

# Strategic Teaching-Learning Activities in Integrating 4C's in Pathfit Courses

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**Abstract**—The integration of 21st-century competencies—Critical Thinking, Communication, Collaboration, and Creativity (4Cs)—into Physical Activity Towards Health and Fitness (PATHFIT) courses has become an essential goal in promoting holistic education. This study aimed to determine the extent of 4Cs integration and to identify strategic teaching-learning activities that enhance such integration within PATHFIT courses at the University of the Cordilleras. A mixed-methods approach was employed. Quantitative data were gathered through an online Likert-scale questionnaire administered to PATHFIT students, while qualitative data were obtained through semi-structured interviews with Physical Education instructors. The quantitative findings revealed that the integration of the 4Cs is fully integrated, with a general weighted mean of 3.48, indicating strong implementation in areas such as group collaboration, creative tasks, and interactive learning. However, areas like conflict resolution and instructional design showed slightly lower levels of integration. Qualitative analysis highlighted key strategies used by instructors, including student-led projects, multimedia fitness assignments, and peer collaboration exercises. These activities were identified as effective in promoting student engagement and enhancing 4C-related outcomes. The study concludes that strategic, student-centered approaches are vital for embedding 21st-century skills in physical education. The findings have significant implications for curriculum development and instructional training, supporting a transformative learning environment that prepares students for future challenges.

**Keywords**— Curriculum development, Instructional strategies, Student engagement, Transformative learning, 21st-century competencies.

## I. INTRODUCTION

Athletes invest an immense amount of time and effort The integration of 21st-century skills, particularly the 4Cs—Critical Thinking, Communication, Collaboration, and Creativity—into Physical Activity Towards Health and Fitness (PATHFIT) courses, has gained significant attention in modern education. As physical education evolves beyond traditional fitness training, embedding strategic teaching-learning activities that foster cognitive, social, and creative development is essential in preparing students for lifelong wellness and adaptability. At the University of the Cordilleras (UC), PATHFIT courses are designed to holistically develop students, ensuring that physical education remains engaging, relevant, and transformative.

Traditionally, PATHFIT courses focus on physical fitness, movement skills, and health education, but recent pedagogical shifts emphasize the need for interactive, student-centered learning that enhances problem-solving, teamwork, and innovation. By embedding the 4Cs, educators can create a dynamic learning environment where students engage

meaningfully, think critically about health, and collaborate effectively.

Research highlights the importance of integrating the 4Cs into education, particularly in physical education and fitness-related courses. A study on strategic management in PATHFIT courses demonstrates how critical thinking, collaboration, communication, and creativity can be embedded into higher education through interactive learning strategies (De Leon, 2025). Although primarily focused on university teaching, its findings can be adapted for PATHFIT courses at UC to enhance student engagement and participation.

Additionally, the study "Innovation and Integration of 4Cs in the Quality of Teaching" explores the significance of blended learning in embedding the 4Cs into educational systems (Garcia & Thompson, 2024). The findings suggest that interactive and technology-driven approaches can improve student participation, which can be applied to PATHFIT courses at UC through digital fitness projects and collaborative workouts.

Moreover, the paper "Implementing 4Cs as 21st Century Skills in Global Education" examines how communication, collaboration, creativity, and critical thinking can be incorporated into physical education through problem-solving activities, teamwork exercises, and creative projects (Johnson & Rivera, 2023). These strategies align with UC's PATHFIT courses, where students can engage in peer-led coaching, fitness challenges, and health debates.

Furthermore, the University of the Cordilleras has been recognized for its innovative academic programs, particularly in teacher education and physical education, which emphasize holistic learning approaches. The integration of multimedia resources and interactive learning techniques into PATHFIT courses aligns with global trends in educational innovation, ensuring that students develop critical thinking and collaborative skills essential for future career readiness. The emphasis on structured instructional strategies in physical education supports findings that systematic communication methods and interactive learning environments improve student motivation and comprehension (Mahdi, 2023).

While all components show full integration, areas like conflict resolution skills (3.49) and instructional methods (3.30) could benefit from refinement to further strengthen interpersonal dynamics and teaching strategies, consistent with the Social-Based Learning and Leadership framework, which underscores the role of group dynamics and relational conflict management in fostering meaningful relationships (Vinokur, 2024). These findings affirm the effectiveness of embedding the 4Cs into UC's PATHFIT courses, reinforcing their

contribution to holistic student development and future-ready competencies.

II. METHODOLOGIES

This study employs a mixed-methods research design, integrating both quantitative and qualitative approaches to obtain a comprehensive understanding of the research problem. The quantitative component focuses on generating numerical data that can be statistically analyzed to measure the extent of 4Cs integration in PATHFIT courses. This will help quantify students' and teachers' perceptions, attitudes, and behaviors related to 21st-century skill development.

The qualitative component complements this by providing deeper insights into the strategic teaching-learning activities employed by Physical Education instructors to enhance the integration of the 4Cs. This will be achieved through in-depth interviews, allowing for rich, descriptive data.

Data collection methods will include the administration of online surveys using a structured Likert-scale questionnaire and the conduct of semi-structured interviews with selected PE teachers. The population of this study consists of PATHFIT students and Physical Education (PE) teachers from the tertiary level at the University of the Cordilleras, located along Governor Pack Road, Baguio City. The inclusion of PATHFIT students is essential for assessing the extent to which the 4Cs (Critical Thinking, Communication, Collaboration, and Creativity) are integrated into their learning experience. Meanwhile, PE teachers are included to provide insights into the strategic teaching-learning activities they utilize or recommend to enhance the integration of the 4Cs. These two groups of respondents are critical in addressing the specific problems outlined in this study and in drawing meaningful conclusions regarding the effectiveness of 4Cs integration in PATHFIT courses.

TABLE 1. To determine the extent of integration of the 4Cs (Critical Thinking, Communication, Collaboration, and Creativity) in PATHFIT courses, the study will utilize the weighted mean as the primary statistical tool. The responses from the Likert-scale questionnaire will be analyzed to identify the overall and categorical levels of integration based on the following interpretation guide:

Mean Range	Scale	Qualitative Value	Description
3.25-4.0	4	Fully Integrated	Integration is Completely achieved
2.50-3.24	3	Moderately Integrated	Integration is Satisfactorily achieved
1.75-2.49	2	Slightly Integrated	Integration is partially achieved
1.00-1.74	1	Not Integrated	Integration is Not achieved

III. RESULTS AND DISCUSSION

Integration of 4C's in pathfit courses

This section discussed the Integration of 4C's in pathfit courses at the University of the Cordilleras (U.C.).

Table 2 shows the Integration of the 4C's in pathfit courses. Generally, the result showed that the integration of the 4C's to pathfit courses are fully integrated with a general weighted mean of 3.48.

TABLE 2. Integration of the 4C's in pathfit courses.

4C's	Weighted Mean	Qualitative Value
Creativity		
1. Incorporation of Creative Activities	3.65	Fully Integrated
2. Problem-Solving Tasks	3.38	Fully Integrated
3. Variety in Teaching Methods	3.32	Fully Integrated
4. Encouragement of Personal Goals and Reflection	3.55	Fully Integrated
5. Student-Led Projects	3.36	Fully Integrated
Critical Thinking		
1. Instructional Method	3.30	Fully Integrated
2. Assessment Practices	3.42	Fully Integrated
3. Student Engagement	3.41	Fully Integrated
4. Instructor and Peer Feedback	3.35	Fully Integrated
5. Curriculum Design	3.31	Fully Integrated
Collaboration		
1. Group Activity Participation	3.74	Fully Integrated
2. Peer Feedback and Support	3.54	Fully Integrated
3. Cooperative Learning Tasks	3.62	Fully Integrated
4. Shared Goal Setting	3.62	Fully Integrated
5. Conflict Resolution Skills	3.49	Fully Integrated
Communication		
1. Interactive Learning	3.55	Fully Integrated
2. Peer Feedback and Support	3.47	Fully Integrated
3. Curriculum Design	3.58	Fully Integrated
4. Multimedia Resources	3.47	Fully Integrated
5. Facilitation of Interactive Learning Active	3.54	Fully Integrated
General Weighted Mean	3.48	Fully Integrated

The integration of the 4Cs into PATHFIT courses at the University of the Cordilleras (UC) reflects a progressive educational framework that prioritizes holistic student development. The fully integrated approach, indicated by a general weighted mean of 3.48, demonstrates UC's commitment to enhancing physical education with 21st-century competencies.

This result aligns with recent studies emphasizing the importance of embedding 21st-century skills into physical education to enhance student engagement and holistic learning (De Leon, 2025). Research on strategic management in PATHFIT courses highlights that preparedness in instructional design and curriculum development significantly impacts student outcomes, reinforcing the effectiveness of integrating the 4Cs.

Additionally, studies on instructional design for holistic learning emphasize that fostering creativity and collaboration enhances problem-solving abilities and adaptability in educational settings. This corroborates with the idea of multidisciplinary education as a catalyst for holistic learning, emphasizing how interdisciplinary approaches foster critical thinking, creativity, and collaboration (Upadhyay, 2024). The strong integration of collaboration through group activities (3.74) and cooperative learning tasks (3.62) supports findings that team-based learning enhances motivation and performance.

Similarly, the emphasis on communication through interactive learning (3.55) and curriculum design (3.58) aligns with advocating for structured instructional strategies to improve student interaction and knowledge retention. This

corroborates with the idea that effective communication strategies in learning, highlighting how systematic communication methods and interactive learning environments improves student motivation and comprehension (Mahdi, 2023).

Lastly, while all components are fully integrated, areas such as conflict resolution skills (3.49) and instructional methods (3.30) could be further refined to strengthen interpersonal dynamics and teaching strategies. This goes with explored Social-Based Learning and Leadership as an innovative approach to conflict resolution in educational settings, emphasizing the importance of group dynamics and relational conflict management to foster meaningful relationships and personal growth (Vinokur, 2024). These findings validate the effectiveness of integrating the 4Cs into PATHFIT courses, supporting the broader goal of holistic student development and future-ready competencies. What are your strategies or strategies you plan to do to enhance the integration of 4Cs in the PATHFit courses you handled?

The table presents thematic categories derived from the qualitative responses of Physical Education instructors at the University of the Cordilleras regarding strategies to enhance the integration of the 4Cs—Critical Thinking, Communication, Collaboration, and Creativity—into PATHFIT courses. These themes represent varied teaching approaches aligned with best practices in 21st-century education.

TABLE 3

Theme	Frequency	Sample Responses
Creative and Student-Centered Outputs	5	"Creating their own outputs"; "Creating own routines"; "Design wellness campaigns"; "Creating assessment tools"
Communication and Digital Integration	4	"Communication via Canvas, Zoom"; "Use of LMS platforms"; "Use of digital platforms"
Group Work and Collaboration	5	"Group activities"; "Let students work by group or pair"; "By pair or group activities"
Analytical and Reflective Thinking	5	"Analysis activities"; "Situational-based questions"; "Structured reflection and discussion"
Experiential Learning	3	"Hands-on activities"; "Learning by doing"; "Demonstration first before students follow"
Problem-Based and Critical Learning	2	"Problem-solving scenarios"; "Situational-based questions"
Inclusive and Differentiated Instruction	1	"Giving varied activities to target multiple intelligences of students"

One emerging strategy is curriculum revision, where instructors emphasized the importance of revisiting and enhancing course content by starting with foundational concepts and progressively advancing to complex tasks. This ensures alignment with 21st-century learning goals (Aquino & Rivano, 2024). In connection with this, instructors frequently mentioned the use of technology, such as Zoom, Canvas, Google Meet, and Messenger, to improve engagement and enable more flexible, interactive learning environments, which

aligns with findings by Garcia and Thompson (2024) on the role of tech-integrated instruction.

Alongside this, instructors highlighted the value of peer learning, where students work collaboratively in pairs or groups to share insights, which supports Johnson and Rivera's (2023) findings that peer collaboration enhances critical thinking and mutual respect.

Professional development was also identified, albeit less frequently, as essential, with instructors noting the benefit of sharing teaching strategies. This reflects Vinokur's (2024) recommendation that sustained mentorship and continuous learning improve teaching efficacy and student outcomes. The importance of positive classroom culture was noted through responses emphasizing unity and inclusiveness, helping foster the interpersonal environment necessary for effective collaboration and communication. Teachers also emphasized maximizing the use of LMS platforms, particularly Canvas, to support digital communication and organize creative learning activities—an approach supported by Mahdi (2023), who noted that LMS use improves learner motivation and comprehension.

Other unique strategies included team teaching and strategic timing of instruction, such as giving reminders or instructions before dismissal, reflecting thoughtful time and content management in course delivery. The use of critical thinking activities such as situational-based or open-ended questions was also common. These approaches promote analytical skills and align with De Leon's (2025) call for deeper integration of critical questioning in the PATHFIT curriculum.

Similarly, instructors encouraged creative student outputs, including designing routines and personal projects, as a way to foster autonomy and motivation—an approach supported by Upadhyay (2024), who emphasized the value of personalized learning.

Instructors also stressed the importance of clear and consistent communication strategies, using platforms like Canvas and Zoom to engage students effectively.

Notably, the most frequently mentioned strategy was group work and collaboration, which involved structured team-based learning and peer support. According to Johnson and Rivera (2023), such collaborative environments significantly improve student retention and engagement. Related to this were strategies focused on analytical and reflective tasks, including structured reflections and post-activity analysis, which help develop metacognitive skills and encourage deeper learning.

Hands-on and experiential learning also stood out, with strategies such as learning by doing, live demonstrations, and physical tasks reflecting the active nature of PATHFIT courses. These experiences not only promote engagement but also develop all four core skills simultaneously. Digital integration was further reinforced by instructors' reliance on various platforms to blend physical and virtual learning environments, allowing for dynamic, real-time collaboration.

The use of problem-based learning through real-world scenarios, especially related to fitness and health, provided opportunities for students to think critically and solve

meaningful challenges. Similarly, student-led projects, such as wellness campaign design or creating original assessment tools, were praised for fostering ownership and creativity.

Finally, the multiple intelligence approach was mentioned as a strategy for inclusivity, where instructors offered diverse activities to cater to different learning styles. This promotes engagement and encourages every learner to contribute uniquely to classroom activities.

Overall, these findings suggest that PE instructors are using a variety of innovative, learner-centered strategies to embed the 4Cs into their PATHFIT teaching. The implications are clear: for the 4Cs to be meaningfully integrated into physical education, institutions must support curriculum flexibility, ongoing teacher training, technology adoption, and inclusive, student-driven pedagogy. These strategies collectively contribute to a transformative learning environment that prepares students for lifelong personal and professional success.

#### IV. CONCLUSIONS

1. The results of this study clearly indicate that the 4Cs—Critical Thinking, Communication, Collaboration, and Creativity—are fully integrated into PATHFIT courses at the University of the Cordilleras, with an overall weighted mean of 3.48. The high level of integration reflects the institution’s commitment to developing holistic, future-ready learners through physical education.
2. Among the 4Cs, Collaboration had the highest mean, indicating that group work, cooperative tasks, and shared goals are core practices in PATHFIT instruction.
3. High scores in Creativity and Communication are attributed to the effective use of multimedia platforms, digital tools, and diverse teaching methods.
4. Despite overall strong integration, conflict resolution skills (3.49) and instructional methods (3.30) were the lowest-rated indicators, signaling areas for improvement.
5. Qualitative responses emphasized the need for ongoing curriculum updates to better align instructional design with evolving 21st-century competencies.
6. Experiential and problem-based learning, along with reflective tasks, effectively enhance the integration of the 4Cs by promoting practical application, critical thinking, and deeper understanding.
7. Teachers emphasized the need for inclusive teaching strategies and formal monitoring systems to ensure effective and continuous integration of the 4Cs.

#### V. RECOMMENDATIONS

1. *Sustain the full integration of the 4Cs by reinforcing existing instructional practices.* UC should continue to support the use of group activities, peer interaction, and student-led projects that promote collaboration, creativity, and communication.
2. *Promote collaborative learning structures.* Instructors should be encouraged to maintain and expand peer-led activities, team-based assessments, and cooperative fitness tasks that sustain high levels of engagement and social learning.

3. *Strengthen digital literacy and technology use.* Provide ongoing training on Learning Management Systems (e.g., Canvas) and communication tools (e.g., Zoom, Google Meet) to support tech-enhanced instruction.
4. *Enhance instructional methods and conflict resolution training.* Faculty development programs should focus on instructional design, classroom management, and social-emotional learning to improve conflict mediation and effective pedagogy.
5. *Sustain curriculum revisions aligned with 21st-century skills.* Encourage continuous review and innovation of PATHFIT syllabi, ensuring they reflect interdisciplinary, outcome-based learning models.
6. Encourage the use of real-world activities and reflective practices in PATHFIT courses to strengthen student engagement and cognitive development.
7. Implement multiple intelligence-based instruction and establish regular monitoring tools to assess and enhance 4C integration in PATHFIT courses.

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#### AUTHOR INFORMATION



Mr. Garickson I. Palao-ay is a Physical As an Education instructor at the University of the Cordilleras, he played a key role in the study titled "Strategic Teaching-Learning Activities in Integrating 4C’s in PATHFIT Courses." He took the lead in processing and communicating all necessary documents to the stakeholders involved in the research. Alongside his co-author, he facilitated the successful implementation of the study by designing the research instruments and overseeing the data collection process. Furthermore, he was responsible for analyzing the collected data and writing the results and discussion section, ensuring the research objectives were effectively addressed.



*Mr. Anaclito Almoite Jr.* During the implementation of the study. For this paper, he was responsible for interpreting the gathered data, as well as writing the results and discussion section.



*Dr. Marcelino M. Agnawa Jr.*, is one of the co-authors and also the research adviser of this study. He is currently the Program Chair of the Physical Education Department in the College of Teacher Education at the University of the Cordilleras. Through his expertise in research development, he guided the researchers in meeting the necessary requirements to begin the study. He also contributed to the completion of the research by referring experts to validate both the research instrument and the findings.