*	.035	.500**	.292*
Feedback	.513**	.391**	.291*	.034	.419**
Student Complete Their Assignment	.373**	.474**	.231	.574**	.570**
Extend Their Learning	.582**	.354**	.214	.144	.257*

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 4 shows the test of correlation on the respondents' perception on the use of flipped classroom and their motivation. Only self-efficacy (0.377) and active learning strategies (0.512) are significantly correlated with instruction at 0.01 level. On the other hand, instruction and learning environment is significantly correlated at 0.05 level as evident to its calculated correlation value of 0.314. Meanwhile, preparation is significantly correlated to self-efficacy (0.476), active learning strategies (0.468) and learning environment stimulation (0.374) at 0.01 level of significance. Class discussion is significantly correlated to self-efficacy (0.584) and active learning strategies (0.434) at 0.01 level of significance. On the other hand, class discussion is significantly correlated to learning environment stimulation at 0.05 level of significance as evident to computed correlation value of 0.279. Furthermore, results show that the respondents' perception on group activities during the conduct of flipped classroom approach is significantly correlated at 0.05 level, with learning strategies and learning environment stimulation given their computed values 0.287 and 0.292, respectively. Consequently, group activities are significantly correlated with achievement goal (0.500) at 0.01 level of significance.

Results also reveal that feedback as a component of flipped classroom approach as per the perception of the respondents is significantly correlated with self-efficacy (0.513), active learning strategies (0.391) and learning environment stimulation (0.419) at 0.01 level of significance. More so, it is significantly correlated with performance goal at 0.05 level given that its computed value is 0.291. Another correlation with the indicated significant value was student being able to complete their assignment after-class, it was determined that it is significantly correlated to motivation in terms of self-efficacy (0.373), active learning strategies (0.474), achievement goal (0.574) and learning environment stimulation (0.570) at 0.01 level of significance. Lastly, respondents' perception on flipped classroom approach in terms of being able to extend their learning in the after-class shows significant correlation with self-efficacy and active learning strategies at 0.01 level of significance as indicated in their computed values of 0.582 and 0.354, respectively. It is, on the other hand, significantly correlated with learning environment stimulation at 0.05 level of significance since its computed value is 0.257.

The results are congruent with the findings of Naciri et al. (2022) and Yilmaz et al. (2017).

Table 5*Relationship Between Flipped Classroom Approach and Acquisition of Practical Skills*

Variables	Interpretation of Wiring Diagram	Correct Installation of Electrical Circuit	Testing of Electrical Wiring Installation	Compliance with Safety Regulation	Competence with Tools and Effective Use of Materials
Instruction	-.005	-.083	.095	.095	-.083
Preparation	-.043	-.158	.002	.002	-.158
Class Discussion	.027	-.100	.093	.093	-.100
Group activities	.146	.034	.106	.106	.034
Feedback	-.024	-.151	.007	.007	-.151
Student Complete Their Assignment	-.049	.003	-.039	-.039	.003
Extend Their Learning	-.097	-.067	-.018	-.018	-.067

****.** Correlation is significant at the 0.01 level (2-tailed).

***.** Correlation is significant at the 0.05 level (2-tailed).

Table 5 shows the correlation between students' perception on the conduct of flipped classroom approach in terms of instruction, preparation, class discussion, group activities, feedback, students being able to complete their assignment and being able to extend their learning in the after-class, and their acquisition of practical skills. Results reveal that the indicators do not correlate significantly with any of the indicators of practical skills of the respondents including interpretation of wiring diagram, correct installation of electrical circuit, testing of electrical wiring installation, compliance with safety regulation and competence with tools and effective use of materials. This is evident to their computed correlation values as indicated in the table. The correlation coefficients, which range from -0.158 to 0.146, show a weak to none correlation among the teaching strategies and students' ability to acquire practical skills for electrical installation and maintenance. In accordance to the negative correlation coefficients for instruction, preparation, feedback, and extend their learning in some domains of the study, there is a correlation between using these instructional strategies more frequently and acquiring fewer practical abilities in those domains. There are a variety of potential causes for this, including internet availability, learners time management or a lack of interest in the subject matter.

The class discussion, group activities, and student completion of the assignment have positive correlation coefficients in some areas show that higher levels of these instructional approaches are related to higher levels of practical skill acquisition. This could be as a result of the active participation and engagement that these teaching strategies encourage, which can improve learning and the acquisition of practical abilities. However, it is possible that a number

of factors contributed to the lack of significant relationship between flipped classroom and the acquisition of practical skills in electrical installation and maintenance. For instance, how long the flipped classroom approach is implemented, the number of the respondents and if it is combined with other teaching strategies may affect how effective it is. A fuller picture of the relationship between these variables might be obtained by more studies utilizing larger samples, more reliable measurements, and more thorough analysis. Furthermore, acquiring practical skills could require hands-on training and application, which might be challenging in a flipped classroom environment where much of the learning takes place outside of class. As a result, it's likely that other teaching strategies, such group activities or student completion of assignments, may be more useful for helping learners acquire practical skills in this situation.

5. Conclusion and Recommendation

This study showed that flipped classroom approach encourages self-directed learning, active engagement, quick feedback, and enhanced motivation, all of which are essential for achieving successful learning outcomes. It also appeared that the students demonstrated outstanding performance in the acquisition of practical skills in electrical installation and maintenance. While there is a significant relationship between the perception of respondents in the use of flipped classroom approach and their level of motivation, there is no significant relationship between flipped classroom approach and acquisition of practical skills of the respondents at in any level. Due to a variety of factors, it is probable that the flipped classroom approach will not significantly affect students' ability to acquire practical skills in electrical installation and maintenance.

With the limits of the study, the results might have been affected by several factors not considered such as student learning style, research duration, sample size, lack of interactivity, and students' prior knowledge. Hence, while TLE teachers may be encouraged to use the flipped classroom approach, further research is encouraged with a longer time frame and a more comprehensive assessment instrument in evaluating the acquisition of practical skills.

Appendices

Appendix A

Use of Flipped Classroom Approach in terms of Instruction during Out-of-Class Phase

In EIM class, I...	Mean	Std. Deviation	Verbal Interpretation
1. feel that watching video lessons/ reading learning activity sheets and taking notes contribute efficiently to my learning.	4.32	0.79	Well Evident
2. frequently pause or repeat parts of the videos, or reread learning activity sheets in order to increase my understanding of the material.	4.38	0.74	Well Evident
3. like watching the lessons on video/ reading learning activity sheets.	3.98	0.81	Well Evident
4. try to learn as much as possible while watching the video lessons/reading learning activity sheets.	4.27	0.78	Well Evident
5. feel learning foundational content prior to class greatly enhances my understanding of the lesson.	4.30	0.77	Well Evident
Overall	4.25	0.52	Well Evident

Legend: 4.50-5.00 Highly Evident, 3.50-4.49 Well Evident, 2.50-3.49 Moderately Evident, 1.50-2.49 Somewhat Evident, 1.00-1.49 Not Evident

Appendix B

Use of Flipped Classroom Approach in terms of Preparation during Out-of-Class Phase

In EIM class, I...	Mean	Std. Deviation	Verbal Interpretation
1. feel that learning foundational content prior to class greatly enhances my understanding of the lesson.	4.42	0.77	Well Evident
2. put maximum effort in preparing for my in-class activity.	4.02	0.70	Well Evident
3. feel confident about the lesson before coming to class after watching the video lessons/ reading the learning activity sheets.	3.95	0.81	Well Evident
4. go about the preparatory activities at my own pace.	4.13	0.77	Well Evident
5. save time in class because I have more time to formulate questions if I don't understand the lesson.	4.22	0.69	Well Evident
Overall	4.15	0.47	Well Evident

Legend: 4.50-5.00 Highly Evident, 3.50-4.49 Well Evident, 2.50-3.49 Moderately Evident, 1.50-2.49 Somewhat Evident, 1.00-1.49 Not Evident

Appendix C

Use of Flipped Classroom Approach in terms of Class Discussion in the In-Class Phase

In EIM class, I...	Mean	Std. Deviation	Verbal Interpretation
1. feel that flipped classroom encourages me to practice critical and creative thinking.	4.10	0.75	Well Managed
2. think that flipped classroom gives me the opportunity to ask more questions inside the classroom.	3.88	0.67	Well Managed
3. can get help from the teacher when I don't understand the lesson.	4.05	0.85	Well Managed
4. think that flipped classroom gives me more time to practice the skills.	4.12	0.76	Well Managed
5. feel that discussion in flipped classroom allows me to have a deeper understanding of the lesson.	4.13	0.75	Well Managed
Overall	4.06	0.52	Well Managed

Legend: 4.50-5.00 Highly Managed, 3.50-4.49 Well Managed, 2.50-3.49 Moderately Managed, 1.50-2.49 Somewhat Managed, 1.00-1.49 Not Managed

Appendix D*Use of Flipped Classroom Approach in terms of Group Activities in the In-Class Phase*

In EIM class, I...	Mean	Std. Deviation	Verbal Interpretation
1. think that the activities during the class improve the learning process.	4.57	0.70	Highly Managed
2. think that the activities during the class improve the acquisition of the practical skills.	4.05	0.79	Well Managed
3. think that flipped classroom gives me greater opportunities to communicate with other learners.	4.30	0.79	Well Managed
4. learn better when I have other classmates to ask for help.	4.43	0.74	Well Managed
5. think that flipped classroom improves collaborative learning.	4.32	0.65	Well Managed
Overall	4.33	0.51	Well Managed

Legend: 4.50-5.00 Highly Managed, 3.50-4.49 Well Managed, 2.50-3.49 Moderately Managed, 1.50-2.49 Somewhat Managed, 1.00-1.49 Not Managed

Appendix E*Use of Flipped Classroom Approach in terms of Feedback in the In-Class Phase*

In EIM class, I...	Mean	Std. Deviation	Verbal Interpretation
1. find the class activities helpful to complement the learning activity sheets and video lessons.	4.43	0.65	Well Managed
2. think flipped classroom enables me to focus on the quality of my work product or outputs.	4.12	0.72	Well Managed
3. think flipped classroom helps me done well in the lesson.	3.95	0.77	Well Managed
4. believe that the flipped classroom makes it simple for me to follow the instructions.	4.10	0.84	Well Managed
5. think flipped classroom is directly linked to my learning intentions and success criteria.	4.17	0.76	Well Managed
Overall	4.15	0.47	Well Managed

Legend: 4.50-5.00 Highly Managed, 3.50-4.49 Well Managed, 2.50-3.49 Moderately Managed, 1.50-2.49 Somewhat Managed, 1.00-1.49 Not Managed

Appendix F*Use of Flipped Classroom Approach in terms of Assignment Completion in After-Class Phase*

In EIM class, I...	Mean	Std. Deviation	Verbal Interpretation
1. am able to work on my assignment at my own pace.	4.40	0.67	Well Evident
2. find that doing the assignment helps me in synthesizing my learning.	4.17	0.67	Well Evident
3. find that the amount of assignment is appropriate.	4.38	0.76	Well Evident
4. find that it is easier for me to do the assignment after all the activities done before and during class activities.	4.37	0.71	Well Evident
5. find that the assignment reinforces the learning that I gained during and after class activities.	4.10	0.63	Well Evident
Mean	4.28	0.43	Well Evident

Legend: 4.50-5.00 Highly Evident, 3.50-4.49 Well Evident, 2.50-3.49 Moderately Evident, 1.50-2.49 Somewhat Evident 1.00-1.49 Not Evident

Appendix G*Use of Flipped Classroom Approach in terms of Extend their Learning in the After-Class Phase*

In EIM class, I...	Mean	Std. Deviation	Verbal Interpretation
1. believe that flipped classroom, along with delivery of content outside class and perform the activity is an instructional method appropriate for my specialization.	4.12	0.74	Well Evident
2. got the ability to self-pace my learning with flipped classroom approach.	4.12	0.61	Well Evident
3. believe that I am able to learn the lessons with flipped classroom approach better than with traditional lecture-based instruction.	4.37	0.76	Well Evident
4. have the flexibility to access information and create my own learning experiences.	4.02	0.77	Well Evident
5. believe that flipped classroom learning has reduced my dependency on the teacher.	4.13	0.70	Well Evident
Overall	4.15	0.47	Well Evident

Legend: 4.50-5.00 Highly Evident, 3.50-4.49 Well Evident, 2.50-3.49 Moderately Evident, 1.50-2.49 Somewhat Evident, 1.00-1.49 Not Evident

Appendix H*The Level of Motivation in terms of Self-Efficacy*

In EIM class, I...	Mean	Std. Deviation	Verbal Interpretation
1. am sure that I can understand the lesson even if the content is difficult or complicated.	4.07	0.73	Motivated
2. am sure that I can do well the practical skills application needed in the lesson.	4.03	0.69	Motivated
3. prefer to collaborate to other learners to know the lesson rather than do for myself during activities.	4.12	0.78	Motivated
4. easily learn no matter how much difficult or complicated the lesson.	4.10	0.71	Motivated
5. never give up or only do the easy parts when activities are too difficult.	4.15	0.80	Motivated
Overall	4.09	0.44	Motivated

Legend: 4.50-5.00 Highly Motivated, 3.50-4.49 Motivated, 2.50-3.49 Moderately Motivated, 1.50-2.49 Somewhat Motivated, 1.00-1.49 Not Motivated

Appendix I*The Level of Motivation in terms of Active Learning Strategies*

In EIM class, I...	Mean	Std. Deviation	Verbal Interpretation
1. can understand when new concepts that I learned have conflict with my previous understanding.	4.32	0.70	Motivated
2. connect them to my previous experiences when learning a new concept.	4.13	0.75	Motivated
3. find relevant resources that will help me when I do not understand the new concept.	4.32	0.68	Motivated
4. would discuss with the teacher or other learners to clarify my understanding when I do not understand the new concept.	4.07	0.76	Motivated
5. attempt to make connections between the concepts that I learn during the learning processes.	4.05	0.79	Motivated
Overall	4.18	0.48	Motivated

Legend: 4.50-5.00 Highly Motivated, 3.50-4.49 Motivated, 2.50-3.49 Moderately Motivated, 1.50-2.49 Somewhat Motivated, 1.00-1.49 Not Motivated

Appendix J*The Level of Motivation in terms of Performance Goal*

In EIM class, I...	Mean	Std. Deviation	Verbal Interpretation
1. participate in learning activities to get a good grade.	4.68	0.54	Highly Motivated
2. participate in learning activities to perform better than other learners.	4.18	0.75	Motivated
3. participate in learning activities so that other learners think that I'm smart.	3.70	0.79	Motivated
4. participate in learning activities so that the teacher pays attention to me.	3.80	0.80	Motivated
5. participate in learning activities to get higher scores to demonstrate my capability.	4.28	0.64	Motivated
Overall	4.13	0.38	Motivated

Legend: 4.50-5.00 Highly Motivated, 3.50-4.49 Motivated, 2.50-3.49 Moderately Motivated, 1.50-2.49 Somewhat Motivated, 1.00-1.49 Not Motivated

Appendix K*The Level of Motivation in terms of Achievement Goal*

In EIM class, I...	Mean	Std. Deviation	Verbal Interpretation
1. feel most fulfilled when I attain a good score in a performance.	4.72	0.64	Highly Motivated
2. feel most fulfilled when I am able to solve a difficult problem.	4.48	0.68	Motivated
3. feel most fulfilled when I can demonstrate and share my skills.	4.52	0.72	Highly Motivated
4. feel most fulfilled when other learners accept my ideas.	4.50	0.65	Highly Motivated
5. feel most fulfilled when I perform better than other learners.	4.25	0.84	Motivated
Overall	4.49	0.45	Motivated

Legend: 4.50-5.00 Highly Motivated, 3.50-4.49 Motivated, 2.50-3.49 Moderately Motivated, 1.50-2.49 Somewhat Motivated, 1.00-1.49 Not Motivated

Appendix L*The Level of Motivation in terms of Learning Environment Stimulation*

In EIM class, I...	Mean	Std. Deviation	Verbal Interpretation
1. am willing to participate in this learning activity because the content is exciting and changeable.	4.63	0.55	Highly Motivated
2. am willing to participate in this learning activity because the teacher uses a variety of teaching methods.	4.37	0.64	Motivated
3. am willing to participate in this learning activity because the teacher does not put a lot of pressure on me.	3.87	0.81	Motivated
4. am willing to participate in this learning activity because all of us are involved in discussions.	4.35	0.63	Motivated
5. am willing to participate in this learning activity because it is challenging.	4.27	0.66	Motivated
Overall	4.30	0.42	Motivated

References

- Abeyssekera, L., & Dawson, P. (2015). Motivation and cognitive load in the flipped classroom: definition, rationale and a call for research. *Higher education research & development*, 34(1), 1-14.
- Akarawang, C., Kidrakran, P., & Nuangchalem, P. (2015). Enhancing ICT Competency for Teachers in the Thailand Basic Education System. *International Education Studies*, 8(6), 1-8.
- Akçayır, G., & Akçayır, M. (2018). The flipped classroom: A review of its advantages and challenges. *Computers & Education*, 126, 334–345. <https://doi.org/10.1016/j.compedu.2018.07.021>
- Albalate, A. R., Larcia, H. D. S., Jaen, J. A. R., Pangan, K. R. O., & Garing, A. G. (2018). Students' Motivation Towards Science Learning (SMTSL) of STEM Students of University Of Batangas, Lipa City. *PEOPLE: International Journal of Social Sciences*, 3(3), 1262–1274. <https://doi.org/10.20319/pijss.2018.33.12621274>
- Alhadi, S., & Nanda Eka Saputra, W. (2017). The Relationship between Learning Motivation and Learning Outcome of Junior High School Students in Yogyakarta. *Proceedings of the 1st Yogyakarta International Conference on Educational Management/Administration and Pedagogy (YICEMAP 2017)*. <https://doi.org/10.2991/yicemap-17.2017.23>
- Bergmann, J., & Sams, A. (2016). Flipped learning for elementary instruction. *International Society for Technology in Education*. Volume 5
- Campillo-Ferrer, J.M., Miralles-Martínez, P. (2021). Effectiveness of the flipped classroom model on students' self-reported motivation and learning during the COVID-19 pandemic. *Humanit Soc Sci Commun* 8, 176 (2021). <https://doi.org/10.1057/s41599-021-00860-4>
- Cheng, L., Ritzhaupt, A. D., & Antonenko, P. (2019). Effects of the flipped classroom instructional strategy on students' learning outcomes: A meta-analysis. *Educational Technology Research and Development*, 67, 793-824.

- Cimermanova, I. (2015). Creativity in EFL teacher training and its transfer to language teaching. *Procedia-Social and Behavioral Sciences*, 197, 1969-1975.
- Ferriz-Valero A, Østerlie O, Penichet-Tomas A and Baena-Morales S (2022). The Effects of Flipped Learning on Learning and Motivation of Upper Secondary School Physical Education Students. *Front. Educ.* 7:832778. doi: 10.3389/feduc.2022.832778
- Hidalgo, D.M. & Callo, E.C. (2023). Flipped Classroom Practices in Improving Economic Skills and Social Learning. *International Journal of Educational Management and Development Studies*, 4 (2), 1-26. <https://doi.org/10.53378/352975>
- Irvine, J. (2018). A Framework for Comparing Theories Related to Motivation in Education. *Research in Higher Education Journal*, 35.
- Jacolbia, R. B. (2016). Future educators' perceptions on technology and livelihood education status and development of work skills. *Journal of Advances in Humanities and Social Sciences*, 2(2), 85-91.
- Jong, MY. (2023). Flipped classroom: motivational affordances of spherical video-based immersive virtual reality in support of pre-lecture individual learning in pre-service teacher education. *J Comput High Educ* 35, 144–165 (2023). <https://doi.org/10.1007/s12528-022-09334-1>
- Jou, Min; Wang, Jingying. (2013, March). Investigation of effects of virtual reality environments on learning performance of technical skills. *Computers in Human Behaviour*, 433-438.
- Kim, H., & Kim, B. (2022). Effects of Situation-Based Flipped Learning and Gamification as Combined Methodologies in Psychiatric Nursing Education: A Quasi-Experimental Study. *In Healthcare*, Vol. 10, No. 4, p. 644.
- Lai, C.-L., & Hwang, G.-J. (2016). A self-regulated flipped classroom approach to improving students' learning performance in a mathematics course. *Computers & Education*, 100, 126–140. <https://doi.org/10.1016/j.compedu.2016.05.006>

- Li, Z., & Li, J. (2022). Using the Flipped Classroom to Promote Learner Engagement for the Sustainable Development of Language Skills: A Mixed-Methods Study. *Sustainability*, 14(10), 5983. <https://doi.org/10.3390/su14105983>
- Lin, P. C., & Chen, H. M. (2016). The effects of flipped classroom on learning effectiveness: using learning satisfaction as the mediator. *World Transactions on Engineering and Technology Education*, 14(2), 231-244.
- Naciri, A., El Hajji, M., Radid, M., Kharbach, A., & Chemsî, G. (2022). Exploring Student Motivation and Performance in the Flipped Classroom: A Case Study of Nursing Students. *Electronic Journal of General Medicine*, 19(3), em364. <https://doi.org/10.29333/ejgm/11796>
- Ordinario, C. (2017). Nearly 10 million employed Pinoys unskilled, only laborers—data. <https://businessmirror.com.ph/>.
- Öztürk, M., Çakıroğlu, Ü (2021). Flipped learning design in EFL classrooms: implementing self-regulated learning strategies to develop language skills. *Smart Learn. Environ.* 8, 2 (2021). <https://doi.org/10.1186/s40561-021-00146-x>
- Promise, O. (2017). Electrical Installation and Maintenance Skill Needs of Technical College Graduates for Job Creation and Self-Reliance in ENUGU State. *Journal of Science and Computer Education (JOSCED)*. 3 (3)
- Proske, A., Roscoe, R. D., & McNamara, D. S. (2014). Game-based practice versus traditional practice in computer-based writing strategy training: effects on motivation and achievement. *Educational Technology Research and Development*, 62(5), 481-505.
- Shi-Chun, D., Ze-Tian, F., & Yi, W. (2014). The Flipped Classroom—Advantages and Challenges. Proceedings of the 2014 International Conference on Economic Management and Trade Cooperation <https://doi.org/10.2991/emtc-14.2014.3>
- Smith, J. P. (2015). *The efficacy of a flipped learning classroom*. Doctoral dissertation, McKendree University.
- Talbert, R. (2017). *Flipped learning: A guide for higher education faculty*. Stylus Publishing, LLC.

- Triantafyllou, E. (2015). The flipped classroom: Design considerations and moodle. Using Moodle for supporting flipped classrooms, *Ingeniør Uddannelsernes Pædagogiske Netværk*, IUPN, 5-12.
- Turan, Z., & Göktaş, Y. (2018). Innovative Redesign of Teacher Education ICT Courses: How Flipped Classrooms Impact Motivation? *Journal of Education and Future*, 13, 133–144.
- Xiu, Y. & Thompson, P. (2020). Flipped University Class: A Study of Motivation and Learning. *Journal of Information Technology Education: Research*, 19, 2020, 041-063. <https://doi.org/10.28945/4500>
- Xu, Z., & Shi, Y. (2018). Application of constructivist theory in flipped classroom-take college English teaching as a case study. *Theory and Practice in Language Studies*, 8(7), 880-887.
- Yilmaz, E., Şahin, M., & Turgut, M. (2017). Variables Affecting Student Motivation Based on Academic Publications. *Journal of Education and Practice*, 8(12), 112–120.