



Physical activity-based ice-breaking in guidance services: student engagement and career adaptability mapping

Actividades rompehielo basadas en actividad física en servicios de orientación: participación estudiantil y mapeo de la adaptabilidad profesional

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Abstract

Introduction: Guidance services require active strategies that help students engage with educational and career transitions. Physical activity-based ice-breaking may support readiness, motivation, attention, and peer interaction, but its role in career adaptability-oriented guidance remains underexplored.

Objective: This study described students' engagement in physical activity-based ice-breaking activities and mapped career adaptability needs using the 4C framework.

Methodology: A preliminary quantitative descriptive design was used with two independent datasets. In total, 228 students completed a 16-item Physical Activity-Based Ice-Breaking Engagement Scale, and 255 completed a Preliminary Career Adaptability Survey. Data were analyzed using descriptive statistics, Cronbach's alpha, and exploratory non-parametric comparisons.

Results: Student engagement was high ($M = 62.49$; $SD = 8.25$), with 68.9% in the high category. Affective/motivational engagement was highest, while social response and cooperation was lowest. The scale showed excellent internal consistency ($\alpha = .925$). Career adaptability mapping showed positive 4C tendencies but revealed needs in planning, decision-making, experiential exploration, and confidence-building.

Conclusions: The findings provide preliminary descriptive evidence for designing active, movement-based career guidance without establishing causal effects.

Keywords

Physical activity-based ice breaking; student engagement; career adaptability; guidance services; movement-based learning.

Resumen

Introducción: Los servicios de orientación requieren estrategias activas que ayuden a los estudiantes a afrontar las transiciones educativas y profesionales. Las actividades rompehielo basadas en actividad física pueden favorecer la disposición, la motivación, la atención y la interacción entre pares, aunque su papel en la orientación vinculada a la adaptabilidad profesional sigue siendo poco explorado.

Objetivo: Este estudio describió la participación de los estudiantes en actividades rompehielo basadas en actividad física y mapeó sus necesidades de adaptabilidad profesional mediante el marco 4C.

Metodología: Se utilizó un diseño cuantitativo descriptivo preliminar con dos conjuntos de datos independientes. En total, 228 estudiantes completaron una escala de participación de 16 ítems y 255 respondieron una Encuesta Preliminar de Adaptabilidad Profesional. Los datos se analizaron mediante estadística descriptiva, alfa de Cronbach y comparaciones no paramétricas exploratorias.

Resultados: La participación estudiantil fue alta ($M = 62.49$; $DE = 8.25$), con un 68.9% en la categoría alta. La participación afectiva/motivacional fue la más elevada, mientras que la respuesta social y cooperación fue la más baja. La escala mostró excelente consistencia interna ($\alpha = .925$).

Conclusiones: Los hallazgos ofrecen evidencia descriptiva preliminar para diseñar una orientación profesional activa basada en el movimiento, sin establecer efectos causales.

Palabras clave

Rompehielo basado en actividad física; participación estudiantil; adaptabilidad profesional; servicios de orientación; aprendizaje basado en el movimiento.

Introduction

Contemporary education increasingly requires learning and guidance experiences that are not limited to cognitive understanding, but also encourage students to participate actively, interact socially, and relate learning experiences to their future lives (Toding et al., 2026; Bhardwaj et al., 2025; Rivera & Garden, 2021). This orientation is particularly relevant in adolescence, when students are expected to understand themselves, negotiate peer relationships, and begin preparing for educational and career transitions. In this context, physical activity can be positioned not merely as sport performance or physical fitness, but as a pedagogical medium that supports motivation, attention, self-regulation, social interaction, and readiness to engage in developmental learning tasks (Latino & Tafuri, 2024; Ruhland & Lange, 2021; Saputra et al., 2026). Thus, the educational value of physical activity lies not only in bodily movement, but also in its capacity to create active, focused, and socially meaningful learning conditions.

Within school settings, guidance services play a central role in helping students understand themselves, explore future possibilities, make educational and career decisions, and develop confidence in facing transitions. However, these developmental tasks are often abstract and future-oriented, making them difficult for students to engage with through passive or purely verbal formats. From a physical activity and sport pedagogy perspective, guidance services may be strengthened through movement-based strategies that transform passive reflection into active, embodied, and socially meaningful participation (Bersan et al., 2024; Xiong et al., 2023). Nevertheless, career guidance is still frequently delivered through information-based sessions, lectures, discussions, or paper-based activities (Chen et al., 2022). Although these approaches may provide useful information, they do not always create sufficient student engagement, particularly when students are asked to reflect on personal goals, career uncertainty, and future decision-making (Liu et al., 2023; Hall et al., 2024).

Physical activity-based ice-breaking activities offer a potential bridge between the need for active participation and the reflective goals of guidance services. Ice-breaking activities are commonly used to reduce tension, build group readiness, and create a positive atmosphere at the beginning of a session (Liang, 2024). However, when these activities are intentionally designed through physical movement, they may do more than energize students. They can invite students to follow instructions, coordinate bodily responses, experience positive emotions, interact with peers, and become more prepared to engage in subsequent guidance tasks (Masini et al., 2022; Caracuel-Cáliz et al., 2025; Sortwell et al., 2024; Kolovelonis & Goudas, 2023). Therefore, physical activity-based ice breaking should not be understood merely as a recreational warm-up, but as a structured entry point for meaningful guidance activities.

Student engagement is particularly important in career guidance because the success of guidance activities depends not only on students' attendance, but also on their willingness to reflect, explore, communicate, and make meaning from career-related experiences (Maree & Magere, 2023). In this study, engagement is understood as a multidimensional construct that includes physical participation, affective-motivational involvement, cognitive attention, and social response/cooperation. These dimensions are highly relevant to guidance services for several reasons. Physical participation reflects students' readiness to become actively involved rather than remain passive recipients of information. Affective-motivational involvement indicates whether students feel comfortable, enthusiastic, and emotionally prepared to discuss personal and future-oriented issues. Cognitive attention shows whether students can follow instructions, understand activity rules, and connect the activity with guidance content. Social response and cooperation are especially important because guidance services often require peer interaction, listening, responding, sharing perspectives, and collaborative reflection. Thus, multidimensional engagement provides a useful lens for understanding whether physical activity-based ice breaking can support the psychological and social readiness needed in career guidance, not only in general physical education contexts (Reeve et al., 2025).

Career adaptability provides a conceptual framework for understanding students' readiness to face educational and occupational transitions. It is commonly explained through four dimensions: concern, control, curiosity, and confidence (Fu et al., 2023; Magnano et al., 2021). Concern refers to students' awareness of and orientation toward the future, while control reflects their responsibility and agency in shaping career decisions. Curiosity describes students' willingness to explore possible selves, educational pathways, and career environments, whereas confidence reflects their belief in their ability to solve problems and face career-related challenges (Pellegrino et al., 2025; Matijaš & Seršić, 2021). In the



context of school guidance, these four dimensions require more than the delivery of career information. They require students to imagine future possibilities, take initiative, communicate choices, explore alternatives, and build confidence through structured experiences. Movement-based group activities may provide opportunities for such processes by allowing students to practice decision-making, peer communication, exploration, initiative, and confidence in an active and socially situated format.

Although physical activity and movement-based learning have been widely discussed in physical education and sport pedagogy, their application in school guidance services remains limited. This limitation is important because guidance services address developmental issues that are not only cognitive, but also emotional, social, and future-oriented. Career guidance is still frequently delivered through verbal, informational, or paper-based formats, even though students often need more active and socially meaningful experiences to engage with future-oriented reflection. Similarly, ice-breaking activities are widely practiced in schools, but they are often treated as supplementary activities rather than as structured pedagogical tools. Empirical descriptions of their role in supporting career-related developmental processes remain scarce (Denault et al., 2019). This creates both a practical and theoretical gap: although physical activity-based ice breaking is commonly used as an energizing activity, its role as a structured pedagogical entry point for supporting student engagement and informing career adaptability-oriented guidance design remains insufficiently examined.

To address this gap, the present study analyzed two independent datasets. The first dataset described students' engagement in physical activity-based ice-breaking activities. The second dataset mapped students' career adaptability needs based on concern, control, curiosity, and confidence. Because the two datasets were independent and not collected from matched participants, this study does not claim causal effects or direct statistical relationships between engagement and career adaptability. Instead, it provides preliminary descriptive evidence that may inform the design of active guidance services integrating physical activity-based ice breaking with career adaptability development.

The objectives of this study were threefold: (1) to describe students' engagement in physical activity-based ice-breaking activities, (2) to examine the internal consistency of the Physical Activity-Based Ice-Breaking Engagement Scale, and (3) to map students' career adaptability needs based on the 4C framework: concern, control, curiosity, and confidence. The findings are expected to provide a preliminary empirical basis for designing active, movement-based, and socially meaningful guidance services, without positioning the present study as evidence of causal effectiveness.

Method

Research Design

This study employed a preliminary quantitative descriptive design. The quantitative approach was used because the study relied on numerical data collected through student surveys and analyzed using descriptive statistics and exploratory non-parametric comparisons (Creswell & Creswell, 2018). This design was selected because the study aimed to describe existing patterns of student engagement and map students' career adaptability needs before the development of a structured physical activity-based career guidance intervention. Descriptive studies are appropriate for describing the distribution and characteristics of variables without testing causal hypotheses (Aggarwal & Ranganathan, 2019), while descriptive analysis in educational research is useful for identifying contextual patterns and needs before designing further intervention studies (Loeb et al., 2017). As a preliminary study, the present research was intended to provide initial empirical information for future intervention development rather than to establish intervention effectiveness (Thabane et al., 2010; Leon et al., 2011).

Two independent datasets were used complementarily. The first dataset focused on students' engagement in physical activity-based ice-breaking activities, whereas the second dataset focused on students' career adaptability needs mapped onto the 4C framework: concern, control, curiosity, and confidence. The two datasets were not collected from the same matched participants and were therefore not used to test direct statistical relationships between engagement and career adaptability. Each dataset was analyzed separately. The integration of the two datasets was intended to provide a broader empirical basis for designing future movement-based career guidance interventions, not to establish causal or correlational conclusions.



In addition to descriptive analysis, exploratory non-parametric comparisons were conducted on the engagement dataset to examine whether student engagement scores differed across selected student characteristics. These analyses were treated as exploratory and complementary to the descriptive design. They were intended to identify preliminary group differences within the engagement dataset and were not used to infer causal effects. Therefore, the findings from these comparisons were interpreted cautiously and should be understood as exploratory group differences rather than evidence of causal relationships.

Participants

Participants were recruited using a non-probability purposive-convenience sampling procedure. This sampling approach was selected because the study required students who had access to, or experience with, learning and guidance activities relevant to physical activity-based ice breaking and career-related reflection. The participants consisted of Grade X–XII students from public and private senior high schools in Central Java, Indonesia. They were considered relevant to the study because students at this educational level are expected to begin developing career awareness, exploring future educational and occupational pathways, and preparing for career-related decision-making.

The first dataset involved 228 students who completed the Physical Activity-Based Ice-Breaking Engagement Scale. The respondents consisted of 133 female students (58.3%) and 95 male students (41.7%). This dataset was used to describe students' engagement in physical activity-based ice-breaking activities and to examine engagement differences based on selected characteristics, including gender, weekly physical activity frequency, and participation in physical activity or sport extracurricular programs. The second dataset involved 255 students who completed the Preliminary Career Adaptability Survey. The respondents consisted of 171 female students (67.1%) and 84 male students (32.9%). This dataset was used to map students' career adaptability needs based on the 4C framework.

The inclusion criteria were students who were enrolled in the target educational level, voluntarily agreed to participate, completed the online form, and provided responses relevant to the study focus. Responses were screened for completeness, duplication, participant eligibility, and invalid or inconsistent response patterns. No responses were excluded after screening because all submitted responses met the eligibility criteria; therefore, all responses were retained for the final analysis.

Table 1. Participant Characteristics of the Two Independent Datasets

Dataset	Study Focus	n	Gender Profile	Additional Participant Information
Dataset 1	Engagement in physical activity-based ice-breaking activities	228	Female = 133 students / 58.3%; Male = 95 students / 41.7%	Used to examine engagement profile, weekly physical activity frequency, and extracurricular physical activity participation
Dataset 2	Career adaptability mapping	255	Female = 171 students / 67.1%; Male = 84 students / 32.9%	Used to map career adaptability needs based on concern, control, curiosity, and confidence

The two datasets were analyzed separately according to their respective study focus.

Instruments

The Physical Activity-Based Ice-Breaking Engagement Scale was developed for the present preliminary study based on the multidimensional student engagement framework. The scale consisted of 16 items using a five-point Likert response format, ranging from 1 = strongly inappropriate to 5 = strongly appropriate. Student engagement has commonly been conceptualized as a multifaceted construct involving behavioral, emotional, and cognitive dimensions (Fredricks et al., 2004). In physical activity contexts, recent work on engagement in physical education has also emphasized the importance of measuring engagement through behavioral, emotional, cognitive, and agentic dimensions (Stringfellow et al., 2024). Therefore, the present scale contextualized behavioral engagement as physical participation, emotional engagement as affective/motivational engagement, and cognitive engagement as cognitive attention. The social response/cooperation dimension was added to capture peer interaction, responsiveness, initiative, and cooperation during group-based movement activities, drawing on literature that recognizes social and agentic dimensions of engagement (Joshi et al., 2022; Reeve & Tseng, 2011). The scale development process followed general recommendations for developing and validating scales in



social and behavioral research (Boateng et al., 2018). Because the instrument was developed for preliminary descriptive purposes, Cronbach's alpha was used to examine initial internal consistency, not to claim full psychometric validation.

The second instrument was the Preliminary Career Adaptability Survey. This survey was developed based on the Career Adapt-Abilities Scale framework proposed by Savickas and Porfeli (2012), which includes four dimensions: concern, control, curiosity, and confidence. These dimensions were used as the basis for developing descriptive indicators related to students' career planning, decision-making influences, career exploration, and perceived confidence. Although the survey was derived from the CAAS framework, it was not administered as the full standardized CAAS and was not interpreted as a standardized CAAS score. This was because the purpose of the preliminary phase was to map students' contextual career development needs as a basis for designing a future movement-based guidance intervention, rather than to produce standardized career adaptability scores. Students' responses were therefore analyzed descriptively and organized according to the four dimensions of concern, control, curiosity, and confidence.

Procedure

Data were collected through online forms between January and February 2026 as part of the preliminary study phase. The survey links were distributed with the assistance of school representatives and teachers, who coordinated student participation in the relevant learning or guidance activity context. To ensure response quality, the form used required-response settings, and all responses were screened for completeness, duplication, demographic eligibility, and unusual or inconsistent response patterns. The screening showed that all responses met the eligibility criteria; therefore, no responses were excluded, and all submitted data were included in the final analysis.

The first dataset was used to describe students' engagement in physical activity-based ice-breaking activities, while the second dataset was used to identify students' career adaptability profiles and developmental needs. Because the datasets were independent, no individual-level relationship between engagement and career adaptability was tested.

Data Analysis

Data analysis was conducted separately for the two independent datasets. For the first dataset, descriptive statistics were used to examine students' engagement in physical activity-based ice-breaking activities, including score range, mean, standard deviation, mean item score, response distribution, and engagement categories. Cronbach's alpha was calculated for the overall scale and each engagement dimension to provide initial evidence of internal consistency.

Exploratory non-parametric analyses were conducted on the engagement dataset to examine preliminary differences in engagement scores across selected student characteristics. Mann-Whitney U tests were used for two-group comparisons, including gender and extracurricular physical activity participation, while the Kruskal-Wallis test was used to compare weekly physical activity frequency categories. When the Kruskal-Wallis test indicated significant differences, post-hoc pairwise comparisons were performed using Mann-Whitney U tests with Bonferroni adjustment. The significance level was set at $p < .05$. These inferential analyses were treated as exploratory and complementary to the descriptive design; therefore, the results were interpreted as preliminary group differences and not as evidence of causal effects. Effect sizes were reported where appropriate to support interpretation beyond statistical significance.

For the second dataset, students' responses to the Preliminary Career Adaptability Survey were analyzed descriptively. The findings were organized according to the 4C framework: concern, control, curiosity, and confidence. Frequencies and percentages were used to describe students' career planning, decision-making influences, career exploration, and perceived confidence. The results were used to identify developmental needs that could inform the design of future physical activity-based career guidance services.

Ethical Clearance



Ethical approval was obtained from the Research Ethics, Community Service, and Publication Ethics Committee of the Faculty of Tarbiyah and Teacher Training, Ma'arif University, Lampung, under approval number No. 01/3370/UMALA/LPMNU/1/2026. Before completing the instruments, students were informed about the purpose of the study, the voluntary nature of participation, the anonymity of their responses, and their right to discontinue participation. No personally identifiable information was reported in the analysis or manuscript.

Results

Descriptive Profile of Physical Activity-Based Ice-Breaking Engagement

The results are presented in two main parts according to the two independent datasets used in this study. The first part reports students' engagement in physical activity-based ice-breaking activities. The second part presents the descriptive mapping of students' career adaptability based on the 4C framework. Because the two datasets were collected from different participants, the findings are reported separately and should not be interpreted as evidence of direct relationships between engagement and career adaptability.

In the first dataset, 228 students completed the Physical Activity-Based Ice-Breaking Engagement Scale. The results showed that students' engagement in physical activity-based ice-breaking activities was generally high. The total score ranged from 31 to 80, with a mean score of 62.49 and a standard deviation of 8.25. The mean item score was 3.91, suggesting that students' responses generally tended toward the "appropriate" category.

Out of 228 students, 157 students (68.9%) were in the high engagement category, 68 students (29.8%) were in the moderate category, and only 3 students (1.3%) were in the low category. These findings indicate that most students reported positive engagement with physical activity-based ice-breaking activities.

Table 2. Descriptive Statistics of Student Engagement

Aspect	Result	Interpretation
Number of students	228	Students completed the engagement scale
Score range	31–80	Empirical minimum and maximum scores
Mean score	62.49	High engagement tendency
Standard deviation	8.25	Moderate variation among students
Mean item score	3.91	Responses tended toward "appropriate"
High engagement	157 students / 68.9%	Most students showed high engagement
Moderate engagement	68 students / 29.8%	Some students showed moderate engagement
Low engagement	3 students / 1.3%	Very few students showed low engagement

Distribution of Student Responses

Across 3,648 item responses, the most frequent response was "appropriate," with 2,101 responses (57.6%), followed by "strongly appropriate," with 703 responses (19.3%). The combined positive responses reached 76.9%. Meanwhile, "hesitant" responses accounted for 18.1%, while negative responses were relatively low, consisting of 4.6% "inappropriate" responses and 0.5% "strongly inappropriate" responses.

Table 3. Overall Response Distribution

Response Category	Frequency	Percentage
Strongly inappropriate	18	0.5%
Inappropriate	167	4.6%
Hesitant	659	18.1%
Appropriate	2,101	57.6%
Strongly appropriate	703	19.3%
Total	3,648	100%

These findings show that students generally perceived physical activity-based ice-breaking activities as suitable and engaging. However, the presence of 18.1% hesitant responses also indicates that not all students responded with the same level of certainty, suggesting that differences in activity design, instruction clarity, or participation opportunities may require further attention.

Engagement Dimensions and Internal Consistency

The analysis of engagement dimensions showed that affective/motivational engagement had the highest mean score ($M = 4.03$), followed by cognitive attention ($M = 3.95$), physical participation ($M = 3.88$), and social response/cooperation ($M = 3.76$). This pattern indicates that students tended to feel happy, motivated, and attentive during physical activity-based ice-breaking activities, although their social responsiveness and cooperation were relatively lower than the other engagement dimensions.

The highest item score was found in the item "I feel happy when following movements together with friends" ($M = 4.18$), while the lowest item score was found in the item "I actively give responses during the activity" ($M = 3.55$). This result supports the dimensional finding that students' emotional involvement was stronger than their active verbal or social responsiveness.

Table 4. Engagement Dimensions and Reliability

Dimension	Mean	Cronbach's Alpha	Interpretation
Physical participation	3.88	.769	Students actively followed movement and instructions
Affective/motivational engagement	4.03	.841	Students felt happy, enthusiastic, and motivated
Cognitive attention	3.95	.797	Students paid attention and understood the rules
Social response/cooperation	3.76	.812	Students showed cooperation, but initiative and responsiveness need support
Overall scale	3.91	.925	Excellent internal consistency

The reliability analysis indicated that the Physical Activity-Based Ice-Breaking Engagement Scale had excellent internal consistency, as shown by the overall Cronbach's alpha value of .925. At the dimensional level, alpha coefficients ranged from .769 to .841, indicating acceptable to good internal consistency. These results suggest that the scale demonstrated adequate internal consistency for use in preliminary descriptive research.

Exploratory Group Comparisons of Engagement Scores

Exploratory non-parametric analyses were conducted to examine whether engagement scores differed based on selected student characteristics. These analyses were conducted only on the first dataset and were interpreted as preliminary group comparisons, not as evidence of causal effects.

Mann-Whitney U tests were used for two-group comparisons, including gender and extracurricular physical activity participation. The Kruskal-Wallis test was used to examine differences across weekly physical activity frequency categories. Because the Kruskal-Wallis test showed significant differences, post-hoc pairwise comparisons were conducted using Mann-Whitney U tests with Bonferroni adjustment.

Table 5. Exploratory Non-Parametric Test Results for Student Engagement Scores

Variable	Groups / Categories	Mean Score	Statistical Test	Result	Interpretation
Gender	Male	60.25	Mann-Whitney U	$U = 8014.00$; $p < .001$; $r_{rb} = .269$	Female students showed significantly higher engagement than male students
	Female	64.09			
Weekly physical activity	Never	54.95	Kruskal-Wallis H	$H(3) = 40.86$; $p < .001$; $\epsilon^2 = .169$	Engagement differed significantly across weekly physical activity categories
	1-2 times	61.71			
	3-4 times	66.51			
	>4 times	69.74			
Extracurricular physical activity	No	60.67	Mann-Whitney U	$U = 7954.50$; $p = .002$; $r_{rb} = .240$	Students involved in extracurricular physical activity showed significantly higher engagement
	Yes	63.94			

The exploratory comparisons showed statistically significant differences in engagement scores based on gender, weekly physical activity frequency, and extracurricular physical activity participation. Female students reported higher engagement than male students. Students who participated in extracurricular physical activity also showed higher engagement than those who did not. In addition, engagement scores increased across weekly physical activity frequency categories, from students who never engaged in weekly physical activity to those who engaged in physical activity more than four times per week.

These findings should be interpreted as exploratory group differences within the engagement dataset. They do not indicate causal effects of gender, weekly physical activity, or extracurricular participation on engagement.

Post-Hoc Comparisons for Weekly Physical Activity

Because the Kruskal–Wallis test showed significant differences across weekly physical activity categories, post-hoc pairwise comparisons were conducted using Mann–Whitney U tests with Bonferroni adjustment.

Table 6. Post-Hoc Pairwise Comparisons for Weekly Physical Activity

Pairwise Comparison	Adjusted p-value	Interpretation
Never vs 1–2 times	.008	Significant
Never vs 3–4 times	< .001	Significant
Never vs >4 times	< .001	Significant
1–2 times vs 3–4 times	.001	Significant
1–2 times vs >4 times	< .001	Significant
3–4 times vs >4 times	.910	Not significant

The post-hoc analysis showed that students who never engaged in weekly physical activity had significantly lower engagement than students who engaged in physical activity 1–2 times, 3–4 times, or more than four times per week. Significant differences were also found between students who engaged in physical activity 1–2 times per week and those who engaged 3–4 times or more than four times per week. However, no significant difference was found between students who engaged in physical activity 3–4 times per week and those who engaged more than four times per week. This result suggests that engagement scores tended to be higher among students with more frequent physical activity, but the difference appeared to plateau between the 3–4 times and >4 times categories.

Career Adaptability Mapping Based on the 4C Framework

The second dataset involved 255 students and was used to map students' career adaptability needs based on the 4C framework: concern, control, curiosity, and confidence. Because the Preliminary Career Adaptability Survey was used for descriptive mapping rather than standardized measurement, the results are presented as frequency-based descriptive findings.

To avoid mixing empirical data with interpretive conclusions, Table 7 presents only the descriptive findings for each dimension. Interpretive implications are presented separately after the table.

Table 7. Empirical Findings of Career Adaptability Mapping Based on the 4C Framework

Dimension	Descriptive Indicator	Frequency / Percentage
Concern	Students had clear career goals	38 students / 14.9%
Concern	Students had career plans that were not yet detailed	126 students / 49.4%
Concern	Students were still planning their future careers	78 students / 30.6%
Concern	Students had no career plan	13 students / 5.1%
Control	Career decisions were influenced by personal interests and talents	202 students / 79.2%
Control	Career decisions were influenced by career prospects and salary	132 students / 51.8%
Control	Career decisions were influenced by family advice	130 students / 51.0%
Control	Career decisions were influenced by information from teachers or school counselors	22 students / 8.6%
Curiosity	Students intended to seek further career information	201 students / 78.8%
Curiosity	Students had practical career-related experience	66 students / 25.9%
Curiosity	Students had no practical career-related experience	186 students / 72.9%
Confidence	Students felt that their personality matched certain career fields	203 students / 79.6%
Confidence	Students understood the educational and skill requirements of their preferred careers	201 students / 78.8%
Confidence	Students felt ready to face work challenges	203 students / 79.6%
Confidence	Students felt confident in their career choices	220 students / 86.3%



In the concern dimension, most students had begun to think about their future, but their plans were not yet fully concrete. Only 38 students (14.9%) reported having clear career goals, while 126 students (49.4%) had plans that were not yet detailed. In addition, 78 students (30.6%) were still in the planning stage, and 13 students (5.1%) had no career plan. This distribution shows that although most students had some orientation toward the future, many had not yet translated their aspirations into specific and structured career plans.

In the control dimension, students' career decision-making was most strongly influenced by personal interests and talents, as reported by 202 students (79.2%). Career prospects and salary were reported by 132 students (51.8%), while family advice was reported by 130 students (51.0%). In contrast, only 22 students (8.6%) reported that information from teachers or school counselors influenced their career decisions. This finding is notable because it suggests that formal school-based guidance sources were perceived by students as having a relatively limited influence on their career decision-making compared with personal, economic, and family-related considerations.

In the curiosity dimension, students showed a strong intention to seek further career information. A total of 201 students (78.8%) planned to search for additional information about careers. However, only 66 students (25.9%) reported having practical career-related experience, while 186 students (72.9%) had no such experience. This indicates a clear descriptive gap between students' intention to explore career information and their actual experiential exposure to career-related activities. The difference between students intending to seek information (78.8%) and students with practical experience (25.9%) suggests that students' curiosity was more strongly expressed at the informational level than at the experiential level.

In the confidence dimension, students generally showed positive self-belief. A total of 203 students (79.6%) felt that their personality matched certain career fields. In addition, 201 students (78.8%) understood the educational and skill requirements of their preferred careers, 203 students (79.6%) felt ready to face work challenges, and 220 students (86.3%) felt confident in their career choices. These findings indicate that students reported relatively strong confidence, although this confidence needs to be interpreted alongside the limited practical experience reported in the curiosity dimension.

Interpretive Summary of Career Adaptability Needs

Based on the descriptive mapping, several career adaptability needs can be identified. In the concern dimension, students need support in developing specific, realistic, and step-by-step career plans. In the control dimension, the relatively low influence of teachers and school counselors indicates the need to strengthen the visibility and role of school-based guidance in students' career decision-making. In the curiosity dimension, students' high intention to seek information but low practical experience suggests the need for more experiential career exploration activities. In the confidence dimension, students' positive self-belief should be supported through realistic information, direct experience, and structured reflection so that their confidence becomes more grounded in actual preparation.

Table 8. Interpretive Summary of Career Adaptability Needs

Dimension	Interpretive Summary
Concern	Students had begun to think about the future, but many still needed support in making specific, realistic, and step-by-step career plans.
Control	Students had personal bases for decision-making, but the low influence of teachers and school counselors suggests the need to strengthen formal guidance support.
Curiosity	Students showed strong informational curiosity, but their exploration remained mostly informational rather than experiential.
Confidence	Students showed positive confidence, but this confidence needs to be strengthened through realistic guidance, direct experience, and structured reflection.

Overall, Table 8 summarizes the main developmental needs identified from the descriptive career adaptability mapping. These needs highlight the importance of designing guidance activities that help students move from general career awareness toward more specific planning, informed decision-making, experiential exploration, and realistic confidence-building.

Discussion

The present study generated three main findings. First, students reported high engagement in physical activity-based ice-breaking activities. Second, social response and cooperation emerged as the lowest engagement dimension, indicating the need for more structured peer interaction to support active social participation. Third, the career adaptability mapping revealed developmental needs related to career planning, exploration, decision-making, and confidence-building. Taken together, these findings should not be interpreted as evidence of causal effects. Rather, they provide preliminary descriptive evidence that physical activity-based ice breaking may be considered a relevant design component for developing active guidance services aligned with the 4C framework.

The high level of student engagement supports the view that structured movement can be positioned as an educational medium beyond physical participation. The highest engagement dimension was affective/motivational engagement, indicating that students experienced enjoyment, enthusiasm, and positive emotional involvement during physical activity-based ice-breaking activities. In the context of career guidance services, this affective readiness is important because students are often asked to discuss personal goals, future uncertainty, and career-related choices. Nevertheless, given the descriptive preliminary design of this study, the finding should be understood as indicating a supportive learning atmosphere rather than demonstrating a direct effect of movement on students' career reflection. Movement-based ice breaking may therefore be considered a potential strategy for creating a more comfortable and emotionally supportive context before students engage in career-related tasks.

The cognitive attention dimension also showed a positive result, indicating that students were able to pay attention to instructions and understand the rules of the activity. This finding suggests that movement-based ice breaking does not necessarily distract students from guidance-related tasks when the activity is clearly structured (Ruhland & Lange, 2021; Mazzoli et al., 2021). However, the educational value of physical activity depends on instructional clarity. When movement activities are organized with explicit rules, purposeful tasks, and guidance-related objectives, they may help students remain attentive and prepared for the next stages of the guidance session (Omarov et al., 2024; Liang, 2024). Given the descriptive preliminary design of this study, these findings should be interpreted as indicating the potential usefulness of structured movement in supporting students' attention during guidance-related activities, rather than as evidence of a direct effect of movement on cognitive engagement.

Social response and cooperation obtained the lowest mean score among the engagement dimensions. This finding suggests that physical movement alone may not be sufficient to generate active social participation. Although students may enjoy moving together, they still need structured opportunities to respond verbally, take initiative, cooperate, and communicate during the activity. Therefore, physical activity-based ice-breaking activities should be designed not only to promote movement, but also to provide peer roles, rotating leadership opportunities, short verbal responses, and reflective group discussions. Such elements may help position movement-based ice breaking as a more structured social learning experience that encourages interaction, cooperation, and participation in guidance services (Suryadi et al., 2024; Silva et al., 2021).

The exploratory non-parametric comparisons showed that engagement scores differed significantly based on gender, weekly physical activity frequency, and extracurricular physical activity participation. Students who engaged in physical activity more frequently reported higher engagement scores, and students involved in sports or physical activity extracurricular programs also reported higher engagement than those who were not involved (Song et al., 2022; Antunes et al., 2024). However, because these analyses were exploratory and conducted within a descriptive preliminary design, the findings should not be interpreted as evidence that physical activity frequency or extracurricular participation directly caused higher engagement. Rather, they indicate preliminary group differences that may inform the design of future studies using stronger comparative, longitudinal, or experimental approaches.

The career adaptability mapping showed positive tendencies in concern, control, curiosity, and confidence, while also identifying several developmental needs that are relevant for designing physical activity-based guidance services. In the concern dimension, many students had career plans that were not yet specific. This finding indicates the need for guidance activities that help students move from general aspirations toward more concrete, realistic, and step-by-step career planning (Quinlan & Renninger, 2022; Gashi et al., 2023). Given the descriptive preliminary design of this study, physical activity-based



guidance should be understood as one possible design format to address this need, for example through career station movement, reflective walking, or movement-based planning tasks. However, the effectiveness of these strategies still needs to be examined in future intervention studies.

In the control dimension, students' career decisions were mostly influenced by personal interests, career prospects, salary, and family advice, whereas the reported influence of teachers or school counselors was only 8.6%. This finding is particularly noteworthy because it suggests that school-based guidance may not yet be perceived by students as a major source of support in career decision-making. The low percentage should not be interpreted as evidence that teachers and counselors have no role in students' career development. Rather, it indicates the need to make guidance services more visible, accessible, and actively connected to students' decision-making processes. This has important implications for guidance practice because career control is closely related to students' agency, responsibility, and ability to make informed choices. When school counselors are less visible in this process, students may rely more heavily on personal preferences, family expectations, or economic considerations, which may not always be accompanied by sufficient structured reflection.

The 8.6% finding also raises practical questions about how guidance services are communicated, accessed, and experienced by students. Rather than indicating the absence of school guidance, this result suggests that career guidance may need to become more visible, personally relevant, and participatory from the students' perspective. School counselors may therefore strengthen their role as facilitators of active decision-making experiences, not only as providers of career information. Physical activity-based guidance may offer one possible entry point by creating participatory formats in which students move, choose, discuss, justify, and reflect on career-related decisions, although this possibility still requires further empirical testing (Collins et al., 2024; Wangid et al., 2025).

In the curiosity dimension, students showed a strong intention to seek career information, but many had limited practical career-related experience. This descriptive gap suggests that students' curiosity was more informational than experiential. In other words, students appeared interested in learning more about careers, but they may not yet have had sufficient opportunities to experience, simulate, observe, or reflect on career-related situations directly. Future guidance activities may therefore consider career simulations, career station games, role play, peer discussion, and reflective movement tasks as possible ways to provide more experiential forms of exploration (Soliman et al., 2020; Kizys et al., 2025). These strategies should be interpreted as design implications derived from the descriptive findings, rather than as intervention effects demonstrated by the present study.

In the confidence dimension, students showed relatively positive readiness and belief in their career choices. However, this confidence should be interpreted carefully in relation to the limited practical experience reported in the curiosity dimension. Students may feel confident in their preferred career choices, but such confidence may remain general if it is not supported by realistic information, direct experience, and guided reflection. In physical activity-based guidance services, confidence may be explored through movement-based tasks that ask students to make choices, take roles, solve career-related challenges, and explain their decisions to peers. Without sufficient information, practice, and reflective feedback, students' confidence may not yet be fully grounded in actual career preparation (Kleine et al., 2021; Liu et al., 2022).

Taken together, the findings suggest that physical activity-based ice breaking can be considered a potential active entry point for career guidance services (Ruhland & Lange, 2021; Wang et al., 2024). However, because the two datasets were independent, the present study cannot establish a direct statistical association between student engagement and career adaptability. The findings should therefore be understood as a preliminary basis for designing more active and structured guidance formats. Students' positive responses to movement-based engagement, together with the identified career adaptability needs, indicate that future guidance activities may incorporate career stations, movement-based decision tasks, short challenges related to educational pathways, peer discussion, and reflection on concern, control, curiosity, and confidence. In this sense, physical activity is proposed as a possible pedagogical component within career guidance design, rather than as an established mechanism for improving career adaptability (Ojala et al., 2023).

Implications for Physical Activity-Based Guidance Services



The findings have several implications for the design of guidance services. First, school counselors may consider physical activity-based ice-breaking activities as a way to support students' readiness before career guidance sessions. Second, these activities should be intentionally connected to career development goals rather than used only as warm-up activities. Third, activity design should address the four dimensions of career adaptability: future planning, decision-making responsibility, career exploration, and confidence-building.

In practice, counselors may consider several possible activity formats, including career station movement, where students move between career option stations; decision-making corners, where students choose and justify career-related decisions; reflective walks, where students think about future goals while moving; role-play relays, where students act out career scenarios in groups; and career exploration circuits, where students complete short movement-based tasks related to different career pathways. These formats are proposed as preliminary design implications based on the descriptive findings and should not be interpreted as tested intervention models within the present study.

These activity formats are particularly relevant because the lowest engagement score was found in social response and cooperation. This finding suggests that physical activity-based guidance should not only promote movement, but also provide structured opportunities for peer interaction, verbal response, collaboration, and reflection. For instance, counselors may assign students to small groups, provide movement-based career challenges, ask them to explain their choices, and guide them to reflect on the meaning of the activity. Such structured interaction may support the development of ice-breaking activities into social learning experiences that encourage active participation in career guidance, although this implication still needs to be examined in future intervention studies (Ahadinasrikin et al., 2021; Wang et al., 2024).

Therefore, physical activity-based ice-breaking activities can be considered as part of an integrative career guidance strategy. In addition to movement-based engagement, counselors may incorporate digital career information, culturally relevant reflection, and direct exploration activities to make the guidance process more adaptive and meaningful for students. This is consistent with Setiawan et al. (2026), who emphasized that technology-based, culture-based, and experiential career guidance strategies are important for supporting students' career readiness in secondary schools.

Implications for Sport Pedagogy and Interdisciplinary Practice

Although this study was conducted within the context of guidance services, its findings are relevant to sport pedagogy and physical activity-based education. The results suggest that structured movement may support more than physical participation. It may also be associated with motivation, attention, social interaction, and reflective learning. In this sense, the study extends the discussion of physical activity beyond Physical Education settings by showing its potential relevance for student developmental services and career guidance. Physical activity can therefore be positioned not only as a tool for fitness or motor engagement, but also as a possible medium for broader educational and psychological development (Wahyudin et al., 2026).

The integration of movement into guidance services also supports interdisciplinary practice. Physical activity-based ice breaking can connect principles of Physical Education with counseling and career development goals. This interdisciplinary transfer is supported by studies on classroom-based physical activity, active breaks, and movement-based learning, which show that physical activity can be integrated into non-Physical Education contexts to support students' attention, on-task behavior, engagement, and readiness for learning tasks (Ruhland & Lange, 2021; Mazzoli et al., 2021; Masini et al., 2022). In the context of guidance services, this evidence suggests that movement-based activities may be adapted beyond sport or fitness purposes and used as structured pedagogical tools to facilitate emotional readiness, peer interaction, reflection, and career-related participation. Such integration may help schools design more active, engaging, and student-centered guidance services, especially for adolescents who may respond better to experiential, movement-based, and peer-supported activities than to purely verbal guidance formats (Santos et al., 2022). However, given the descriptive preliminary design of the present study, this implication should be understood as a design direction rather than as evidence of an established intervention effect.



From an interdisciplinary perspective, the present study suggests that physical activity-based strategies may be transferred into guidance contexts when they are intentionally connected to developmental objectives. However, such transfer should not be assumed automatically. Movement activities need to be designed with clear pedagogical structure, explicit guidance goals, and reflective follow-up. Without these elements, physical activity-based ice breaking may remain only an energizing activity rather than a meaningful component of career guidance. Therefore, the contribution of this study lies in identifying a possible bridge between sport pedagogy and guidance practice, while also indicating the need for stronger intervention-based evidence.

Limitations and Future Research

Several limitations should be acknowledged. First, this study used a descriptive preliminary design; therefore, causal conclusions cannot be drawn. The findings describe students' engagement and career adaptability needs, but they do not demonstrate that physical activity-based ice-breaking activities directly improve engagement or career adaptability. In addition, the engagement data and career adaptability data came from two independent datasets with different numbers of respondents. As a result, the relationship between physical activity-based ice-breaking engagement and career adaptability could not be tested directly at the individual level. Future studies should use matched datasets so that the relationship between engagement and career adaptability can be examined more rigorously.

Second, the career adaptability data were mapped descriptively onto the 4C framework and did not yet use a standardized career adaptability scale. Future studies should use validated career adaptability instruments, such as the Career Adapt-Abilities Scale or its adapted versions, to provide stronger psychometric evidence. The study also relied on self-report instruments and online responses, which may be influenced by students' subjective perceptions. Although no responses were excluded after screening, future studies should continue to apply rigorous eligibility checks, duplicate response detection, and response-quality controls. Combining self-report data with observation, teacher or counselor ratings, and behavioral indicators of participation would also strengthen the validity of future findings.

Third, this study did not include a control group or a comparison group of students who did not participate in physical activity-based ice-breaking activities. Without a comparison group, it is not possible to determine whether the observed engagement patterns were specifically related to physical activity-based ice breaking or to other factors, such as the general guidance context, teacher facilitation, peer atmosphere, or students' prior interest in physical activity. Future research should therefore employ experimental or quasi-experimental designs comparing students who receive physical activity-based ice-breaking guidance with students who receive conventional guidance or non-movement-based ice-breaking activities.

Future studies should also consider pretest-posttest designs to examine changes in engagement and career adaptability over time. A stronger design may include three groups: one group receiving physical activity-based ice-breaking guidance, one group receiving non-physical ice-breaking guidance, and one group receiving conventional career guidance without ice-breaking activities. Such a design would allow researchers to examine whether movement-based ice breaking provides added value beyond ordinary guidance activities. In addition, future studies should include objective observation of physical activity engagement, fidelity checks of activity implementation, and standardized measures of career adaptability outcomes. Overall, future research should move from preliminary descriptive mapping toward matched, comparative, and intervention-based designs.

Conclusions

This study showed that students reported generally high engagement in physical activity-based ice-breaking activities within guidance-related contexts. Affective/motivational engagement emerged as the strongest dimension, indicating that students experienced enjoyment, enthusiasm, and positive emotional involvement during the activities. However, social response and cooperation obtained the lowest score, suggesting the need for more structured opportunities for students to respond, collaborate, communicate, and take initiative during movement-based guidance activities. The Physical Activ-



ity-Based Ice-Breaking Engagement Scale also demonstrated excellent internal consistency in this preliminary study, providing initial evidence of its usefulness for describing student engagement in movement-based guidance activities.

The career adaptability mapping indicated positive tendencies in concern, control, curiosity, and confidence, while also revealing developmental needs related to concrete career planning, informed decision-making, experiential exploration, and realistic confidence-building. The relatively low reported influence of teachers and school counselors in students' career decision-making further suggests the need to strengthen the visibility and role of school-based guidance services. Overall, physical activity-based ice-breaking activities may be considered a relevant design component for developing more active, reflective, and socially meaningful career guidance services. However, because this study used two independent datasets and a descriptive preliminary design, the findings should not be interpreted as evidence of direct relationships or causal effects. Future studies should use matched samples, standardized career adaptability instruments, control or comparison groups, and experimental or quasi-experimental designs.

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