Developing Positive Climate and Behavior Management in a Flipped Classroom

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Abstract

This study aimed to examine the positive climate and behavior management aspects of the flipped classroom environment in a Grade 7 science class. Further, it determined the factors that contribute to the establishment of a positive learning classroom environment and management of student behavior in a flipped classroom. The students' asynchronous pre-class activities included a science courseware developed by the Department of Science and Technology. Meanwhile, the synchronous face-to-face activities involved performing individual and group activities and answering concept questions through peer instruction. The classroom environment was described using the Classroom Assessment Scoring System. The scores obtained during the classroom observation were triangulated using the students' and teacher's daily journal entries, and student focus group discussions held at the end of the implementation. Findings showed that the flipped classroom experienced difficulty in establishing a positive climate and facilitating behavior management on the first few days of implementation. However, the scores in positive climate and behavior management gradually increased as the implementation of the flipped classroom progressed. It is worth noting that the flipped classroom exhibited high range scores in the following areas of positive climate – positive affect, relationship, and positive communication; and middle range score for respect. Towards the end of the implementation of the flipped classroom, middle range scores were obtained in the following areas of behavior management – clear behavior expectation, proactive, redirection of misbehavior, and student behavior. Based on the findings, this study discussed the ways of overcoming the challenges in developing a positive climate and behavior management.

Keywords: flipped classroom, positive climate, behavior management

Introduction

After two years of emergency remote teaching and learning, schools in the Philippines are now reopening and have started offering courses in blended modalities. Blended classes were not commonly offered prior to the pandemic thus it challenged teachers, students, curriculum developers, and administrators to explore new teaching and learning paradigms that take advantage of technology and independent learning.

Flipped classroom is a blended learning model that combines face-to-face classes, and synchronous and asynchronous remote learning. In a flipped classroom, students get exposure to instructional content using readings, videos, or both outside the class. The class time is used for assimilating knowledge through active learning activities. This learning modality is an emerging trend in science education as it blends technology into the daily learning activities of students.

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It addresses the need to integrate technology in the classroom, develops metacognition among learners, and provides students with cognitive activities during class hours (Jensen et al., 2015). In a flipped classroom, students have time to assess their own understanding and monitor their own thinking through metacognition. More time inside the classroom is devoted to cognitive activities which lead to mastery. In this approach, students gain knowledge and comprehension outside the class and are expected to apply, analyze, synthesize, and evaluate those concepts inside the class (Sarawagi, 2013).

Bergmann and Sams (2012) pointed out that flipped learning is about the use of the in-class time with students in the best way possible. Shih and Tsai (2017) suggested that the teacher implementing flipped classrooms should constantly examine the effectiveness of self-study, be creative in designing classroom activities, and incorporate social learning during in-class activities. Teachers implementing a flipped classroom who fail to plan for engaging active learning activities will not achieve a significant increase in student engagement and achievement (Findlay-Thompson & Mombourquette, 2014; Waddell, 2012). Therefore, proper preparation of active learning activities is the key to the success of flipped classrooms.

Flipped classrooms are at their best when structured with active learning activities (Baepler et al., 2014; Jensen et al., 2015). This study used peer instruction as the active learning activity. In implementing peer instruction in class, students are free to discuss their answers to conceptual exercises and problems (Crouch & Mazur, 2001). Active learners participate in class by questioning, giving answers, and expressing opinions among peers and instructors (Abdullah et al., 2012). Peer instruction not only asserts student ownership of his learning, but also creates a conducive learning environment.

One advantage of peer instruction in promoting active engagement in class is the immediate feedback on student understanding. Different ways of polling systems can be utilized during peer instruction such as show of hands, flashcards, digital scanning forms, Personal Response System (PRS) and other similar technologies.

The Plickers application used in this study is a hybrid of flashcards, scanning form, and classroom network. The students used the printed Plicker cards which contained the responses for the concept test. The camera phone of the teacher scanned the cards, and the Plickers application installed in the teacher's device recorded the answers of the students and generated percentages of the students who chose each response. The design of the implementation of the flipped classroom with peer instruction (FCPI) in this study is low cost and can be utilized even with minimal resources. This application works efficiently even in gadgets with low specifications.

One of the challenges in technology integration in classrooms involves the readiness of teachers. Not all teachers are 'digital natives.' Many would be hesitant to incorporate technology in a flipped class especially with the reported challenges like the "unsettledness" of students in the flipped classroom, the new role of the teacher, technology dependency, and source of pre-class activities, among others (See & Corny, 2014; Strayer, 2007). However, due to the circumstances, teachers need to learn the management skills and preparations to incorporate technology in class. This study on FCPI is a significant endeavor in promoting technological teaching pedagogy which will allow teachers to maximize the benefits of flipped classrooms and avoid falling into its pitfalls.

The FCPI strategy explored in this study is expected to deliver positive outcome in positive climate and behavior management by promoting learning at the rate and pace of the learner and not of

the teacher, and valuable use of class time as students come to class prepared and ready for active learning activities. Flipped classrooms are highly individualized in nature while peer instruction promotes collaboration. The initial information transferred through individual study in the flipped setting is highly sought for in the peer instruction setting. It is expected that in a flipped classroom and peer instruction approach, the Filipino science classroom will be transformed into a true 21st century classroom where quality learning happens.

Objectives

The study aimed to analyze how FCPI facilitates the creation of a positive climate and behavior management in the classroom. Specifically, the study was done to: (a) determine the factors that contribute to the establishment of a positive learning classroom environment; and (b) analyze the factors that are crucial to managing students' classroom behavior in a flipped classroom set-up.

Conceptual Framework

Figure 1 shows that the use of the flipped classroom with peer instruction requires individual/independent learning before class and interaction with the teacher and peers during class. The flipped classroom is an attempt to end the teacher-centered model of teaching. A shift from direct instruction to individual learning provides more classroom time for collaboration, coaching, content analyses, and receiving feedback. Flipped learning as a pedagogical approach makes the group learning space more dynamic and interactive. This was done by giving students direct instruction in their individual learning spaces.

Figure 1

The conceptual framework
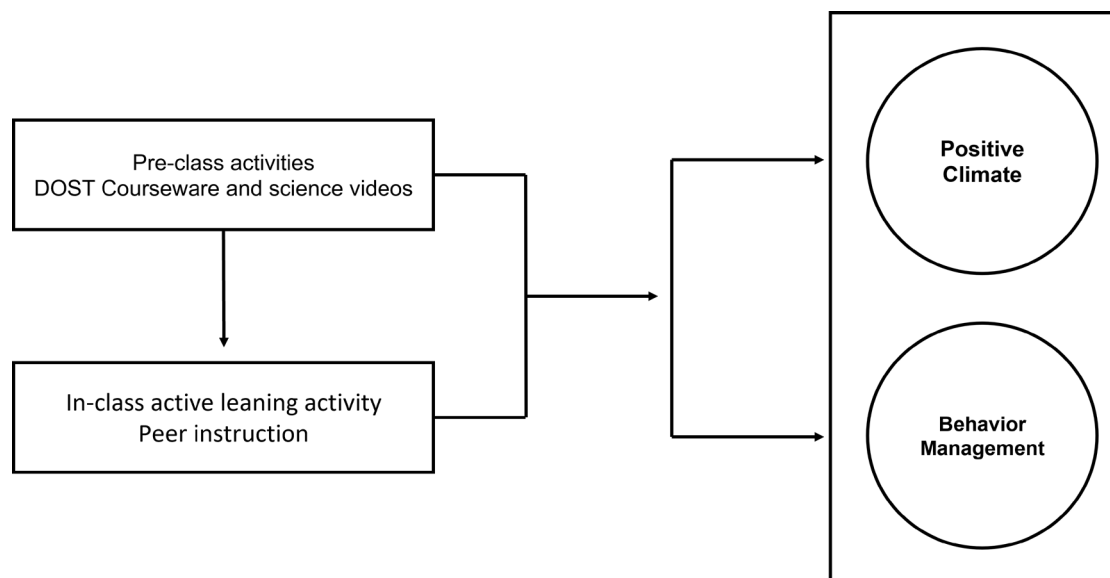
Flipped classrooms have made it possible for students to come to school prepared (Herreid & Schiller, 2013). More learning happens inside the classroom when the teacher and, most importantly, the students come prepared. Asynchronous studying of learning materials as homework makes students ready for class and engaged for higher-order learning. When they are prepared, they are more enthusiastic in classroom activities and are more confident to help one another.

Peer instruction improves the feedback system in class (Buchart et al., 2009). With real-time feedback in a face-to-face class, the teacher can adjust accordingly his instruction to the level of the students. It also increases student-student interaction and ensures active engagement and a cooperative atmosphere in class since they are expected to discuss with peers. Peer instruction polling that keeps the anonymity of students encourages participation, especially for shy students, and breaks the monotony of the traditional lecture through concept tests and discussions. This study verifies the possible effects of flipped classrooms with peer instruction on the classroom environment specifically on positive climate and behavior management.

Methodology

Context of the Flipped Classroom

The study utilized a one-group quasi-experimental research design. It was conducted in an integrated national high school in the municipality of Sta. Cruz, Laguna, Philippines. Permission to conduct the study, and parent and student consent were sought. Sta. Cruz is a first-class municipality and the provincial capital of Laguna. The school is government-owned and follows the residential mode of content delivery.

The study was conducted during the first quarter of the School Year 2019-2020. It involved 47 Grade 7 Junior High School students enrolled in Science 7. Overall, there were nine (9) lessons included in the study:

> Lesson 1 - Pure substances and mixtures
> Lesson 2 - Evaporation
> Lesson 3 - Elements and compounds
> Lesson 4 - The periodic table of elements and symbols of elements and compounds
> Lesson 5 - Subatomic particles
> Lesson 6 - Acids and bases in matter
> Lesson 7 - Acid and base indicator
> Lesson 8 - Metals and nonmetals
> Lesson 9 - Difference between observation and inference

Unlike the conventional classroom, the students in the flipped classroom were introduced to the content of the lesson before the class. The Department of Science and Technology (DOST) science courseware for Grade 7 served as the main source of pre-class assignments in the FCPI. The conceptualization, development, and production of the courseware which was launched in December 2014 was a joint effort of the DOST-Science Education Institute (SEI), Advanced Science and Technology Institute (ASTI), Philippine Normal University (PNU), and University of the Philippines-National Institute for Science and Mathematics Education Development (UP NISMED). To access the science courseware, students logged in to the school's computer laboratory on a predetermined schedule.

During face-to-face interactions, the students applied, analyzed, and evaluated what they understood from the pre-class activity. The lessons were enriched with activities like worksheets with puzzles and illustrations, visual presentations, and printed copies of the periodic table to suit the visual type of learners. Meanwhile, boardworks and experiments were included to cater to the tactile learners; and lecture discussion, role play, and recitation were included for the auditory

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type of learners. Learning activities during face-to-face class were conducted individually or by group. Slide decks and LCD projector were used in delivering instructions in class.

The study adapted the peer discussion process implemented at the University of Waterloo Centre for Teaching Excellence (2016), as follows:

> *Step 1:* A question was posted by the teacher.
> *Step 2:* The students individually answered the questions using Plickers™. The students raised their Plickers cards representing their answers. The teacher collected on-the-spot formative assessment data using her camera phone.
> *Step 3:* When all students have given their answers, the teacher showed the percentage of students who got the correct answer.
> *Step 4:* The students were prompted to discuss their answers with their partner.
> *Step 5:* After the peer discussion, the students revoted their answer.
> *Step 6:* The teacher gave the correct answer and the explanation.

The rest of the questions were answered and discussed following these steps. After class, the students wrote in their journals what they learned from the process.

Data Collection

Classroom observation

The classroom environment was observed for positive climate and behavior management using an instrument adopted from the Classroom Assessment Scoring System™ (CLASS™). This scoring system was developed and validated at the University of Virginia Curry, School of Education. Positive climate dimension is categorized under emotional support domain, while behavior management dimension is under classroom organization domain. Each domain covers several dimensions which were scored in a scale of 1–7. A score range of 1–2 is considered low, 3–5 as middle, and 6–7 as high (CLASS Implementation Guide, 2009). A fourth year BS Mathematics and Science Teaching (BS MST) student from the University of the Philippines Los Baños was invited to observe and score the class using the scoring system. He has taken four Field Study courses in his program which made him qualified to observe the different interactions in class. The observer was given a briefing about the nature, characteristics, and methods of carrying out flipped classroom and peer instruction. To ensure accuracy of the scores, the observer was also briefed about the scoring parameters. The scores were triangulated using the journal entry of the teacher and students, and through focus group discussion with selected students.

Journals

The students wrote journal entries after their science class. The journal was mainly focused on the experiences of the students in the science class, which include their insights about the lessons, learning activities, their classmates, and their teacher.

Meanwhile, the teacher-researcher also kept a daily teaching journal that served as a way of keeping track of notable events and difficulties and/or improvements occurring in each classroom set-up. The journals of both teacher and students were used to determine difficulties, progress, and effectiveness of the teaching methodologies used in this study.

Focus group discussion

A recorded focus group discussion (FGD) with students was conducted to describe their experiences in class, enumerate difficulties they encountered, and give suggestions on how to improve the implemented method of teaching. The FGD was participated in by 14 girls and 11 boys.

Results and Discussion

Positive climate

The factors contributing to a positive climate were relationships, positive affect, positive communication, and respect. Relationship between student and teacher was indicated by warm and supportive engagement with one another. Positive affect was seen in frequent smiling, laughter, and enthusiasm in class. Positive communication can be displayed physically or verbally between the students and the teacher. Respect is seen through eye contact, having a warm and calm voice, using respectful language and cooperation, and sharing between the students and the teacher.

Figure 2 presents the score graphs for positive climate dimensions. As indicated, the FCPI generally started at the middle range of relationship in the first three lessons.

> *"Medyo nahirapan si Mam sa class review dahil magulo kami."* (Our teacher had difficulty conducting the class review because we are disorderly.) (n=2)
>
> *"Nangbu-bully ang katabi ko."* (My seat mate is bullying me.) (n=2)
>
> *"Minsan ay hindi ako nakikinig kay Ma'am."* (Sometimes I do not listen to our teacher.) (n=1)
>
> *"Makulit ako sa room."* (I am playful inside the classroom.) (n=1)
>
> *"Di maintindihan ng classmate ko ang pinapagawa ni Ma'am."* (My classmate does not understand the instructions of our teacher.) (n=5)

Figure 2

Positive climate as shown in classroom relationship, positive affect, positive communication, and respect
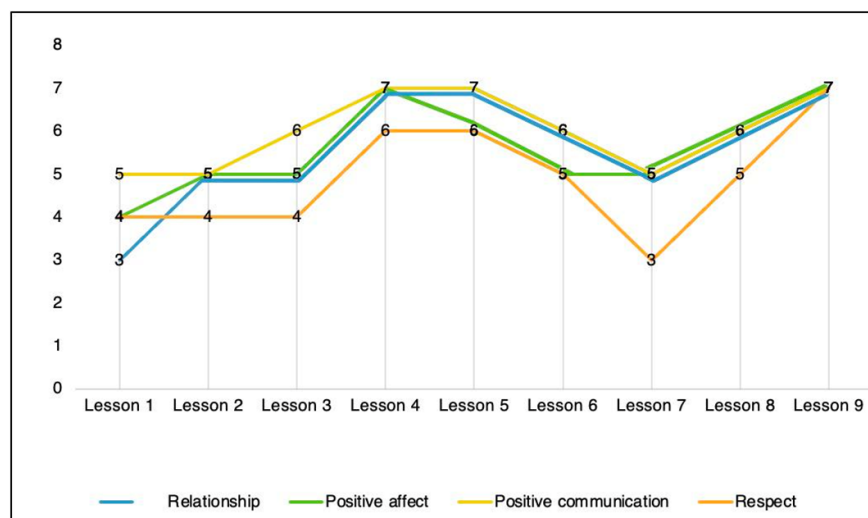
In the FCPI, the lowest score for relationship was observed in Lesson 1. On this day, the teacher reported in her journal that students were peeking at the window and wanted to go home already during the discussion. They seemed uninterested in the lesson because they already know the topic being discussed.

Consequently, this situation was also reflected in the positive affect dimension for the FCPI. The teacher needed to reprimand the students because of their behavior. Taking into consideration that the students were not yet familiar with the teacher and most especially with the new teaching strategy they were exposed to, the FCPI experienced difficulty establishing a positive climate until the fourth lesson. Relationships occurring in the flipped classroom, regardless of the method, predict the classroom environment (Hannah, 2013) and the success of the flipped method (McCollum et al., 2017). Some behaviors which conveyed care and developed rapport between students and teacher were responding to questions that communicate concern and interest, giving praise to student works or actions, and engaging in informal conversations (Barr, 2016).

On the other hand, positive affect was mostly at the middle range. Meanwhile, positive communication was observed mostly at the high range. This indicates frequent positive communications, whether verbal or physical, among teachers and students.

In the succeeding meetings in the FCPI, an improvement in the positive climate dimension was observed. The varied activities in FCPI allowed students to develop a warm relationship with the teacher and with co-learners. The highest scores were recorded more frequent positive communication as indicated by the positive entries in the student journal.

> *"Marunong makitungo ang mga classmates ko."* (My classmates know how to work with others.) (n=7)
> *"Nagtawanan kaming magkaklase."* (We laughed in class.) (n=5)
> *"Maganda ang pag-aaral ko kasama ng classmate."* (It is nice to study with my classmates.) (n=2)
> *"Me and my partner help each other get the correct answer."* (n=3)
> *"Nadagdagan ang pakikinig sa teacher para matuto."* (I listen more to my teacher to learn.) (n=13)
> *"Masayang magturo si Ma'am."* (Our teacher is a fun teacher.) (n=13)
> *"Natuto akong magpahalaga sa gawa ng iba."* (I learned to value the work of others.) (n=1)
> *"Class namin ang pinakamasaya."* (Our class is the most enjoyable.) (n=1)
> "I do my best in every science lesson." (n=1)

Respect, as the last factor contributing to positive climate, was observed to be mostly at middle range. The FCPI gained varying scores for respect which may be affected by outside factors like the nature of the activity and student behavior. The lowest and highest scores for respect gained in the FCPI were 3 and 7, respectively. On the day when the lowest score was observed, the teacher noted that the students got too excited during the demonstration of laboratory materials used in measuring pH.

Behavior management

Factors contributing to behavior management were clear behavior expectation, being proactive, redirection of misbehavior, and student behavior. Clear behavior expectation was regarded as

clarity and consistent enforcement of rules. Being proactive was observed as anticipation of problems to effectively prevent problems from developing. Redirection of misbehavior was described as effective reduction of misbehavior by focusing on positive behavior and making use of subtle cues. Effective re-direction of misbehavior did not take time away from learning. Meanwhile, student behavior was regarded as frequent compliance and little aggression and defiance of students. Figure 3 presents the graphs of the scores of FCPI for behavior management.

At the start of the class, teachers should communicate to their students the classroom or house rules so that students will be guided and know what behavior is expected of them in class (Turano, 2005). As presented in Figure 3, the teacher in the FCPI got low scores in setting clear behavior expectation on Lesson 1. This resulted in the display of negative behaviors in class evident in the student journal entries.

> *"May nangongopya."* (There are cheaters.) (n=3)
> *"Minsan nale-late ako sa klase."* (Sometimes, I am late in class.) (n=2)
> *"Minsan di ako umaattend sa klase."* (Sometimes, I do not attend class.) (n=2)
> *"Magulo at maingay ang iba kong classmates."* (Some of my classmates are disorderly and noisy. (n=14)
> *"Minsan sinasaway kami ni Ma'am."* (Sometimes, we are reprimanded by our teacher.) (n=3)

Nevertheless, on Lesson 2, the highest score of 7 for clear behavior expectation was obtained. This was marked in the teacher's journal when she was able to establish rapport with her students. The students were observed to be more cooperative and engaged in the group activity since the teacher had set her expectations of the students about pre-class activities and during class activities. The students wrote the following about the group activities in their journal:

> *"Masaya ako dahil lahat kami ay nakikicooperate."* (I am happy because everyone cooperated.) (n=22)
> *"Masaya ang group activity."* (Group activities are fun.) (n=22)

In the succeeding classes, clear behavior expectation was observed to reach middle to high range scores. This indicated that rules and expectations may be stated clearly but were inconsistently enforced in the classroom. The nature of the flipped classroom being activity-based allowed the teacher to set clear behavior expectation.

Figure 3

Behavior management as shown in clear behavior expectation, being proactive, redirection of misbehavior, and student behavior

The teacher in the classroom was characterized by middle range proactive behavior. This indicated that the teacher used a combination of proactive and reactive responses; sometimes she monitored and reacted to early indicators of behavior problems, but other times missed or ignored them.

The FCPI showed middle-range character for redirection of misbehavior. This indicated that some of the teacher's attempts to redirect misbehavior were effective, particularly when she focused on the positives and used subtle cues. As a result, misbehavior rarely continued, escalated, or took time away from learning. The highest score for this factor was obtained in the FCPI in Lesson 8. Although there was a power interruption during class, the students were attentive and engaged. The class even got 100 % correct answers during peer instruction.

The score graph for student behavior in FCPI showed a distinctive trend. This indicated periodic episodes of misbehavior in the classroom. In Lessons 1 and 7, poor student behavior was observed. This was validated in the journal entry of the teacher where she mentioned that the students during Lesson 1 were uneasy and wanted to go home already during class hours, lacked interest in the lesson, and were noisy. In Lesson 7, the students got too excited and disorganized during the demonstration of acid-base indicators. Although student behavior scored low in Lessons 1 and 7, generally, as the implementation of the teaching strategies in FCPI progressed, the students in the FCPI became cooperative, engaged, and attentive. The FCPI implemented resulted in improved student behavior as they started realizing the importance of pre-class activities in understanding the lesson. This set-up also accommodated activities like demonstration and group activities which students liked better than mere lectures.

Based on the results of the study, the sense of "unsettledness" observed in FCPI can be attributed to the variety of learning activities conducted during the class time unlike in the traditional teaching method which is purely lecture. This "unsettledness" may be attributed to high student engagement in a flipped classroom. Based on the FGD participated in by 14 girls and 11 boys, students indeed had fun and enjoyed their science class. The students remarked that they were given advanced study materials through computer courseware and used Plickers™ during class. These activities were also their favorite science-related activities. They were also excited to use

the tablets and desktop computers. However, this "unsettledness" can be an obstacle to effective implementation of FCPI, thus, should be managed.

For the behavior management dimension, the findings showed that FCPI promoted redirection of misbehavior and being proactive. However, it was noted that the use of the FCPI gave the teacher more opportunity to be proactive based on the performance of the students in the pre-class activities. Based on the data, the FCPI improved student behavior in class by engaging them in activities and equipping them with prior knowledge which helped them perform better in class. It was recognized that setting clear behavior expectations was vital in managing behavior in the FCPI. The nature of this classroom set-up being activity-based and student-centered requires the teacher to be efficient in setting clear behavior expectations.

Factors that Contribute to Positive Climate and Behavior Management in FCPI

The following factors that promote positive climate and behavior management in FCPI surfaced from the classroom observations, students' and teacher's journal, and FGD.

1. *Communication of benefits.* It is natural to see resistance among students whenever a new teaching strategy is implemented in class. Therefore, it is very important that the teacher considering the flipped classroom approach should 'sell' the idea to students by laying down its benefits and the responsibilities of the students.

2. *Appropriate physical layout of the classroom.* The physical layout of the class allows for effective collaboration among students and easy monitoring of the teacher. Flipped classrooms encourage group activities in class. The classroom should be conducive enough to hold such activities. A strategic arrangement of the classroom will prevent misbehaviors like cheating, as reported during the FGD, from happening (Crouch et al., 2007).

3. *Matched pre- and in-class activities.* The design of pre-class activities should match the in-class activities for the flipped classroom instruction to be more effective. In relation to pre-class activities, the participants of the FGD mentioned that the science courseware aided them in:
    a. understanding the lesson during the pre-class activity,
    b. finishing in-class activities faster,
    c. applying the content of the pre-class activity to their science lesson,
    d. performing more activities in class,
    e. enjoying the in-class activities (including the peer instruction activity) more with higher level of participation,
    f. being more relaxed because they know the lesson that will be discussed in class,
    g. being able to follow the discussion of the teacher during class review,
    h. gaining confidence to perform in class,
    i. having complete notes before the class, and
    j. being more excited and motivated to attend the science class.

    All these benefits of a well matched pre- and in-class activities would promote positive climate and behavior management in class.

4. *Setting a common class goal.* Encourage the class to achieve a common goal. During the peer instruction activity, the students felt sad when the percentage of students who got

the correct answer was low. As a response, the students tried their best to get the correct answer on the second round because they wanted to do better. To do this, the students reviewed the questions and the choices. If the percentage was already high, they were happy, and they no longer changed their answers.

The participants during the FGD suggested the following to further improve the classroom environment in FCPI.

1. The pre-class activities should be within the level of understanding of the students and can be done independently within the given time frame. In the FCPI, majority of the students understood the pre-class assignment. However, several students reported that sometimes they found it difficult to understand the pre-class assignment because it was in English, some did not have transcriptions nor scripts, or the volume was too low. They needed more time to watch it 3 to 5 times to fully understand the lesson. The students suggested preparing a version of science courseware in Filipino. Like what is observed in Malaysia, students experienced difficulty in understanding pre-class activities delivered through English videos (Muniandy, 2018). To address this issue, the flipped classroom set-up gave the students ample time to clarify and discuss their difficulties with their teacher in class.

2. Involve the students in reinforcing discipline in class. Teachers and students creating expectations and rules in class together would build respect and develop relationships. This is evident in the FCPI. For instance, students in the FGD suggested the following schemes on how to prevent cheating and dishonesty in class.

   a. Check the honesty of co-learners.
   b. Require shading of answers instead of manually writing the letter of the answers.
   c. Erasures of answer during peer instruction should not be allowed.
   d. Teachers should move around to prevent the occurrence of cheating.
   e. Ensure that students were not peeking on the teacher's cellphone for the correct answer.

Conclusions

Fostering positive climate and behavior management in FCPI is facilitated by different factors which include communicating benefits, observing appropriate physical structure of the class, proper matching of the pre- and in-class activity, and encouraging the class to achieve a common goal. These factors helped improve positive climate and behavior management in FCPI. The FCPI experienced challenges in establishing relationships, positive affect, and respect. However, considering the factors mentioned above, these challenges were successfully hurdled as the FCPI scored better in all factors of positive climate at the end of the implementation.

Recommendations

This study provides a model for teaching science in a blended approach. The blended learning model combining flipped classroom and face-to-face peer instruction is an effective means of providing students with sufficient support in terms of learning materials, technology, scaffolding, and social interaction.

Teachers implementing the flipped classroom with peer instruction should be cognizant in developing a classroom environment specifically on positive climate and behavior management.

This can be done by explaining well to the students the importance of pre-class activities in understanding the lesson and to their performance in class. In a positive classroom environment, students can develop confidence and feel safe and joy which can greatly influence the way they participate and perform in class.

Teachers should be given support and training on how to modify the classroom environment to encourage academic engagement and discourage disruptive behaviors in face-to-face classes. As seen in the study, establishing positive climate and behavior management could be a challenge on the first few days of implementation. Engaging face-to-face activities and equipping students with prior knowledge helped them perform better and develop positive behavior in class. Recognizing the nature of this classroom set-up being activity-based and student-centered, clear behavior expectation was vital in managing behaviors.

In addition, it is recommended that teachers seek training and assistance on how to incorporate technology in class, specifically in finding the right blend of pre- and in-class activities. They can try other active learning strategies for face-to-face classes like problem-based learning, simulation, debates, and think-pair-share activities (Gilboy et al., 2014). Likewise, flipped classrooms in a full online mode integrating asynchronous and synchronous activities, follows the same principle of seamless connection between pre- and in-class activities.

References

Abdullah, M.J., Abu Bakar, N. R., & Mahbob, M. H. (2012). The dynamics of student participation in classroom: Observation on level of participation. *Social and Behavioral Sciences, 59,* 61–70. https://doi.org/10.1016/j.sbspro.2012.09.246

Baepler P., Walkera, J.D., & Driessenb M. (2014). It's not about seat time: Blending, flipping, and efficiency in active learning classrooms. *Computers and Education, 78,* 227–236. https://doi.org/10.1016/j.compedu.2014.06.006

Barr, J. J. (2016). *Developing a positive classroom climate IDEA paper #61.* The IDEA Center.

Bergmann, J., & Sams A. (2012). Flip your classroom: *Reach every student in every class every day.* International Society for Technology in Education.

Buchart, S., Handfield, T., & Restall, G. (2009). Using peer instruction to teach philosophy, logic and critical thinking. *Teaching Philosophy, 32,* 1–40. https://doi.org/10.5840/teachphil20093212

Crouch, C.H., & Mazur, E. (2001). Peer instruction: Ten years of experience and results. *American Association of Physics Teachers, 69*(9), 970–977. https://doi.org/10.1119/1.1374249

Crouch, C. H., Watkins, J. Fagen, A. P., & Mazur, E. (2007). Peer instruction: Engaging students one-on-one, all at once. *Research-Based Reform of University Physics, 1*(1).

Findlay-Thompson, S., & Mombourquette, P. (2014). Evaluation of a flipped classroom in an undergraduate business course. *Business Education and Accreditation, 6*(1), 63–71. https://ssrn.com/abstract=2331035

Gilboy M.B., Heinerichs S., & Pazzaglia G. (2014). Enhancing student engagement using the flipped classroom. *Journal of Nutrition Education and Behavior, 47*(1), 109–114. https://doi.org/10.1016/j.jneb.2014.08.008

Hannah, R. (2013). *The effect of classroom environment on student learning* [Master's thesis, Western Michigan University]. ScholarWorks. https://scholarworks.wmich.edu/honors_theses/2375

Herreid, C.F., & Schiller, N.A. (2013). Case studies and the flipped classroom. *Journal of College Science Teaching, 42*(5), 62–66. http://www.jstor.org/stable/43631584

Jensen, J.L., Kummer, T.A., & Godoy, P.D.d.M. (2015). Improvements from a flipped classroom may simply be the fruits of active learning. *CBE—Life Sciences Education, 14*, 1–12. https://doi.org/10.1187/cbe.14-08-0129

McCollum, B. M., Fleming, C. L., Plotnikoff, K. M., & Skagen, D. N. (2017). Relationships in the flipped classroom. *The Canadian Journal for the Scholarship of Teaching and Learning, 8* (3), 1–19. https://doi.org/10.5206/cjsotl-rcacea.2017.3.8

Muniandy, V. (2018). Effectiveness of flipped classroom on students' achievement and attitudes towards English language in secondary school. *Journal of Innovative Technologies in Education*, 2, 9–15.

Sarawagi, N. (2013). Flipping an introductory programming course: Yes you can!. *Journal of Computing Sciences in Colleges, 28*(6), 186–188.

See, S., & Conry, J.M. (2014). Flip My Class! A faculty development demonstration of a flipped classroom. *Currents in Pharmacy Teaching and Learning, 6*(4), 585–5882. https://doi.org/10.1016/j.cptl.2014.03.003

Shih, W. L., & Tsai, C. Y. (2017). Students' perception of a flipped classroom approach to facilitating online project-based learning in marketing research courses. *Australian Journal of Educational Technology, 33*(5), 32–49. https://doi.org/10.14742/ajet.2884

Strayer, J. F. (2007). *The effects of the classroom flip on the learning environment: A comparison of learning activity in a traditional classroom and a flip classroom that used an intelligent tutoring system* [Doctoral Dissertation, The Ohio State University]. OhioLink Electronic Theses and Dissertations Center. https://etd.ohiolink.edu/apexprod/rws_etd/send_file/send?accession=osu1189523914&dispositi

Turano, A. A. (2005). *The impact of classroom environment on student learning.* (Master's thesis, Rowan University). Rowan Digital Works. http://rdw.rowan.edu/etd/1089

University of Waterloo. (n.d.). *Centre for Teaching Excellence Peer Instruction.* https://uwaterloo.ca/centre-for-teaching-excellence/teaching-resources/teaching-tips/learning-activities/active-learning/peer-instruction-and-concept-tests

Waddell, D. (2012). Point/Counterpoint: To flip or not to flip? Learning and leading performance, and perception in a flipped satellite classroom. *American Journal of Pharmaceutical Education, 77*(9), 196. https://doi.org/10.5688/ajpe779196