

CROSSFIT Tabata-Based Course Pack for Promoting Good Health and Well-Being Among Tertiary Students

Benedict Al E. Candia¹; Jovelito A. Canillas²; Vincent Invierno Caballes³;
Rafael G. Matutinao⁴; Keith A. Gregorio⁵; Mary Flor Villaruel⁶

¹Research Director, Velez College, Inc., Cebu City, Philippines

²Chair, Kinesthetics, Cebu Normal University

³Instructor I, Cebu Technological University

⁴Chair, Cultural Affairs, Cebu Technological University, Daan Bantayan Campus

^{5,6}Teacher III, Department of Education, Ajuy National High School

¹<https://orcid.org/0000-0003-2889-6833>

²<https://orcid.org/0000-0001-5649-9654>

³<https://orcid.org/0009-0008-8106-0238>

⁴<https://orcid.org/0009-0008-3668-9010>

⁵<https://orcid.org/0009-0003-9747-2716>

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Abstract: This study developed and evaluated a CrossFit Tabata-based fitness course pack in tertiary physical education (PE) course with the objective of enhancing students' health-related fitness components and supporting the broader goal of promoting good health and well-being. Employing a quasi-experimental one-group pretest–posttest design, the intervention was implemented among randomly selected students enrolled in Physical Activities Toward Health and Fitness (PATHFIT) two during the second semester of academic year 2020–2021 in a higher education institution in Cebu City, Philippines. Data were collected through both quantitative measures of health-related fitness and qualitative feedback from students and instructors. The results revealed a statistically significant improvement in students' health-related fitness components after completing the CrossFit Tabata-based intervention. Student feedback indicated strong agreement on the usability, energy intensity, engagement, music integration, mood enhancement, and movement variety of the course pack. Focus group discussions with physical education instructors highlighted key challenges, including unstable internet connectivity, limited access to resources and fitness equipment, constraints in performance space, and difficulties in monitoring student progress. Conversely, identified opportunities included innovation in instructional delivery, systematic implementation of physical education programs, and increased student participation. The study concludes that the CrossFit Tabata-based course pack is an effective pedagogical intervention that enhances students' physical fitness and promotes active participation in physical education. It is recommended that this fitness course pack be formally adopted in PATHFIT 2 curricula and further refined for sustainable implementation in higher education.

Keywords: Health and Well-Being; CrossFit Tabata; Health-Related Fitness Components; Physical Education; Sustainable Development Goals.

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I. INTRODUCTION

CrossFit Tabata has emerged as a progressive trend in promoting physical activity, specifically designed to advance the United Nations' Sustainable Development Goal (SDG)

3—Good Health and Well-being—among students (Candia et al., 2021). This fitness modality integrates free-hand exercises and weight training with Tabata music to deliver High-Intensity Interval Training (HIIT) geared toward enhancing students' health-related fitness and engagement

levels. As a structured course pack, CrossFit Tabata combines scientifically-backed exercise protocols with educational strategies to achieve optimal fitness outcomes in academic settings (Tüysüz & Kılıç, 2023; Yıldırım & Şenol, 2024).

Tabata, conceptualized by Dr. Izumi Tabata, a Japanese researcher and dean at Ritsumeikan University Graduate School of Sport and Health Science, is a HIIT regimen characterized by short bursts of intense body-weight or resistance exercises alternated with brief recovery periods (Domaradzki et al., 2020; Tabata, 2019). CrossFit complements Tabata by incorporating diverse weight training with HIIT principles, involving both isolation exercises—targeting specific muscle groups such as biceps curls and hamstring curls—and compound exercises that engage multiple muscle groups, such as barbell squats and kettlebell swings (Milanović, Sporiš, & Weston, 2015; Preiato, 2020; Robles & Robles, 2021). The acquisition of “muscle memory” through mastery of posture, movement patterns, and equipment use forms the cornerstone of the CrossFit Tabata instructional approach (Candia et al., 2021).

Despite the global receptivity to CrossFit and Tabata paradigms, there exists a notable gap in research focusing on the application and effectiveness of a CrossFit Tabata-based fitness course pack within the PATHFIT 2 curriculum of Higher Education Institutions (HEIs) in the Philippines. This study addresses this gap by comparing pre- and post-intervention health-related fitness parameters—body composition, muscular endurance, strength, flexibility, and cardiovascular endurance—and examining participatory interest and instructional challenges based on student feedback and teacher observations.

This study is driven by concerns over declining student participation in physical activities and the rise of health problems linked to inactivity. As highlighted in recent interdisciplinary findings within educational and sports sciences, innovative, student-centered, and experiential learning strategies employing technology-enhanced fitness modalities can stimulate motivation and improve health outcomes (Akdoğan & Tonbuloglu, 2023; Güler & Aksu, 2023). The results of this inquiry aim to inform administrators and educators by proposing evidence-based enhancements to PE curricula, thereby addressing obesity and inactivity concerns while fostering sustainable health behaviors. Furthermore, the research findings will expand pedagogical knowledge and provide practical recommendations for teaching physical education with modern, engaging methods adaptable to both indoor and outdoor learning environments (Şahin & Özer, 2024; Zengin & Tekin, 2024).

➤ Research Questions

- To what extent does participation in the CrossFit Tabata-Based Fitness Course Pack in PATHFIT 2 significantly affect tertiary students' health-related fitness components, including body composition, muscular endurance, muscular strength, flexibility, and cardiovascular endurance?

- How do students perceive the implementation of the CrossFit Tabata-Based Fitness Course Pack in PATHFIT 2 in terms of energy level, engagement, usability, music, mood, and movement?
- What challenges and opportunities do PE teachers identify in the feasibility and instructional delivery of the CrossFit Tabata-Based Fitness Course Pack in PATHFIT 2?
- In what ways does the CrossFit Tabata-Based Fitness Course Pack influence students' motivation and adherence to physical activity within an online learning environment?
- What strategies or enhancements can be recommended to optimize the implementation, engagement, and effectiveness of the CrossFit Tabata-Based Fitness Course Pack in tertiary PE courses?

II. THEORETICAL AND CONCEPTUAL FRAMEWORK

Murrock and Higgins's (2009) theory of Music, Mood, and Movement (MMM) and Albert Bandura's (1977) Social Learning Theory form foundational frameworks supporting this study. The MMM theory posits that music stimulates mental, emotional, and physical responses, thereby increasing participation in physical activity (PA) and enhancing health-related fitness components. It suggests that music creates an appealing atmosphere and guides movement during exercise, with the rhythmic auditory stimulation (RAS) technique by Thaut and Abiru (2010) and Thaut et al. (1999) integrated to provide counting patterns and timing for exercise demonstrations. This combination supports increased energy expenditure for fat burning, improved blood circulation, proper breathing, and enhanced cardiovascular endurance. Key elements of music—rhythm, melody, pitch, harmony, and interval—within the MMM framework contribute to both physical and psychological engagement, fostering greater participation among learners regardless of their fitness level (Murrock & Higgins, 2009; Tenenbaum et al., 2004). In the context of Tabata, upbeat and energetic music further stimulates psychological and physiological responses to elevate exercise intensity and energy cost (Tabata, 2019).

Bandura's Social Learning Theory explains learning as a process of reciprocal interaction among cognitive, behavioral, and environmental influences, emphasizing the role of observational learning. Batirzal et al. (2021) and the British Journal of Psychiatry (2015) detail four stages of effective modeling: (1) Attention—capturing learners' focus on a behavior; (2) Retention—remembering the observed action; (3) Reproduction—the ability to replicate the demonstrated behavior; and (4) Motivation—the drive to perform the behavior influenced by perceived consequences. These stages underscore the importance of instructor demonstration, video samples, and peer-led group practice for effective skill acquisition in Tabata training. Heick's (2015) framework of pedagogy, andragogy, and heutagogy further support scaffolding learner independence, progressing from teacher-led instruction to self-directed performance.

Recent interdisciplinary research in educational innovation and experiential learning aligns with these theories, emphasizing music and social engagement as catalysts for active participation and enhanced learning outcomes (Akdoğan & Tonbuluğlu, 2023; Güler & Aksu, 2023). Studies from Anatolia journal reinforce the effectiveness of integrating sensory stimuli and social

dynamics to optimize motivation and performance in physical education contexts (Şahin & Özer, 2024; Tüysüz & Kılıç, 2023; Yıldırım & Şenol, 2024). This multi-theoretical approach validates the use of music-driven, collaborative, and technology-enhanced strategies in fostering sustainable student fitness engagement.

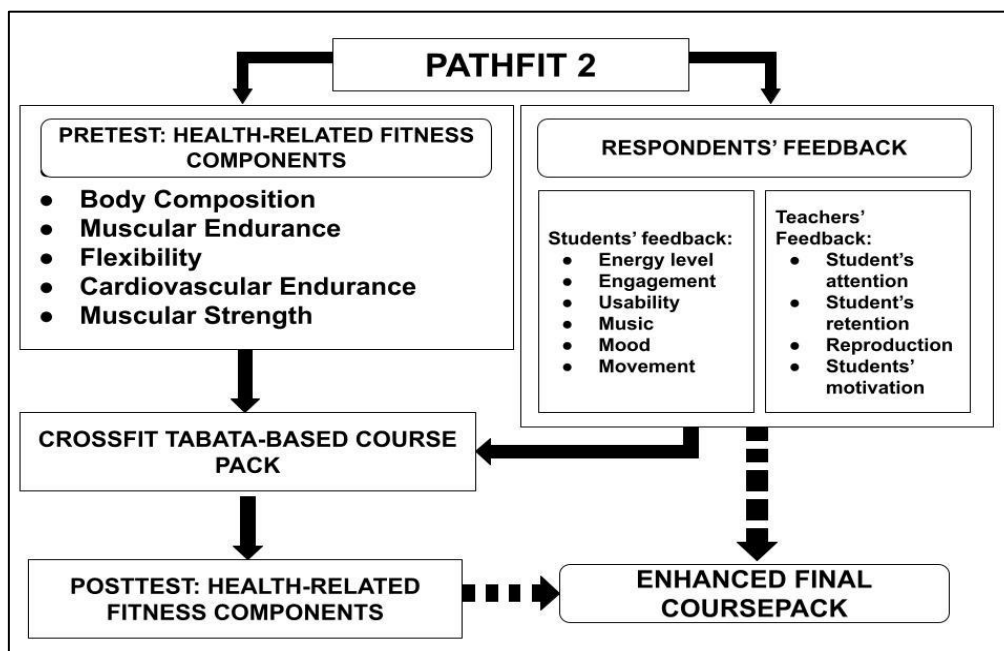


Fig 1 Theoretical-Conceptual Framework of the Study

III. RESEARCH METHODOLOGY

➤ Research Design

This study employed a quasi-experimental design utilizing the one-group pretest–posttest method, an approach suitable for repeated-measures research within the PATHFIT 2 course. Consistent with Batirzal et al. (2021), quasi-experiments are empirical strategies used to estimate the causal impact of interventions on participants, and in this study, the design enabled the measurement of changes in outcomes before and after the intervention.

➤ Participants

The respondents were 60 randomly selected tertiary students, aged 18–20 years, enrolled in three sections of the PATHFIT 2 course at a higher education institution in Cebu City, Philippines. To further assess the feasibility of the intervention for instructional delivery, eight PE teachers participated in a focus group discussion.

➤ Intervention

The intervention consisted of a three-week CrossFit Tabata-based fitness course pack implemented during the second semester of the 2022–2023 academic year. Prior to the pretest, students completed the Physical Activity Readiness Questionnaire (PAR-Q) to evaluate their medical history, fitness readiness, and potential limitations. The program required 30 minutes of daily CrossFit Tabata exercises, monitored through video documentation, exercise logs, and a teacher-provided diet monitoring plan.

➤ Instruments

Data were gathered using four key instruments: (1) the Canadian Society for Exercise Physiology–Physical Activity Training for Health (CSEP-PATH), (2) the Department of Education Order No. 034, s. 2019: Revised Physical Fitness Test Manual, (3) a researcher-made questionnaire with a four-point Likert scale to measure student feedback, and (4) open-ended group interviews with both students and PE teachers to validate instructional feasibility.

➤ Procedures

Data collection involved a pretest and posttest on health-related fitness, survey administration, and focus group discussions with both students and PE teachers. Students provided feedback through questionnaires and interviews, while PE teachers evaluated the feasibility of the intervention in a separate FGD. Ethical standards were strictly observed to ensure informed consent, privacy, anonymity, and confidentiality (Gay & Airasian, 2000).

➤ Reliability and Validity

A pilot test was conducted with PATHFIT 2 students from a private university in Cebu City, Philippines, and the researcher-made questionnaire achieved a Cronbach's alpha of 0.74, establishing acceptable reliability. Furthermore, the standardized Physical Fitness Test (PFT) from the Department of Education was administered before and after the intervention to measure health-related fitness outcomes.

➤ Data Analysis

Quantitative data from the pretest and posttest were analyzed using descriptive statistics (mean, standard deviation) and inferential statistics, specifically paired-samples t-tests, to determine significant differences in health-related fitness before and after the intervention. Survey responses on the Likert scale were summarized using frequency distributions and means. Qualitative data from focus group discussions and open-ended responses were thematically analyzed to identify common patterns, insights, and recommendations regarding the instructional feasibility of the CrossFit Tabata-based course pack.

➤ Ethics Approval

Ethical clearance for this study was granted by the Cebu Technological University (CTU) Research Ethics Committee. All participants provided informed consent prior to participation, and their rights to confidentiality, anonymity, and voluntary withdrawal were fully respected. The study complied with institutional ethical standards and the principles of responsible research conduct.

➤ Disclosure Statement

The author declares no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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➤ AI Declaration

Artificial Intelligence (AI) tools, specifically ChatGPT by OpenAI, were used only to improve the clarity, coherence, and formatting of the manuscript. AI was not used for data collection, analysis, or interpretation. All intellectual contributions, interpretations, and conclusions remain the sole responsibility of the author.

interplay of the variables provides insight into the extent of the CrossFit Tabata-based course pack implementation in PATHFIT 2 tertiary PE classes. Tables 1 to 5 present the pretest and posttest data on health-related fitness components measured through specific exercise demonstrations and scored using the Revised Physical Fitness Test Manual by DepEd (2019). Each fitness component was evaluated using standard scoring and interpretation guidelines. Statistical analyses were performed to determine whether significant differences existed between pretest and posttest scores, thereby validating the effectiveness of the intervention.

➤ Health-Related Fitness Components Before and After the Intervention

• Body Composition

Body composition refers to the relative percentage of body fat and lean muscle mass, which indicates whether body weight is proportional to height (NCERT, 2021). Prior to the intervention, the students recorded a mean height of 5.26 feet, an average weight of 56.70 kilograms, and a BMI of 22.92, classified as normal weight under DepEd (2019) standards. After completing the CrossFit Tabata-based course pack, the mean height increased slightly from 5.26 to 5.27 feet, reflecting only a minimal change (0.0001%). The average weight decreased from 56.70 to 55.60 kilograms, a reduction of 0.03%, suggesting that the program facilitated weight loss through the intensity, intervals, and functional movements typical of Tabata training (Tabata, 2019). Correspondingly, BMI decreased from 22.92 to 22.04, remaining within the normal weight category (NHLBI, 2020). These findings indicate that regular participation in the CrossFit Tabata-based course pack contributed to modest but positive improvements in body composition. This aligns with previous research suggesting that structured daily physical activity supports fat reduction, cardiovascular health, and weight management (USDHHS, 2000; Canadian Fitness and Lifestyle Research Institute, 2002; Van Sluijs et al., 2006).

IV. RESULTS AND DISCUSSIONS

This chapter presents the findings, analysis, and interpretation of the data gathered from the respondents. The

Table 1 The Students' Body Composition Data in Height, Weight, and BMI (N-60)

Variable	Height	Weight	BMI	Interpretation
Before	5.26	56.79	22.92	Normal
After	5.27	55.6	22.04	Normal
Over-all MEAN	0.015	-1.185	-0.876	
p-value	0.002	0.000	0.000	There is a Significant Difference

Table 1 presents the students' body composition data before and after completing the CrossFit Tabata-based Fitness Course Pack in PATHFIT 2. The results indicate a statistically significant difference in height ($p = 0.002$), weight ($p = 0.000$), and BMI ($p = 0.000$). Although the increase in mean height was minimal (from 5.26 to 5.27 feet), the changes in weight and BMI were more pronounced. The average weight decreased from 56.79 to 55.60 kilograms, while the mean BMI dropped from 22.92 to 22.04, both remaining within the "normal" classification (DepEd, 2019).

These findings suggest that the integration of high-intensity interval training (HIIT) through Tabata workouts significantly influenced students' body composition. The intensity and structured intervals of Tabata training are well-documented to enhance fat metabolism, support lean muscle retention, and contribute to overall weight management (Tabata, 2019). Thus, the intervention effectively promoted healthier body composition among the students within the short duration of the program.

➤ Muscular Endurance

Table 2 presents the students' muscular endurance data as measured through the basic plank exercise. Prior to the intervention, the mean duration of holding the plank position was 41.45 seconds, rated as Good based on the DepEd (2019) standards. After completing the CrossFit Tabata-based

Fitness Course Pack, the mean duration increased significantly to 54.65 seconds, corresponding to an Excellent rating. The mean improvement of 13.20 seconds was statistically significant ($p = 0.000$), indicating a very high level of difference between pretest and posttest scores.

Table 2 The Students' Muscular Endurance Data in Basic Plank Exercise (N-60)

Variable	Basic plank time duration	Interpretation
Before	41.45	Good
After	54.65	Excellent
Mean	13.2	
p-value	0.000	The is a Significant Difference

In table 2, the results suggest that the HIIT structure of Tabata workouts substantially enhanced students' muscular endurance. By combining short bursts of maximum effort with structured rest intervals, Tabata training improves the ability of muscles to sustain repeated contractions without fatigue (Tabata, 2019). This aligns with NCERT (2021), which defines muscular endurance as the capacity to perform physical activities for extended periods without tiring. The findings confirm that the CrossFit Tabata-based course pack effectively developed students' muscular endurance, advancing their performance from Good to Excellent levels.

➤ Muscular Strength

Table 3 shows the students' muscular strength performance based on the 90-degree push-up test. Before the intervention, the students obtained a mean of 11 repetitions, which falls under the Fair category (DepEd, 2019). After the use of the CrossFit Tabata-based Fitness Course Pack, the mean repetitions increased to 16, indicating an improvement of 5.28 repetitions. Despite the observed increase, the performance remained within the Fair classification.

Table 3 The Students' Muscular Strength Data in 90-Degree Push-ups (N-60)

Variable	90-degree push up repetitions	Interpretation
Before	11	Fair
After	16	Fair
Mean	5.28	
p-value	0.000	There is a Significant Difference

The statistical result ($p = 0.000$) reveals a highly significant difference between pretest and posttest scores, confirming that the intervention contributed to the enhancement of muscular strength. According to NCERT (2021), muscular strength refers to the ability of individuals to exert force in a specific exercise. While improvements were evident, the findings also suggest that the students require continued strength-focused training to move beyond the Fair category. Previous literature emphasizes that consistent resistance training, freehand exercises, and progressive overload over time are necessary to maximize muscular strength and reinforce muscle memory (Candia et al., 2021). Overall, while the CrossFit Tabata-based course pack demonstrated a positive effect on muscular strength, further integration of structured weight training and strength-specific modules is recommended to elevate students' performance to higher standards.

➤ Flexibility

Table 4 presents the results of the zipper test exercise, which measured the flexibility of the students' shoulder joints. The pretest mean overlap was 26.02 cm (right arm) and 25.76 cm (left arm), both classified as Fair based on DepEd (2019) standards. After completing the CrossFit Tabata-based Fitness Course Pack, the mean overlaps increased to 29.62 cm (right arm) and 28.03 cm (left arm), showing noticeable gains in flexibility. The results were statistically significant ($p = 0.000$), indicating that the intervention had a meaningful impact on shoulder flexibility. However, despite the improvement, both pretest and posttest performances still fell under the Fair category, suggesting that further emphasis on stretching and mobility exercises is necessary.

Table 4 The Students' Flexibility Data in Zipper Test Exercises (N-60)

Variable	Right Arm	Left Arm	Score
Before	26.02	25.76	Fair
After	29.62	28.03	Fair
Mean	-3.6	-2.28	
p-value	0.000	0.000	The is a Significant Difference

Meanwhile, table 5 below shows the results of the sit-and-reach flexibility test, which assessed hamstring and

lower back flexibility. During the pretest, students achieved mean scores of 47.00 cm (1st try), 47.85 cm (2nd try), and

50.56 cm (best score), all rated as Very Good. After the intervention, performance improved to 51.22 cm (1st try), 53.02 cm (2nd try), and 54.63 cm (best score), reflecting

significant increases of 4.23 cm, 5.17 cm, and 4.06 cm, respectively. All improvements were highly significant ($p = 0.000$).

Table 5 The Students' Flexibility Data in Sit and Reach (N-60)

Variable	1st try	2nd try	Best Score	Interpretation
BEFORE	47	47.85	50.56	Very Good
AFTER	51.22	53.02	54.63	Very Good
MEAN	-4.23	-5.17	-4.06	
P-value	0.000	0.000	0.000	There is a Significant Difference

The findings indicate that the CrossFit Tabata-based course pack positively influenced flexibility in both upper and lower body exercises. However, while sit-and-reach performance remained consistently in the Very Good category, the zipper test results stayed within the Fair classification. This suggests that while the course pack supported gains in flexibility, it should integrate additional warm-up routines, dynamic stretches, and mobility drills to address areas of limited improvement. As NCERT (2021) notes, flexibility is the ability to extend muscle groups through the maximum range of motion, and systematic practice is essential for long-term enhancement.

➤ Cardiovascular Endurance

Cardiovascular endurance refers to the ability of the heart and lungs to deliver sufficient oxygen to working muscles during prolonged physical activity without causing undue fatigue (Gholipourmalekabadi et al., 2016). In this study, cardiovascular endurance was assessed using the 3-minute step test, as recommended by the Revised Physical Fitness Test Manual of the Department of Education (DepEd, 2019). The test measured the students' pre-heart rate, post-heart rate, and recovery heart rate per minute.

Table 6 The Students' Cardiovascular Endurance Data in 3-Minute Step Exercise (N-60)

Variable	Pre-heart rate per minute	Post-heart rate per minute	Heart rate recovery	Interpretation
Before	90.7	128.4	80.73	Excellent
After	83.03	120.27	73.15	Excellent
Mean	7.67	8.13	7.58	
p-value	0.000	0.000	0.000	There is a Significant Difference

Table 6 illustrates that before participating in the CrossFit Tabata-based Fitness Course Pack, the students' mean pre-heart rate was 90.7 bpm, increasing to 128.4 bpm immediately after the step test. Their average recovery heart rate after one minute of rest was 80.73 bpm, interpreted as Excellent based on DepEd (2019) standards. After the intervention, improvements were evident: the pre-heart rate decreased to 83.03 bpm, the post-heart rate reduced to 120.27 bpm, and the recovery heart rate declined to 73.15 bpm, all of which remained within the Excellent category.

The findings revealed highly significant differences ($p = 0.000$) in all three cardiovascular measures, demonstrating that consistent participation in the CrossFit Tabata-based course pack effectively improved cardiovascular efficiency. This supports Anderson's (2008) assertion that post-exercise

heart rates provide a reliable indicator of cardiovascular fitness and endurance. The decrease in pre-, post-, and recovery heart rates indicates enhanced oxygen utilization, faster recovery, and better overall cardiorespiratory conditioning among the students.

➤ Students' Feedback and Teachers' Perspectives on the CrossFit Tabata-Based Fitness Course Pack in PATHFIT 2

The implementation of the CrossFit Tabata-based Fitness Course Pack in PATHFIT 2 received generally positive feedback from students and teachers, with findings showing both the effectiveness of the program in enhancing health-related fitness and the challenges that emerged in an online learning context.

Table 7 Students' Feedback on the Course Pack (N-60)

Components	Weighted Mean	Interpretation
Energy Level	3.6	Strongly Agree
Engagement	3.19	Agree
Usability	3.51	Strongly Agree
Music	3.46	Strongly Agree
Mood	3.48	Strongly Agree
Movement	3.42	Strongly Agree
Total	3.44	Strongly Agree

From the students' perspective, the overall weighted mean of 3.44 (Strongly Agree) across six components—energy level, engagement, usability, music, mood, and movement—indicates a strong endorsement of the program. Energy level received the highest rating ($M = 3.60$), suggesting that the program successfully pushed students to exert effort, burn calories, and boost metabolism. As one student affirmed, *"Yes, the CrossFit Tabata-based fitness course pack is highly relevant and effective in enhancing my health since it enabled me to sweat, which is good in burning calories. I also observed how fast my metabolism was since I started doing the Tabata exercises. Basically, in a span of three weeks, there are signs of significant effects of the workout."*

Similarly, another student highlighted how the program motivated them despite not being a regular exerciser: *"Yes, I find this effective because I'm not the type of person who exercises daily, but this drives me to perform. I can feel the after-effects of the exercises and I can say that I was able to control my body better, especially my breathing since I have a history of asthma and it got triggered sometimes. It helps me a lot and the music helped lift my mood while performing."*

These reflections confirm the energizing and motivational effects of the program, aligning with the MMM theory (Terry et al., 2020), which emphasizes how music and structured physical activity positively affect mood and performance.

Despite these strengths, engagement received the lowest score ($M = 3.19$), reflecting participation barriers. As one student explained, *"No, because I have been busy and I cannot keep up with the 3-week exercise. Aside from being busy, energy is also a factor. Since I can only exercise outside our house (inside the gate), the weather is also a factor."* Another echoed similar concerns: *"No, because I'd prefer an exercise where it's not timed. Tabata seems like it's a fast-paced exercise. My family and friends would be more interested in exercises where we can go at a slow to normal pacing and just enjoy the exercise without thinking of the time and executing quickly."* These statements highlight contextual challenges such as time constraints, environmental limitations, and exercise pacing preferences, which resonate with studies on reduced engagement in online physical education (Daum & Buschner, 2012).

Complementing student feedback, PE teachers at the University of San Jose–Recoletos identified both opportunities and challenges in instructional delivery. Teachers recognized the feasibility and potential of the program, as one expressed: *"Yes, we used Tabata Workout in our PATHFIT 2 course, because it's a new trend now and functional as well for the total fitness of our students. Moreover, this Tabata workout aligns with our course description of the subject and one of our physical fitness activities. However, the systematic program and uniform implementation of the course pack are not yet available as a book."*

Another teacher observed the progression of student performance: *"At first, students had a hard time doing the Tabata exercises. But as they do the exercise regularly or more often, they appreciate it. I can see how students show interest in performing the exercises because I see improvement in their performance. Health and skill-related fitness components are enhanced... from the first meeting we had and up to the following days, I see their progress. Moreover, their endurance and how they were able to sustain the Tabata workout."*

Teachers also emphasized the simplicity and adaptability of Tabata, as one pointed out: *"Yes, I find it feasible. Easy to understand, easy to follow by the students. There is a certain time given for you to perform the exercises in a short period and a rest period. Since Tabata is a high-intensity exercise, an individual performing Tabata would be able to enhance skills, specifically skill-related fitness."*

However, they acknowledged persistent challenges in instructional delivery, especially in online settings: *"The time for practice and preparation of the exercises in an online setup is a challenge to both teachers and students."* Another noted, *"Connectivity and the available space for exercise demonstration [are limitations]. More exercises suited for the learners' learning environment are needed."* These challenges mirror those reported in pandemic-era physical education literature, where remote setups limited monitoring and reduced engagement (Chen et al., 2020).

Teachers also stressed the importance of scaffolding and multimedia support, noting: *"The learners can demonstrate proper execution of the exercises if: (a) there is a comprehensive mechanics and procedures of the program, (b) instructional videos or video modeling of the teacher are provided, and (c) constant monitoring and feedbacking of their performance during synchronous and asynchronous delivery are ensured."*

Interestingly, both students and teachers appreciated the flexibility and personalization of the program. Teachers noted that students enjoyed choosing their own music and valued the clear interval structure: *"Perhaps, what students like about this Tabata workout is that (a) they can choose the music they want, (b) learning opportunities are rich on the internet, (c) the specific workout format allows them to stop during the resting interval, and (d) it is easy to identify when to start and stop the music since it was already programmed and edited into its format."*

➤ Summary of Findings

Taken together, these findings affirm that the CrossFit Tabata-based Fitness Course Pack effectively enhanced health-related fitness while promoting motivation and enjoyment through music and structured exercises. However, both students and teachers emphasized the need for refinement in engagement strategies, online delivery tools, and contextual adjustments such as space, pacing, and resources.

The integration of the MMM theory (Terry et al., 2020), SDT (Ryan & Deci, 2000), and UNESCO's health promotion framework (2021) underscores the program's potential as not only a physical fitness intervention but also an educational approach that fosters lifelong health and well-being. Future iterations should incorporate multimedia instructional materials, flexible pacing, and strategies to address environmental barriers, ensuring more inclusive and sustainable implementation.

V. CONCLUSION

The findings of this study indicate that the CrossFit Tabata-based Fitness Course Pack in PATHFIT 2 is an effective intervention for enhancing tertiary students' health-related fitness, including body composition, muscular strength and endurance, flexibility, and cardiovascular endurance. Students reported increased energy, improved mood, and heightened motivation to engage in regular physical activity, while teachers observed measurable improvements in skill- and health-related fitness components. The program's integration of structured exercise intervals, music, and flexibility in practice location supports engagement and aligns with the MMM theory, SDT, and UNESCO's framework for health promotion. Despite these positive outcomes, contextual factors such as limited space, time constraints, online delivery challenges, and varying levels of engagement affected full participation. Teachers emphasized the need for instructional scaffolding, multimedia support, and standardized procedures to optimize implementation. Overall, the CrossFit Tabata-based Fitness Course Pack is feasible, effective, and motivational, but refinements are recommended to ensure accessibility, consistency, and sustainable engagement.

RECOMMENDATIONS

Based on the findings, several recommendations are proposed. Students are encouraged to maintain regular practice of CrossFit Tabata exercises to further enhance their health-related fitness, while following proper warm-up, stretching, and cool-down routines to reduce the risk of injury and improve flexibility. They should also utilize available digital resources, music, and workout guides to optimize motivation and adherence. For PE teachers and higher education institutions, it is recommended to develop a comprehensive instructional manual with clear mechanics, exercise videos, and video modeling for both synchronous and asynchronous delivery. Flexible pacing and alternative exercises should be considered to accommodate diverse student needs, space, and resources, while monitoring student performance regularly and providing continuous feedback to support engagement and skill mastery.

Additionally, multimedia tools and structured playlists should be incorporated to enhance the Music, Mood, and Movement experience. For future research, long-term effects of the CrossFit Tabata-based Fitness Course Pack on students' fitness and lifestyle habits should be explored, including alternative delivery models such as hybrid or face-to-face setups to address online learning limitations. Further

investigation into the psychological and social benefits of the program, including motivation, confidence, and social engagement, is also recommended.

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