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A Flipped Learning Model in a College Physical Education Dance Course: A Non-experimental Design

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Abstract Teaching Physical Education has been plagued with issues on limited class time, gap between concept and practice, and use of traditional assessment methods. Thus, this study implemented flipped learning (FL), specifically the SPRING framework in a college dance course, to address these problems through the promotion of more student agency, in-depth learning, and enhancement of 21st century skills. Since there is a dearth of FL studies that focus on a PE context in the country, this study then sheds light on whether flipped learning model can help improve the conceptual understanding and procedural fluency of the students in a dance course. Using statistical treatment, this study examined (1) the conceptual understanding and procedural fluency of the students through the results of the practical tests done before the major exams and the actual major exams, (2) the proportion of the students with improved performance scores, (3) the significant difference of the mean performance scores before and after the intervention, as well as (4) the difference between the male and female students' scores in both assessments. The results revealed that though the pilot implementation of FL in the PE course in the university yielded generally positive outcomes, some obstacles need to be addressed like technological and logistical limitations due to the sudden shift to remote learning during the pandemic, lack of readiness of the students to regulate their own learning and exhibit other relevant 21st century skills under pressure and uncertain times, and gap between the male and female students performance due to possible latent gender issues in dance education that restrict students' creativity. Thus, the institution needs to provide even more technological, communication, and psychological support for the students to perform better and with more ease whether in a purely online or blended FL environment. More discussions and activities on gender inclusivity in dance classes are also advised to further break barriers against students' artistic freedom and imagination.

Keywords Flexible Learning, Physical Education, Higher Education, Remote Learning

1. Introduction

In the past, a typical dance class in a Physical Education (PE) subject starts with the teacher introducing the dance's history and features. Then, the teacher proceeds with demonstrating the dance steps which the students obediently imitate. After the students master the steps, the teacher assesses how accurately they have executed the dance steps, and for some, how creative the dance was choreographed and performed. It is through this kind of instruction that many people think that PE is merely a physical activity and not theoretical, worth discussing in-depth in an academic context [1]. Specifically, in physical education dance course that entails different genres, the following problems are common: limited class

time, lecture-based instruction, and traditional assessment methods that show a gap between their practical test scores and actual application [2]. Limited class time would also mean having less time to acquire the knowledge and skills necessary for the students to do physical fitness as a lifelong habit [3] which is after all, PE's goal.

With the 21st century innovations in education and with the different sets of learners wired with technology, especially with the remote online learning setup during the pandemic, the traditional way of dance instruction might not effectively work for them anymore. Nowadays, dance education must be holistic under a curriculum that is much attuned with the learning needs of the students. The teachers must closely monitor the students' progress as "dancers (technique), as dance makers (creation), and as appreciators of dance as an art form." [4]. Guided improvisation, creative problem solving, sharing, responding, and critical reflection are now deemed essential in dance instruction so that students would have a shared meaning while working together in dance routines taught in class [4]. This was also similar with Smith-Autard's idea, but she added that the students must also widen their imagination and develop the individuality of the students [5]. Butterworth and Lavender encouraged collaborative learning through discussion and dialogue, while Lavender and Warburton emphasized on enhancing the student's ability to reflect on their own learning and develop critical thinking skills even if PE activities largely focus on honing the students' motor skills [5].

Moreover, it is becoming even more important that students are taught to set focus on achieving individual goals and relate dance concepts learned to dance methodologies and to their own choreography and performance. The students must also learn how to ponder on the process they underwent in mastering the steps—where they went wrong or had difficulties—and to write down all these realizations so that these could be concrete evidence of their learning. Thus, the focus is not only on their output but their learning process [5] which is also equally important in a dancer/ learner's growth and development.

Recently, the use of technology has been increasingly significant in PE. It became a solution to the content overload in some classes by relegating improving low order thinking skills at home while focusing on application, analysis, synthesis and/or evaluation during class time [6]. This has become possible through multimedia technology that "[combines] language and picture signals that improve students' reception and retention of knowledge, unite recognition process, affective process, and will process to stimulate students' inner study motive" [7]. This also minimizes the repetition of demonstration of steps through multimedia technology's "vivid expression of outline, main points and difficulties of skills, proper action decomposition, demonstration of action freeze frame, slowing and magnification, and broadcasting perfect sportsman's action to transmission ways [7]. It can also aid students in assessing their own performance through reviewing the video documentation of their practices and be more reflective of their own creative output and their own attitude toward learning. This would eventually motivate them to improve their craft and adjust their learning styles and behavior.

One specific development in PE teaching is the incorporation of flipped learning (FL) wherein a merge of theoretical mastery and practical competence can be achieved through its holistic approach to learning. Started in 2007 by Chemistry teachers, Jonathan Bergmann and Aaron Sams, FL is defined as a pedagogical approach in which "teachers shift direct learning out of the large group learning space and move it into the individual learning space, with the help of one of several technologies" [8]. Later, Yarbro et al. [9] added this to the definition: "and the resulting group space is transformed into a dynamic interactive learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter."

The four pillars of FL were also enumerated in both versions which was the basis of this study's module flipped classroom design: (1) flexible environments wherein students can decide on the time and venue they want to learn; (2) shift in learning culture, from teacher-centered to a student-centered pedagogy where students review basic concepts at home to prepare for their next class (called *priming*) and devote more time in class to discuss the topics in depth; (3) intentional content that ensures students' *conceptual understanding* and *procedural fluency* (i.e., ability to follow learned steps or instructions on their own) through the use of active learning strategies, peer instruction, problem-based learning, and others; and (4) professional educators who are flexible in shifting from direct instruction to individualized learning, provide immediate feedback on their students' performance, reflect on their own pedagogical practices, and others.

In FL, students learn the basic concepts at home while more in-depth discussion, movement-based activities, and formative and summative assessment can be done in class. This is also a more efficient use of the teacher's time in class as s/he does not spend much time in lecturing basic concepts that the students can just understand from readings but focus more on treating the lesson with more depth. Students come more prepared to class since they have studied the lesson ahead at home before the next class and can more quickly and accurately demonstrate skills or routines focused on the session. Moreover, there is also more time for individual feedback and progress tracking through organizational guides, worksheets, or goal forms that have a list of objectives, and other informal assessment tools [1] unlike before when everybody executes the steps and skills after imitating the teacher and everybody is also expected to master these all at the same time. In reality, not all students perfect dance or sports steps quickly and accurately and not all have the same motivation and interest in learning the subject. Thus, FL recognizes

individual learning needs and capabilities, especially that PE is a skills-based discipline, and students can own their own learning as they also play a more active role in the learning process. However, it can take time for students to adjust to this kind of pedagogy [10] and preparing online and actual class lessons would need more time and effort from the teachers.

Previous studies on the effectiveness of FL in higher education within and outside the Philippines have studied the effect of flipped classroom on the students' academic performance and most of them claimed the positive effect of FL on the students' learning [9], [11-16]. Research on flipped learning applications in PE courses specifically, though limited, were also emerging. One of which is Li's study [2] on the application of a "task driven and ability targeted" flipped classroom on the dance sports teaching in colleges and universities in China. This study claimed that FL stimulated learners' interest in learning and cultivated the students' autonomous learning awareness. However, the method requires high quality and mastery required from the teacher. Hinojo-Lucena et al. [17] also had the same study in a PE class in a Spanish university. The FL model used included additional reading of recommended articles, setting up forums, self-assessment questionnaires, and identification of students' difficulties before the face-to-face classroom. More than the favorable academic performance of the students, it was also found that FL offered opportunities for students to be open to learning and collaborate with others. It also values democracy and student's commitment to learning. The lessons learned from the previous FL applications were noted in the FL design used in this the purely online learning setup of this study.

Given FL's known benefits and challenges discussed in previous studies, it would also be interesting to speculate its effectiveness in an online dance class and its concrete effects on student's learning. Thus, this study would like to shed light on the answer to this question: Does the flipped learning model have a significant effect to improve the conceptual understanding and procedural fluency of the students? Specifically, this study examined the (1) conceptual understanding and procedural fluency of the students through the results of the practical tests done before the major exams and the actual major exams (midterm and final performance exams), (2) the proportion of the students with improved performance scores, (3) the significant difference of the mean performance scores before and after the intervention, as well as (4) the difference between the male and female students' scores in both assessments. This study aimed to discover if the first-ever FL model in the program and in the university has indeed a place in a PE classroom. It also attempted to solve the dearth of FL studies that focus on a PE context in a higher education institution in the Philippines.

2. Materials and Methods

2.1. Method

Non experimental correlational research, specifically before and after design, was used since the study focuses on describing the non-causal statistical relationship between variables, in this case two types of assessments, as they naturally occur. The effect of FL was measured using the difference of the performance results (conceptual understanding and procedural fluency) during the students' practical tests (before FL was applied) and their midterm and final exam grades (after the FL application) in the HKD02: Rhythmic Activities course. The practical tests served as immediate formative assessments right after the review of concepts and steps during the synchronous class. The midterm exam was a basic line dance performance that is categorized as a fundamental dance because it is easy to follow while the final exam was reggae that is a more challenging dance as it will require students to be more creative, collaborate with classmates, and critically think about their new routine. However, though the two dances differ in difficulty level, the same skills and competencies were assessed. The students were given a choice whether to perform individually, by pairs, or by groups, but they were graded based on their individual performance by a different instructor.

2.2. Participants

The participants were selected through purposive sampling. A total of 180 (6 sections) students enrolled in HKD02-Rhythmic Activities/Social Recreational Dance course in the second semester of A.Y. 2020-2021 in San Beda University. Bonafide and enrolled first-year students who passed the pre-requisite subject HKD01-Physical Fitness as part of their general education curriculum during the first semester A.Y. 2020-2021 in San Beda University. Of the 180, 108 are males while 72 are females. Most of the students are aged 18 to 19 years old. Students who were (1) not a member of any professional or non- professional dance organizations inside and outside of the school during their senior high school years and first semester as freshmen students at San Beda University; (2) physically fit to attend the HKD02 class; and (3) did not take two PE classes simultaneously and PE tutorial classes were included in the study. The participants were asked to sign a consent form that indicates their willingness to undergo the implementation of the new method and the study. They were reminded that their answers will not be taken against them and will not whatsoever affect their PE grade for the semester, if they opt not cooperate in the study.

2.3. The SPRING Flipped Learning Framework

Since flipped learning is not applicable to all contexts as many studies have already concluded, this present study

implemented a unique FL model that best suits the dance students based on the requirements of the course, the teacher's style, and the students' profile. It was implemented from the 9th to the 18th session of the course. Prior to this implementation, an orientation on FL was done before the teacher formally started the instruction of social recreational dance. The students spent 1 hour and a half for their synchronous class per week. Since this a flexible class, the students could choose to finish their lessons in asynchronous classes depending on their chosen pace and other personal factors like internet connection and responsibilities in school and at home.

Below shows the SPRING flipped learning (FL) framework for HKD02: Rhythmic Activities adhering to the four pillars of FL discussed above and incorporating information and insights gained from previous literatures that conducted the same study. The acronym of the framework also reflects (1) the reflexive nature of the framework, (2) its intention to track students' progress, and (3) the aim to contribute to the development of the students' lifelong skills for them to become mature learners. All these were done consistently in all classes.

Before the Synchronous Class

1. STUDY. Students watch teachers recorded multimedia instructional materials; handouts or internet sources that will help them understand key concepts about the social recreational dance. They also watch a tutorial video of the dance steps or skills they need to master for next class. These are posted at a week prior to the next synchronous class.
2. PRACTICE**.** Students answer the ten-item online quiz to check their conceptual understanding through the RedCanvas (Online Learning Management System) provided by the University. Their scores are recorded under the quiz component of their Physical Education dance course.

During the Synchronous Class

1. REVIEW. In the first 15-20 minutes of the class, the teacher leads the students in recalling the concepts they learned from the online homework from interactive class discussion. Followed by live synchronous session where everyone performs the assigned sequence of the dance step by step to ensure the clarity of the assigned lesson.
2. INQUIRE. The teacher poses a critical or valuing question for discussion or invites a dialogue between students. He entertains questions from students and resolves doubts and confusions from the students for clarifications.
3. NOTE. The teacher administers consultation and critique to check the students' conceptual understanding and procedural fluency individually, by pairs, or by groups. The rest practice the steps they learned from the video in preparation for the major dance performance. They may also ask their professor to check if they are doing it right through a real-time and spontaneous consultation with the teacher (synchronous feedback) or by sending a video performance to his/her teacher then the teacher provides feedback via Microsoft Outlook or the RedCanvas inbox (asynchronous feedback), especially if they experience internet connection or electricity issues or space limitations.
4. They remember the professor's feedback/comments for future improvement. Towards the latter part of the entire module, the teacher emphasizes adding their own creativity or flavor when they practice or choreograph steps. He can also stress the beauty of combining new actions, shuffling given basic competencies with mastered actions, and creating new routines.
5. GAUGE. Another PE instructor who is a dance expert gives specific feedback on the students' practical test and major exam performance and corrects recurring errors after they have submitted their video of their performance or performed live. The original PE instructor also gives general feedback on the class's performance in the next online class, pointing out their overall strengths and weaknesses.

After the Synchronous Class

1. As a continuation of GAUGE, the students write their insights and realizations on their flipped learning experience the performance exam covering answers to these questions:
   How did flipped learning help you in developing your
   a) independent learning ability;
   b) collaborative skills;
   c) creativity; and
   d) critical and reflective thinking.

They write their answers in the discussion board right after their performance and after they get their score from the professor. Their answers were not graded, but they were required to accomplish it as part of the holistic learning experience in the course.

On the other hand, the researcher as a participant-observer, also accomplish an observation checklist and notes in his overall assessment of his students' skills during practices, consultations, and during each dance performance. The checklist and observation also covered the questions the students answered in the discussion board.

2.4. Statistical Treatment

To identify the effect of flipped learning on the students' conceptual understanding and procedural fluency, their practical tests and major exam scores were analyzed. The

results were presented as mean and standard deviation while frequency and percentage were also used to describe proportion of students with improved grades after the implementation of FL. One-tailed paired t-test was then utilized to determine significance difference. Subgroup analysis was also provided for the male and female students. The level of significance is at 5%. The Medcalc Statistical software version 20.01 was used to execute the statistical calculations. To ensure the validity of the assessment, another PE instructor gave numerical grades result and qualitative feedback on the students' performance in both practical tests and major exams. Also, the rubric for synchronous performance was approved by the panel of experts in dance and was presented, discussed with the students during the orientation, and posted in RedCanvas.

3. Results

This section presents the results of the assessment on the students' conceptual understanding and procedural fluency through the practical tests and major exams.

Figure 1 shows that the average mean score during their midterm practical tests of 94.88 significantly improved to 95.702 after the intervention before the final exam; the improvement is almost 1% of the baseline grade. Among male students, results show that the average practical test mean score during midterms of 93.97 did not significantly improve but still increased slightly to 94.62 after the intervention, with only 0.6964% improvement from the baseline grade. On the other hand, the female students' average score during the midterm practical tests (95.95) significantly improved and increased to 96.98 in the final practical tests; this improvement is 1.0696% of the baseline grade. However, the overall practical test result among female students significantly decreased from 96.82 to just 95.45 after the intervention.

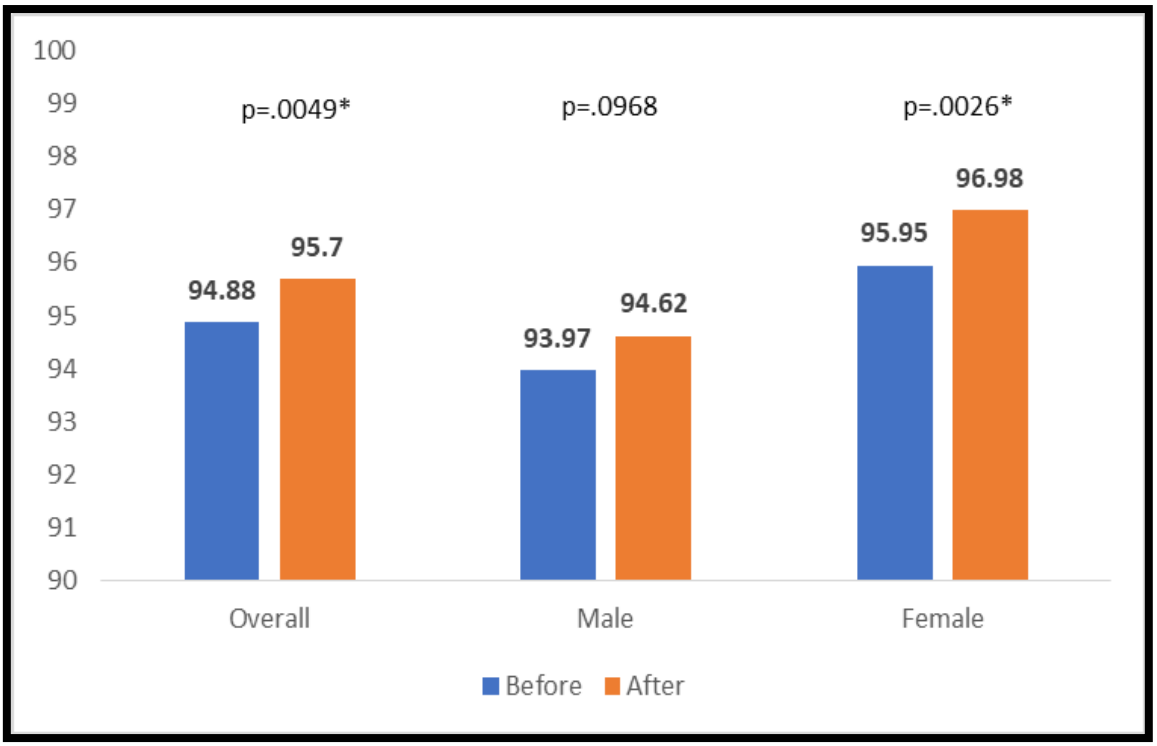

Figure 1. Average Mean Scores in the Practical Tests Before and After the FL Implementation

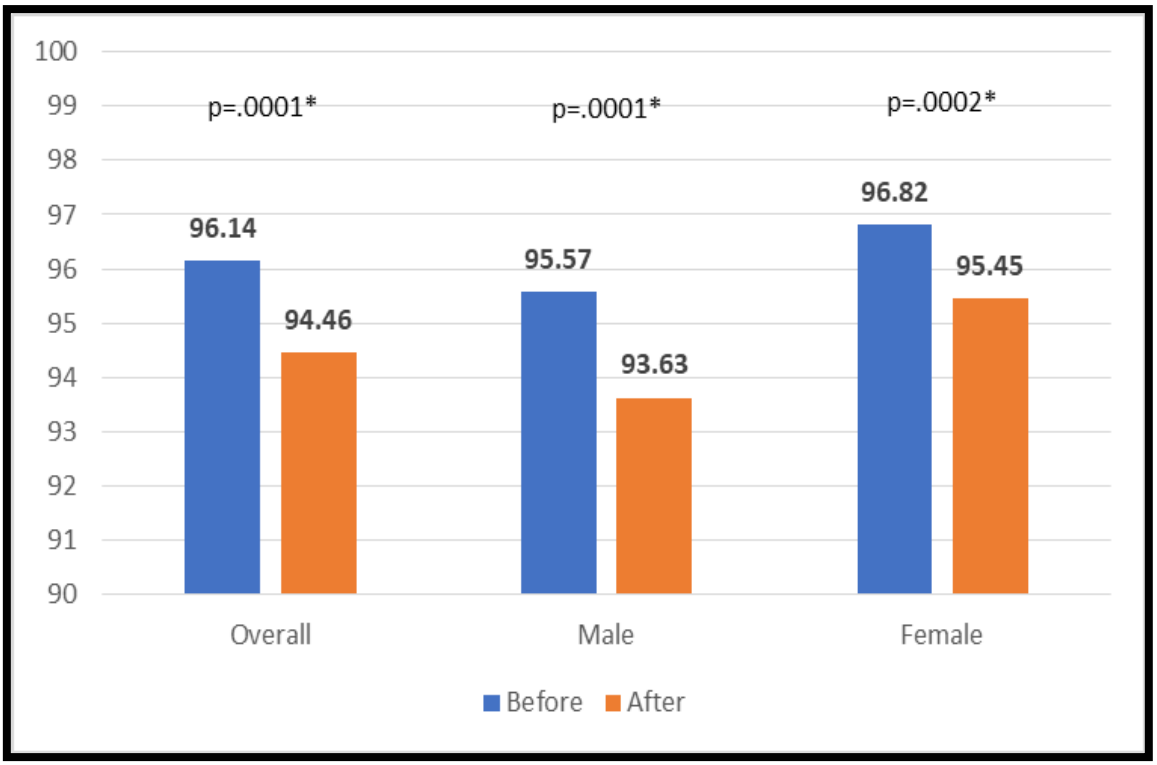

Figure 2. Average Mean Scores in the Midterm and Final Exams (Before and After the FL Implementation)

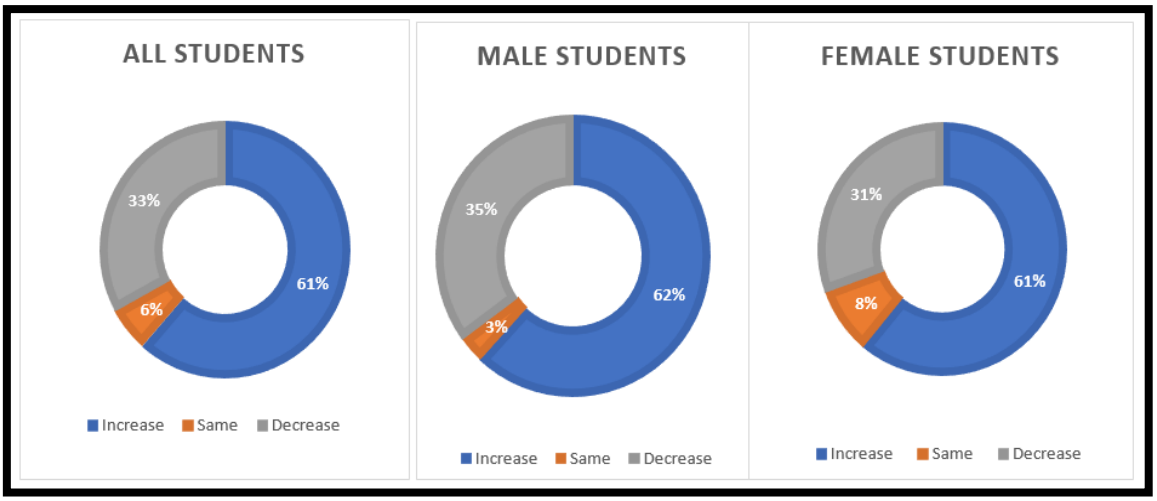

Figure 3. Percentage of Students with Improvement on the Practical Tests Before and After the FL Implementation

Figure 2 shows that the average mean of the midterm exam of 96.14 significantly decreased to 94.46 after the intervention with a 1.7433% decline from the baseline grade.

It can also be noted that the male students' average mean score during the midterm exam of 95.57 significantly decreased to 93.63 after the intervention; there was a 2.0279 % decline from baseline grade. The same trend also occurred with the results of the female students' midterm exam scores with a significant decline from 96.82 95.45 after the intervention (1.4108% from the baseline grade).

Figure 3 reveals that after the intervention, 61.5% of the students experienced an improvement in their final practical assessment scores while 33.0% had lower scores when compared to their midterm practical tests score.

More than half of the male students improved (62%) while 61% of the female students had better performance. Only a small percentage of students (6%) had the same score in both practical assessments before and after the intervention.

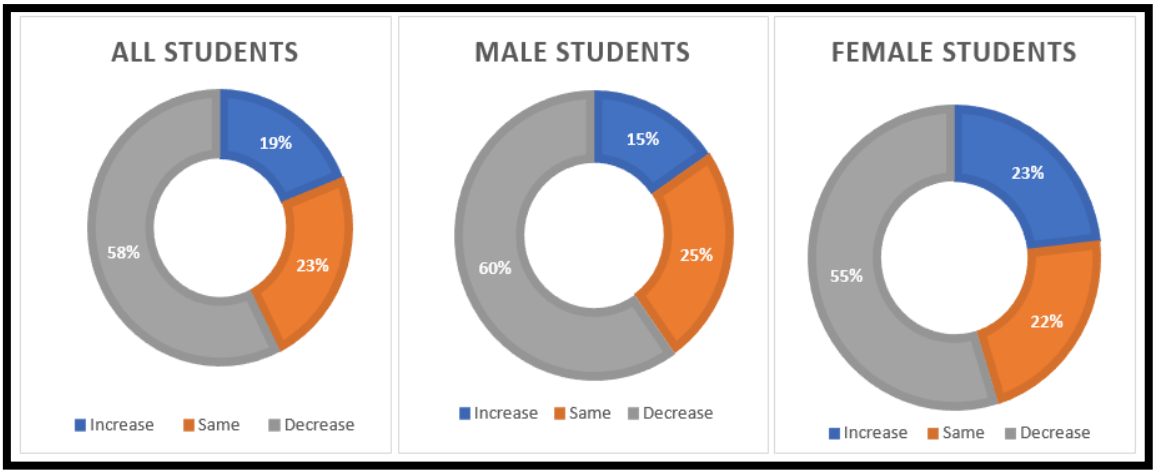

Figure 4. Percentage of Students with Improvement on the Major Exam Scores before and After the FL Intervention

Figure 4 shows that after the intervention, 58% of the students experienced a decline in their major exam scores while only 19% improved during the final exam when compared with their midterm exam score.

Sixty percent (60%) of the male students had a worse performance while 55% for the females.

4. Discussion

This study revealed that there is a significant improvement in the overall mean score and in the scores of both male and female students in the practical exam from the baseline grade after they were subjected to the FL implementation, similar with most of the FL studies reviewed in this study. Understandably, students performed better in the practical test as students only follow the structured lesson divided into sequences from a complete choreographed dance routine. It is afterwards followed by the assessments of the acquired skills or competencies plotted during a specific meeting. Thus, students have a more precise memory and easier retention of the concept on how each sequence should be done, either from synchronous or asynchronous class. The execution of each dance sequence is not complicated because the lesson was organized from simple to complex dance routines, like in the study of Li [2].

However, the results in this study were not as promising as the others, like in Thai, Wever, and Valcke' study [13] in a Belgian context and Malto, Dalida, and Lagunzad' study [14] in a Philippine university context. Unfortunately, there is a significant decline in the major exam scores compared to the practical test scores of the students. Notably, there is a random variation of mean of the percentage around the constant mean from the result of the practical test scores and the major exam results. It could only be surmised that some barriers to physical activities and in succeeding in movement-based assessments have caused the results like lagging internet connection that affected their performance, limited space at home for practice and live or recorded performance, and lack of energy and time to rehearse, collaborate with classmates, and consult with the teacher for feedback due to the simultaneous end-of-the-semester requirements as enumerated in Puen et al. [18], Dimarucot, Aguinaldo, and Andres [19], and Rotas and Cahapay's study [20]—all contextualized during the remote learning situation in universities in the country.

Moreover, some personal problems affecting learning may have also occurred before and during the practices and final performance that might have caused the significant decline in their major exam scores. Some students could have been unmotivated that they are just doing the tasks for compliance' sake. This can be related to Cagande and Jugar's study [16] wherein though the college Physics students had a higher score in their conceptual understanding assessment; the students did not show a significant difference in motivation in learning the subject. Some students also experienced mental block during the presentation and merely relied on or copied their classmate's execution to remember the correct organization of their routine [2]. It can then be inferred that the students, albeit young adults already, are not yet prepared for self-directed learning, especially with the sudden shift to online learning, similar with the result of the study of Reyes et al. [21] when they studied about the Filipino higher education students' readiness for e-learning during a pandemic. Also, in Hao's study [22] that investigated the Education undergraduate majors' FL readiness, it was revealed that the undergraduates' readiness levels for FL were only moderately above the average level. This only affirms that flexible types of learning like FL are not for everyone and using this unconventional method entails (re)teaching basic lifelong skills such as self-regulation, time management, collaboration, resourcefulness, resilience, among many others.

The decline in the performance scores from the midterm to the final exam can also be explained by the higher demands and skills required for the execution of the major exam or the whole dance choreography. One of the criteria

of the major exam is "Creativity and Design" wherein the students are allowed to reconstruct the order of the sequences of the entire choreography using their artistic style and imagination. In line with this, they were also encouraged to add to their original steps that were not taught in their module or the teacher's instructional video. They also needed to collaborate with their classmates to plan, gather all their ingenious ideas, and deliver a high-quality performance together harmoniously. They were also encouraged to do a critical reflection to improve their dance prior to the final and graded performance to gauge their own strengths and points for improvement. All these take time and effort to do, with careful and logical thought and effective communication among the students and between the students and the instructor.

Nevertheless, FL somehow mitigated all these risks by giving the students instructional materials to review on their own anytime, aside from the review and teacher demonstrations that were in synchronous classes [1]. Despite the leniency in the assessments in consideration of the students' difficulty thriving in online learning, students had access to all supports afforded by the university anytime such as instructional materials, handouts, and faculty and technical support. They were also given time to master the steps followed by the teacher's immediate feedback after each lesson to make sure that the students acquire the necessary skills and knowledge before the session ends and the students are left on their own again to practice for more difficult tasks like the midterm and final exam [1].

Lastly, the results revealed gender differences in the performance assessment results, where female students showed more improvement in performance than the males. Female students are more inclined in dancing, participative and more engaged in dance courses than males as dance is often stereotypically categorized as "women's" sports' activity more than men's [23]. Gender issues might have come into play as male students might have hesitated to master dance movements, lead, or cooperate in dance practices, especially if they are still confined with the idea that there are dance movements that are exclusively male or female, limiting their creativity and imagination [24].

5. Conclusion and Recommendations

In conclusion, this study revealed that though the pilot implementation of FL in the PE course in the university produced positive results and a helpful baseline for the improvement of the succeeding implementation of the method, there were still many barriers to overcome for the students to succeed in this kind of learning design. As Shoebridge [10] mentioned, it can take time for students to adjust to this kind of pedagogy; thus, the institution needs to ensure first that the students have the pre-requisite skills and dispositions to be prepared for independent and online learning through the guidance and counselling and teachers' support before a full implementation of FL. The students must also be provided essential psychological support to help them cope with the inevitable challenges of online learning. The institution could also provide more palpable technical, communication, and logistical support for the students to perform better at home or in school and reduce the students' difficulties in performing the tasks; it could provide other alternative means, time, or spaces for movement-based assessments as the institution prepares for the better normal in education in the future. Finally, more discussions on gender inclusivity in dance classes and activities to reinforce these could possibly aid in bridging the gap in the attitude toward and performance between the male and female students in these classes.

It should be noted also that the results are just an approximation of the students' performance in the course as some variables may affect their performance such as actual time spent in studying the dance routine under a flexible mode of learning, the students' background knowledge on the content, the students' ability in doing the assessment based on their personal interests and talents, their reception to the teacher's feedback, and the accurate fitness level of the students, just to name a few. Thus, future studies can consider these factors in improving their FL implementation and their study for better results.

It is also recommended that teachers determine the effect of FL on the students' autonomous learning, collaborative skills, creativity, and critical and reflective thinking that could be taken from the students' and the teachers' perspectives. A quasi-experimental design might also yield different results and perspectives about the potential of this method and the effectiveness of FL when applied in other courses that are not movement-based or in the basic education level would also be interesting to explore.

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